

# Techniques

MARCH 2011

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## APPRENTICESHIPS



**The Value of  
Apprenticeship**

**A Look at DOL's  
Registered  
Apprenticeship**

**CTE and 21st  
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**"Toy Story 3":  
An Opportunity  
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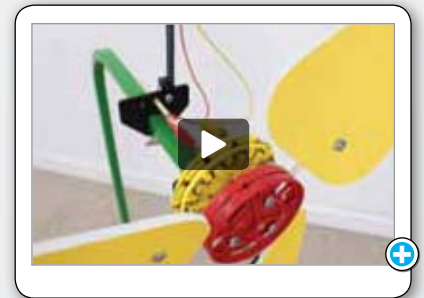
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CONNECTING EDUCATION AND CAREERS

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## Apprenticeships

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# The Value of Apprenticeships



Janet B. Bray

**I HAVE THE PLEASURE AND PRIVILEGE** of representing the Association for Career and Technical Education (ACTE) and its members on the Federal Advisory Committee on Apprenticeship. This committee consists of individuals from business, labor and the public sector and is charged with providing expertise, guidance, advice and recommendations to the U.S. Department of Labor on issues facing the Registered Apprenticeship (RA) Program.

RA offers an excellent opportunity for career and technical education (CTE) to continue to demonstrate its value to economic growth through the training of a relevant and skilled workforce. The topic of on-the-job learning has increasingly been raised during discussions about the position of the United States versus its global counterparts. Other countries incorporate on-the-job

learning (apprenticeships, co-op programs, internships) into their education and workforce systems. CTE and ACTE sit directly in the middle of the discussion as CTE connects education and the workplace and provides the relevant and practical training needed to fill the needs of the workplace.

RA is a system of public-private partnerships that provides structured, on-the-job learning to millions of individuals, qualifying them for lifelong careers. Historically, the RA program has focused on industries such as construction and manufacturing. Today, the RA program is branching out into health care, information technology, energy, telecommunications and more. RA helps to put the unemployed, youth and disadvantaged populations back to work. The issues being discussed by the Advisory Committee will sound very familiar to the CTE community:

- How to expand the program into new industries and professions.
- How to articulate RA between secondary, postsecondary and the workforce system.
- What should the pre-apprenticeship program look like and how to connect it to the education system.
- How to engage new business and industry partners.
- What is the appropriate role of the federal government?
- How to enhance the awareness of RA with potential students, sponsors and educators.

ACTE has a lot to offer as the dialogue around these issues continues. We intend to share the experience and expertise of the CTE community and help inform and shape the recommendations that are offered by the Advisory Committee. But we need your help. Is your institution engaged in the RA program? If so, how and what have been the results? Please send me (jbray@acteonline.org) any information you can share regarding your involvement with RA. Once again, CTE is at the heart of the dialogue on economic growth and the need for a skilled workforce. Regardless of the direction or focus of the dialogue, it always comes back to CTE.

*Janet B. Bray*

Janet Bray, Executive Director

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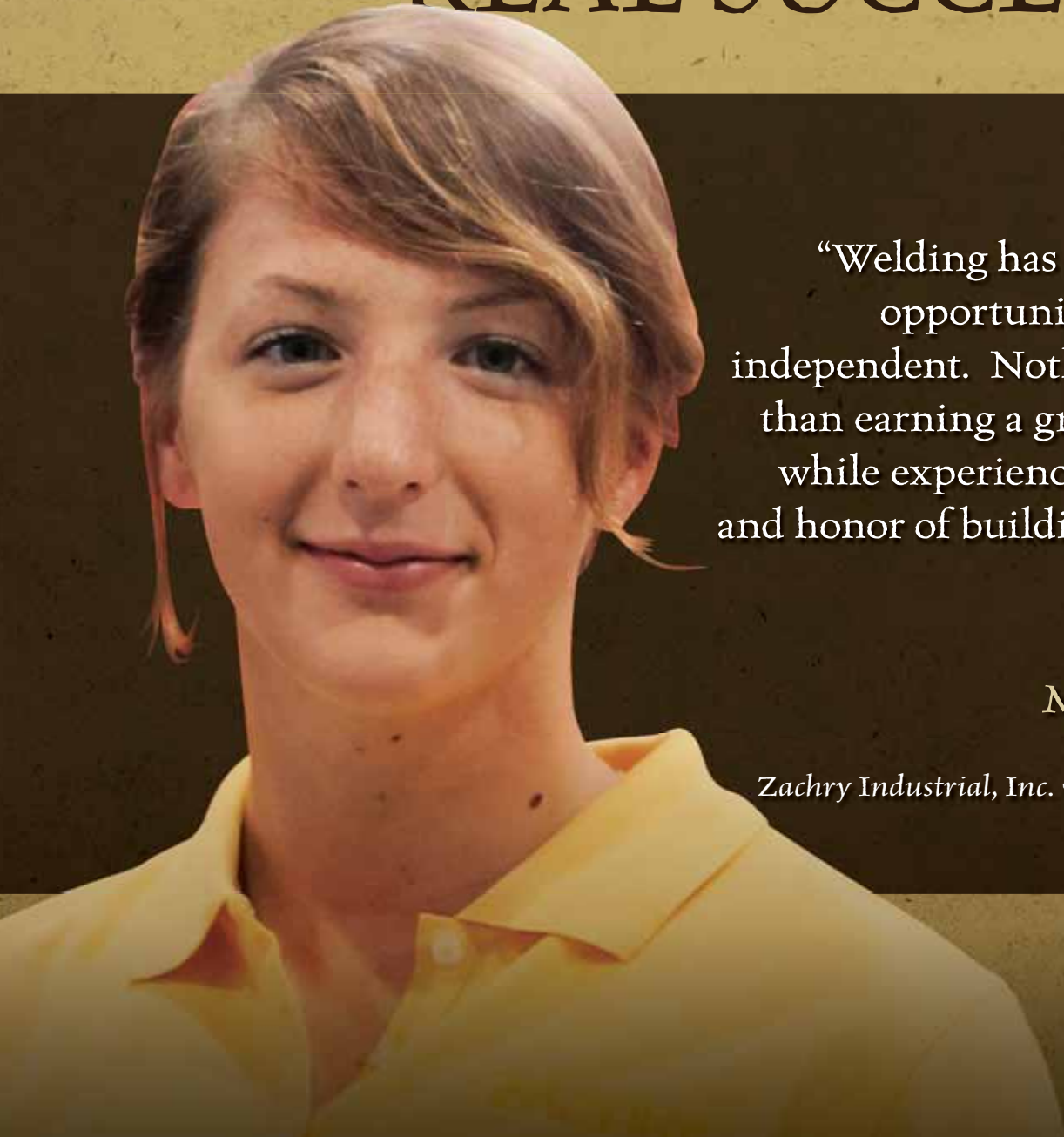
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# Funding Classroom Projects



PHOTO BY ISTOCK.COM

By Susan Reese

**PUBLIC SCHOOL TEACHERS IN THE UNITED STATES SPENT** more than \$1.33 billion out of pocket on school supplies and instructional materials in the 2009-2010 school year, according to the National School Supply and Equipment Association, which reports that teachers spent more than \$350 on average from their own income on material for their classrooms. With school budgets growing even tighter due to our ongoing economic woes, teachers are likely to continue digging into their own pockets to purchase

these supplies; however, there are a number of other options available to teachers for funding their classroom projects.

## Donations

Sometimes teachers have great ideas for projects, but they don't have the money to implement them. One of the best places to turn for help is Donors Choose. This online charity describes the way it works as "citizen philanthropy." On the site, public school teachers from all over the country post classroom project

requests—ranging from books, musical instruments and technology, to field trips and class visitors. Potential donors browse the projects and select ones they find inspiring, and then donate to them in any amount. When a project reaches its funding goal, the materials are delivered to the school.

Since its founding in 2000—by a teacher of course—more than 170,000 projects have been funded and more than \$70,000,000 dollars donated. Among the projects currently posted on the site are



a number in culinary arts, including one for high school students at a school for the deaf and blind. A middle school teacher in a program that has been designated as career and technical education needs flip cameras to help her students with their presentation skills. A charter high school teacher needs a laptop for her students to build their business and entrepreneurial skills.

Donors Choose has an impressive list of supporting partners, including American Express, Chevron, HP, Disney, and the Bill and Melinda Gates Foundation.

Another nonprofit organization helping teachers and schools with donations is ClassWish. On this site, a teacher can create a “wish list” of supplies he or she needs for the classroom. A search tool on the site allows parents, alumni and other supporters to find a school and see exactly what is needed, and then they can make a contribution to help with the funding.

ClassWish offers options for contributing, such as workplace giving, businesses and community organizations “adopting” schools, and even eBay sellers donating percentages of their sales proceeds to their favorite schools and classrooms.

The National Teacher Registry is also a free service for schools and teachers, and it works in a similar way to registering for a wedding or baby shower. It is open to pre-schools, elementary, middle and high schools, as well as to colleges. Teachers create individual registries, and schools can add a National Teacher Registry link to their Web sites to provide information to parents and other supporters. The products available from the registry include books, multimedia, lab equipment and supplies, and safety equipment.

## Grants and Awards

Sometimes funding is offered through an industry-based organization, so teachers may want to explore whether there are grants or awards available from an organization representing the field they

teach. For example, the Biotechnology Industry Organization sponsors a project called “What Can Biotech Do For You?” (WCBD4U). On the project’s Web site, teachers in biotech classrooms list their needs. Recent posts include lab thermometers for temperature experiments, microscopes and a PupilCam for science experiments, and camcorders to record experiments. Each month WCBD4U plans to donate \$250 to a biotech class as decided by popular vote on its Web site.

There also may be local funding opportunities, such as the Teachnet Grants offered through the Teachers Network to teachers in New York City. Among the recipients is Belinda David, a fashion design teacher whose students used everyday recycled materials to create a fashion collection in her project, Fashion Recycles (Expressing Global Environmental Awareness Through Fashion Design).

Teachers may also win grants for projects they have already initiated, such as the ING Unsung Heroes grant, a \$2,000 grant awarded to 100 finalists each year. In addition, the ING Educators Advisory Board selects three top winners for additional financial awards: \$25,000 for first place, \$10,000 for second place, and \$5,000 for third place. Among the 100 winners for 2010 were a construction project, a solar energy project, an agriculture education project, and an environmental and spatial technology project.

Grants.gov is the U.S. government’s central clearinghouse for information on more than 1,000 grant programs and provides access to approximately \$500 billion in annual awards. It’s a huge resource, but some people may prefer a source such as Grant Gopher, where you can search for grants available to nonprofit organizations by state, or read about new grant opportunities. The education section is easily accessed, and grants are categorized by elementary, secondary, classrooms, teachers and technology. There are also articles and news stories.

Teachers are often inventive when it comes to solving problems, and there is even a grant recognizing that ability. It’s from Lemelson-MIT and it is called the InvenTeams High School Invention Grant. Open to science, math and technology teachers, the grant rewards teams of teachers and students who invent technological solutions to real-world problems.

## Difficult Times, Creative Solutions

In these difficult times, creative solutions are often required, and funding classroom projects is one more area where teachers are actively and inventively finding ways to supply their students with the resources that will enhance their learning. ■

### Funding Resources

For more information about the funding opportunities discussed in this story, here are some Web sites to visit.

ClassWish  
<http://classwish.org>

Donors Choose  
[www.donorschoose.org](http://www.donorschoose.org)

Grants.gov  
[www.grants.gov](http://www.grants.gov)

Grant Gopher  
[www.grantgopher.com](http://www.grantgopher.com)

ING Unsung Heroes  
<http://ing.us/about-ing/citizenship/childrens-education/ing-unsung-heroes>

InvenTeams  
<http://web.mit.edu/inventeams>

National Teacher Registry  
[www.nationalteacherregistry.com](http://www.nationalteacherregistry.com)

What Can Biotech Do For You?  
[www.whatcanbiotechdoforyou.com](http://www.whatcanbiotechdoforyou.com)

Teachers Network  
<http://teachersnetwork.org>

**Susan Reese**

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# CTE and 21st Century Skills in College and Career Readiness

By Alisha Hyslop

**THE CONCEPTS OF COLLEGE AND CAREER READINESS** have become central to conversations about education reform efforts on the local, state and national levels. In October 2010, the Association for Career and Technical Education (ACTE), the National Association of State Directors of Career Technical Education Consortium (NASDCTEc), and the Partnership for 21st Century Skills (P21) came together to emphasize that career and technical education (CTE) and 21st century skills should be central components of these conversations. The groups assert, “States, districts and educators will be more effective if they take on the 21st century readiness challenge comprehen-

sively: the knowledge and skills embedded in CTE and the 21st century skills framework together provide the education system students need now.”

In the report “Up to the Challenge: The Role of Career and Technical Education and 21st Century Skills in College and Career Readiness,” ACTE, NASDCTEc and P21 explore shared understandings and common strengths of CTE and P21 efforts, emphasizing that: “Integrating 21st century skills and CTE into the entire education system will put more students on the path to success.” Consider the following excerpt from the report’s executive summary:

- College and career readiness is the new direction for K–12 education. Preparing students to transition, without remediation, to postsecondary education or to careers that pay a living wage, or both, is the ultimate aim of federal and state education policies, initiatives and funding.
- Very few K–12 schools can meet this goal for all students today. Most schools have neither the expectations nor the measures, neither the instructional programs nor the learning environments, to equip students with the knowledge and skills they need to compete and succeed in a global economy.
- This is all too evident in numerous and varied indicators, including increasing international competitiveness (both economic and educational); a lack of qualified workers and a skills imperative from employers; mediocre

student performance; an achievement gap and a dropout crisis in K–12 schools; and a proliferation of remediation in higher education.

## Creating a Better Path to College and Career Readiness

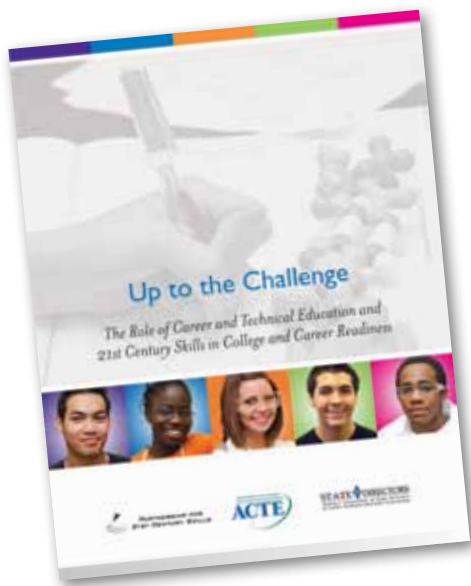
A comprehensive strategy to teach both knowledge and applied skills—including the “4 Cs” of critical thinking and problem solving, communication, collaboration, and creativity and innovation skills—is one that employers, educators and the public are ready to support. In addition, employers want prospective workers to acquire at least some level of industry-specific technical skills before they enter the workforce.

ACTE, NASDCTEc and P21 are essential partners in shaping a unified vision of college and career readiness. Our three organizations and the communities we represent share understandings that should inform the nation’s efforts to improve 21st century readiness.

Incorporating CTE and P21’s Framework for 21st Century Learning throughout the entire education system will help transform learning experiences and outcomes for all students. A unified vision of college and career readiness will empower every educational stakeholder to work more effectively in preparing all students to succeed. A more strategic alignment of CTE programs and the Framework for 21st Century Learning with the entire education system will help break down the silos among academic, CTE and 21st century initiatives, programs and teachers. Making these connections will



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**“A UNIFIED VISION OF COLLEGE AND CAREER READINESS WILL EMPOWER EVERY EDUCATIONAL STAKEHOLDER TO WORK MORE EFFECTIVELY IN PREPARING ALL STUDENTS TO SUCCEED.”**

position CTE as a premier course of study for college and career readiness for all, not just some, students.

Many CTE educators believe that fostering 21st century skills is a real strength of their programs—and one that is not inherent in many traditional education systems. A more intentional focus on the full range of 21st century skills by CTE program leaders and practitioners—and by all education leaders and practitioners—will improve results in programs that do not yet teach these skills comprehensively.

Together, ACTE, NASDCTE<sub>c</sub>, P21 and the communities we represent have much to learn from one another—and much to contribute to all of education.

### Recommendations for Education Leaders

In order to capitalize on the synergies between 21st century skills and CTE to promote college and career readiness, “Up to the Challenge” presents discrete recommendations to policymakers, CTE and P21 advocates, and education leaders. Specific recommendations to education leaders focus on building the infrastructure, programs and relationships that support 21st century readiness:

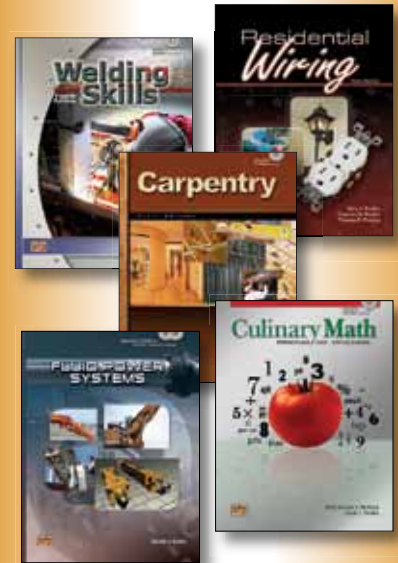
- Close skill gaps by providing students of all ages with access to education that delivers the knowledge and skills necessary to be highly competitive in the labor market.
- Partner with business and industry organizations to develop and implement rigorous programs of study that integrate academic subjects, 21st century skills, and technical knowledge and skills.
- Support professional development and professional learning communities that foster collaboration between CTE and other educators, as well as administrators.
- Support policies that require all students to have a personalized learning plan that clearly maps out a comprehensive strategy to achieve their education and career goals.
- Partner with business and industry organizations to ensure that performance assessments and credentials earned by students reflect mastery of 21st century skills.

You can access a copy of the full report and recommendations by downloading the publication from the ACTE Web site at [www.acteonline.org/reports.aspx](http://www.acteonline.org/reports.aspx). **IT**

**Alisha Hyslop**

is assistant director of public policy for ACTE. She can be contacted at [ahyslop@acteonline.org](mailto:ahyslop@acteonline.org).

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# The Workforce Investment Act: Important but Neglected Law

By Jamie Baxter

**FUELED BY PROMISES MADE DURING THE CAMPAIGN** related to job creation and economic recovery, perhaps the 112th Congress will finally consider the reauthorization of the country's largest job training program, the Workforce Investment Act (WIA). The WIA legislation expired in 2003, yet Congress has not reauthorized the law. With more workers than ever entering the WIA system, there is a need to amend and renew this legislation to ensure that all potential workers are equipped with the training and tools necessary to sustain a living.

In an effort to streamline and strengthen the country's job training system, Congress passed WIA in 1998 as a replacement of the Job Training Partnership Act (JTPA). WIA intended to create a locally integrated "One Stop" delivery system of multiple employment services, job training and education programs. This system was designed to be universally accessible to job seekers, and to meet local industry demands in communities across the country. WIA mandated the participation of partner agencies and other programs that provide such services, including the Perkins program. While these provisions sound good on paper, on the ground, the program has faced many challenges.

Recently, with high unemployment, WIA has had many difficulties meeting the current demand and providing quality training to workers in emerging and expanding fields. In the American Recovery and Reinvestment Act (ARRA) Congress provided a few revisions and additional funds for WIA programs. The

**"THERE IS OPTIMISM THAT WITH THE NEW CONGRESS DISCUSSING JOBS AND JOB CREATION THAT THIS COULD BE THE TIME TO PASS A NEW WIA BILL."**


stimulus package provided \$3.95 billion for various WIA programs. Within those funds, \$1.45 billion was dedicated to states for dislocated workers programs, \$1.2 billion for youth training programs (the maximum age for these programs was also increased from 21 to 24), \$750 million for competitive grants for worker training and placement programs in high-growth and emerging sectors, \$50 million for Youth Build, and \$500 million for WIA grants for adult training services. Although most of this money has been spent, it is promising that Congress sees WIA as a necessary component to worker training and economic recovery.

In hopes of its reauthorization, the Association for Career and Technical Education (ACTE) and the National Association of State Directors of Career Technical Education Consortium have developed recommendations for changes to WIA. You can view them on ACTE's Web site, but the overarching principles are:

1. Increase access to quality training, to ensure that workers are being trained for high-demand, high-wage careers.
2. Strengthen connections between education and workforce development systems, to ensure that all stakeholders at the state level are

- actively involved in worker training.
3. Address administrative and infrastructure challenges to ensure that funds are guaranteed for WIA services and coordination within the WIA program.

ACTE shares these recommendations with Capitol Hill staff on a regular basis to encourage their movement on this legislation. In recent years, Congress has held numerous hearings and listening sessions, and has introduced individual bills on some WIA programs, but a comprehensive bill has not been introduced. There is optimism that with the new Congress discussing jobs and job creation that this could be the time to pass a new WIA bill. However, Congress has many other items on its agenda, so WIA may be pushed to the back burner.

ACTE tracks WIA work and movement very closely. If you work within a WIA program, and would be interested in serving on ACTE's WIA Task Force, please contact me at [jbaxter@acteonline.org](mailto:jbaxter@acteonline.org). For more information on the WIA program, please see ACTE's Web site at [www.acteonline.org/wia.aspx](http://www.acteonline.org/wia.aspx). 

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 You can read more about ACTE's policy activities and the latest happenings in Washington, D.C., on ACTE's CTE Policy Watch blog. Check it out today at [www.acteonline.org/ctepolicywatchblog.aspx](http://www.acteonline.org/ctepolicywatchblog.aspx).

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# An Interview with Gary Weese, ACTE's 2011 Teacher of the Year



Gary Weese was awarded the distinction at ACTE's Annual Convention and Career Tech Expo in Las Vegas last December.

**ACTE:** Tell us about being ACTE's 2011 Teacher of the Year?

**GW:** It's awesome. I wasn't expecting to achieve such an award at this time in my life, especially in teaching. I've been involved in everything else, and I've only been teaching for 12 years. It was just a great award for me to go with all the awards in 2010 that our program has been able to achieve.

**ACTE:** Give our readers a rundown of your biography.

**GW:** I grew up in West Virginia. Then I got into the Air Force and I ended up in Shreveport, Louisiana. At that time, I had my own automotive repair business.

My family basically has come back in, come out of retirement—at least my wife did—in order to run the business, so that I can go teach. I've always been on the Vocational Advisory Council for Caddo Parish, and been very involved with students at that level—especially with DECA. Whenever they asked me to teach, I went to my family and told them that I was interested in doing it. My oldest son said, "Go ahead, Dad. I'll run the family business, and mom can help me and we'll go from there." So, he took over the family business. I still go by and talk to him and help him out all I can each day and also the days I have

off from school. My wife probably made the biggest sacrifice because she was semi-retired.

**ACTE:** Tell us about coming from industry into teaching? What do you think about that as a pathway for CTE teacher education?

**GW:** I think that's the best way to do it. When you're in business, you can see what is needed for someone to be a better employee for you. You can see what you need to train these young people in, in order to increase their employability skills. Also, when you're in business, particularly in the area where you're teaching, you have already made certain contacts out there. That's one thing I can say about our program. And it didn't happen overnight, of course, but we have a very, very strong business and education council that is involved with our automotive program. We use the AYES model to help benefit everybody else. There are several functions that we've done through our AYES Business and Education Council that includes the entire school.

**ACTE:** What did you do to turn the school's hobby shop into an AYES program?

**GW:** Ms. Flowers—the principal who hired me—had already looked into National Automotive Technicians Education Foundation certification. What that entity does is to certify a program. There are 10 different standards that programs are evaluated on and there is a tremendous amount of paperwork involved; there is also a team coming to review the paperwork and the training at the facility. They make sure that the instructors are certified through ASE, an

organization that controls the certification for technicians in the automotive field. We got the program to the point that we could do that, and I'm proud to say we were told that we were the first program to ever achieve a perfect score.

**ACTE: What tips do you have for new teachers entering the profession that could help them to be leaders in the field?**

**GW:** You're going to find out in the first couple years whether you really like it or not. If you're passionate about it, I think that you'll find a way to make yourself excel for the benefit of the students. Now, I will say this: a good mentor is worth his or her weight in gold. With being a part of ACTE, I will say Cheryl Probst from Louisiana was my mentor. She showed me the way and helped me be successful within ACTE and Louisiana ACTE. As far as being a teacher, my mentor was Gayle Flowers, who was my principal and set the example for me to follow. That's one thing that I try to do every day—show my professional self to the students. At the same time, you're setting the example for them to follow.

**ACTE: Do you have any plans yet during your tenure as Teacher of the Year? Any activities that you know you'll be participating in?**

**GW:** I am already making a presentation at the Region IV conference. Being a part of the AYES program at the national level as well as the state level, I will make a presentation at the AYES conference. As a matter of fact, it'll be a continuation of what we did last year, which is the AYES Blues Brothers. If you're having fun and enjoying things you just keep going, right? No one likes to take a class that's not fun. Now sometimes I can't deliver the fun on some of the things you've got to teach. But I strive to do it every day. Even we as adults sometimes lose track of what fun is. With the AYES Blues Brothers presentation, I give a quick analysis of whether or not you're having

fun, and if you're not, give some ideas about what you can do to have fun for yourself and at the same time, have fun in class with the students. **T**

To listen to the podcast of the full interview with Gary Weese, ACTE Teacher of the Year 2011, visit [www.acteonline.org/podcasts.aspx](http://www.acteonline.org/podcasts.aspx).

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# APPRENTICESHIP TRAINING?

BY MORGAN V. LEWIS AND JAMES R. STONE III

As America and the rest of the world struggle to regain robust economic growth, the importance of a well-educated workforce is receiving increased attention. In the United States, most of the emphasis is on moving young people to college in the belief that more education of any kind will lead to better labor market opportunity for young people. This focus on college ignores other pathways to success, such as apprenticeships. Apprenticeship is one of several approaches to work-based learning (WBL). Job shadowing is perhaps the most common approach to WBL with various forms of paid and unpaid internships, school-based enterprise, and cooperative education, as other alternatives.

Apprenticeships have all the features needed to prepare workers for occupations that require extended study to attain competence. Apprentices begin with relatively simple tasks and progress to those requiring more complex skills. Apprentices receive individualized instruction from workers who have demonstrated proficiency in what they teach. The procedures learned and equipment used are in the workplace, so there is no need to transfer what is learned in the classroom to what is done on the job. The work itself provides multiple opportunities to practice the skills being learned. Perhaps most inviting of all, apprentices are paid to learn.

A recent report from the Organization for Economic Cooperation and Development (OECD) titled *Learning for Jobs* shows

that beyond smoothing the transition from school to the workplace, WBL offers a powerful tool for increasing transferable soft skills critical to workplace success; these skills are largely ignored in more conventional school-based learning.<sup>1</sup> Studies of employers show that they strongly value soft skills like the ability to work in teams, communication skills, problem-solving, entrepreneurship and work discipline. But perhaps the most important value WBL provides is the opportunity to improve literacy and numeracy skills in a practical environment, an appealing alternative for those youth not inclined toward the more abstract pedagogies commonly used in school-based learning. Finally, and perhaps most germane to U.S. education debates,

“But perhaps the most important value WBL provides is the opportunity to improve literacy and numeracy skills in a **PRACTICAL ENVIRONMENT**, an appealing alternative for those youth not inclined toward the more abstract pedagogies commonly used in school-based learning.”

ILLUSTRATION BY RACHEL FLEMING

research by Bishop and Mane shows that countries in which high percentages of youth engage in intensive career and technical education (CTE) and WBL, like apprenticeships, have higher rates of school completion and participation in tertiary education than in nations like the United States in which such participation is low.<sup>2</sup>

Proponents of registered apprenticeship argue that the value of this kind of WBL comes from its formal and regulated structures. Apprentices sign formal contracts with their employers that spell out the terms of their agreements. These include skills to be learned, hours of on-the-job and classroom training to be provided, and pay increases to be received as the apprentices' skills improve. Information provided by the U. S. Department of Labor indicates that for the fiscal year ending September 30, 2009, the average starting wage for a registered apprentice was \$13.99 per hour, and the average wage at completion was \$25.82.<sup>3</sup>

The Office of Apprenticeship also reports that programs have been approved for more than 1,000 occupations.<sup>4</sup> Traditionally, the construction trades—such as carpentry, electrical, plumbing and masonry—enroll the largest number of apprentices, but opportunities are available in a wide variety of career areas,

including information technology, health, hospitality, retail, environmental protection and transportation.

To qualify for registration, an apprenticeship program must require a minimum of 2,000 hours of on-the-job and classroom learning, and most require considerably more. The average apprenticeship is four years in length. The traditional contract indicates hours of training, with the most common being 2,000 on-the-job hours and 144 classroom hours per year. About 10 percent of programs have moved to a competency-based system that describes the skills an apprentice must demonstrate and the ways in which these skills will be measured. Some programs, referred to as “hybrid,” specify the skills to be demonstrated and the minimum and maximum hours required to attain each competency. The minimum age to enter an apprenticeship is 16, with a minimum age of 18 for hazardous occupations.

### Limited Usage

Despite the many advantages of apprenticeship, relatively few workers in the United States receive this type of training. Many reasons have been offered for why apprenticeship has never been widely adopted here. Some scholars have traced the low usage as far back as the American Revolution, an era in which cultural

values emphasized equality and rejected relationships based on social status. Others have cited the appeal of the American frontier and the possibility of owning land rather than working for wages. More direct explanations have included the long periods of indenture required by apprenticeships, the difficulties of enforcing contracts, higher wages for factory work than those for paid apprentices, and the reluctance of employers to train young people who have not made a firm commitment to an occupation or who may take their skills to another employer.

At the present time, the main barrier to wider adoption of apprenticeship may be the many job changes that most young people make in their post-education years. During their initial years in the labor market, most workers change jobs several times as they seek the best match between their interests and abilities and the demands of different types of work. As they acquire more experience, their interests crystallize, their expectations adjust to the opportunities open to them, and they are less likely to change jobs. Although frequent job changes are part of the career development process, such changes cause employers to be reluctant to invest significantly in the training of young workers. This reluctance is reflected in the average age at which registered apprentices start their training—between 27 and 29.

## Youth Apprenticeships

There have been attempts to make apprenticeship more appealing both to young people and employers. During the 1990s, there was considerable interest in youth apprenticeships like those promoted by Stephen Hamilton in his book, *Apprenticeship for Adulthood* (Free Press, 1990), and in the pilot program he and his wife, Mary Agnes Hamilton, helped start. During the four years the Hamiltons studied the program, it enrolled a total of 100 students. It continues now at the Broome-Tioga Counties BOCES (Board of Cooperative Educational Services) in New York with an average yearly enrollment of about 30 to 35.

As in the case of the program started by the Hamiltons, youth apprenticeships persist in some states but with relatively few participants. Wisconsin was an early leader in this area. The state established youth apprenticeships in 1991 with the passage of state legislation to promote school-to-work initiatives.<sup>5</sup> In 1994, when similar federal legislation was passed, Wisconsin had youth apprenticeships in nine occupational areas enrolling 348 students. By 1999, the number of occupations had increased to 21 and enrollment was at 1,522. By 2002, one additional occupation had been added and enrollment reached a peak of 3,393. Two years later, after federal funding ended and state funding declined, enrollment dropped to 2,230. In 2005, enrollment was 1,944. In 2007 and 2008, the state increased funding, but enrollment fell further to 1,791. To put this number in perspective, during the 2007-2008 school year, the state's total 11th- and 12th-grade enrollment was 144,887. The number of youth apprenticeships represented about 1.2 percent of this total.

Georgia is another state that began youth apprenticeships in the early 1990s and has continued to strongly support them. In its report for the 2008-2009 school year, Georgia enrolled 7,129 students in its youth apprenticeship pro-

gram—3.5 percent of the total 11th- and 12th-grade enrollment.<sup>6</sup>

Although youth apprenticeships in the state enroll a low percentage of students, the employers who hire these apprentices are very satisfied with their performance. For the past six years, the Georgia Department of Education has surveyed employers and asked a series of questions designed to measure overall satisfaction with apprentices. Most of the employers who responded to the survey for the 2008-2009 school year, 91 percent or more, indicated that their apprentices perform at the level expected, have satisfactory communication, math, computer and problem-solving skills, and that their companies benefit from the program and would recommend it to others.

During the 1990s, the U.S. Department of Labor funded 15 youth apprenticeship demonstration projects and a four-year longitudinal evaluation of their implementation. The evaluators found wide variability in the amount of on-the-job learning across the sites.<sup>7</sup> Some consisted of only job shadowing, whereas others involved two full days of work per week. Only three of the 15 sites came near the goal of equally dividing the time in school-based learning and WBL. Barriers to more extensive involvement included child labor laws, aligning school and work learning, and scheduling and transportation for the time at school and at work.

Despite the variability in their worksite involvement, the participants in youth apprenticeships had positive attitudes about their experiences. They liked the project-based nature of their learning and the direct application of academic skills to real-world problems. They also saw the requirements for participation, such as a specified grade point average and few absences, as motivating them to work harder. Unfortunately, these features did not attract sufficient students to support the continuation of the demonstration projects.

## Pre-Apprenticeships

Even during the 1990s, when youth apprenticeship received the most interest, some critics claimed that because the programs were not registered with state or federal offices that they should not be called “apprenticeships.” That criticism has also been directed at programs labeled “pre-apprenticeships.” Pre-apprenticeships attempt to prepare participants for entry into employment that has a structured training component or further education and training. They do not focus solely on preparation for registered apprenticeships, however, which leads to the charge they should not be called pre-apprenticeships.

In 2009, the Aspen Institute conducted a survey of pre-apprenticeship programs that prepared participants for the construction industry.<sup>8</sup> They identified 260 programs that met their criteria, of which 236 provided information for the survey. The responses reflected a wide variety of services often directed to population groups that are underrepresented in construction occupations (*e.g.*, females). Among the types of training most frequently provided were safety, math/measurement, hand and power tool identification and use, introduction to the construction industry and one or more of its trades, and blueprint reading. Only 2 percent of the organizations conducting pre-apprenticeship programs were local school districts; 18 percent were post-secondary institutions. Almost half (44 percent) of the programs were offered by community-based organizations.

The respondents to the Aspen survey were asked to estimate the percentage of participants that completed their programs and how many were placed in registered apprenticeships, other construction jobs, and further education. Most programs reported that half or more of their participants completed their programs, but relatively few were placed in registered apprenticeships. The majority of programs (59 percent) placed

20 percent or less, and an additional 22 percent placed between 21 percent and 50 percent. Placement rates were a little higher for construction-related jobs and further education.

## Things to Consider

Apprenticeships have much to offer American youth and the American economy, but the results of past efforts to increase apprenticeships suggest that it is unlikely that high schools or community colleges could enroll large numbers. Apprenticeships can, however, provide a way to respond to labor market needs when there are too few opportunities for placement to warrant classroom-based training. The essential components, of course, are employers willing to enter into formal apprenticeship agreements with

students. Employers who are willing to do so should be encouraged to register their programs with state or federal Offices of Apprenticeship.

Programs with only one apprentice can be registered. If employers are unwilling to register a program, the school or college should ensure the program meets the standards for apprenticeships that have been established by these offices.

An individual who is knowledgeable about apprenticeships should coordinate the recruitment of employers and the development of program contracts. Anyone assigned these responsibilities should work closely with the state or federal offices to ensure that standards are met and efforts are not duplicated. Of course, the students who are placed in appren-

ticeships should demonstrate aptitude to learn the skills to be studied and a commitment to the occupations. An extended period of job shadowing should be required of all students expressing interest in apprenticeships to ensure they have a good understanding of the nature of the occupations they are considering. Nothing will kill an apprenticeship initiative faster than employer dissatisfaction with the students who are placed.

A survey of sponsors of registered apprenticeships suggests that there is potential for increasing the number of employers willing to become involved. The survey conducted in 2007 by the Urban Institute found a high level of satisfaction among sponsors.<sup>9</sup> Almost all (97 percent) said they would recommend apprenticeship to other employers, and almost as many (86 percent) said they would strongly recommend it. Virtually the same percentage (83 percent) replied that a “very important” benefit was that it helped them meet the need for skilled workers.

When asked about the costs and drawbacks associated with apprenticeships, about half the sponsors reported dropout rates, and other employers who hire away (poach) apprentices who have completed their programs. The responses in both these categories were about evenly divided among sponsors who considered these to be major or minor problems. Managing their programs and paperwork requirements were cited as major problems by less than 10 percent of sponsors and as minor problems by 30 percent or less. Over half of these respondents (53 percent) had small programs with only one to four apprentices. Slightly less than one-third (30 percent) had five or more apprentices and one-sixth (17 percent) had no apprentices at the time they responded to the survey.

Although the attitudes held by sponsors of registered programs may not be the same as the average employer, the results of this survey, like those from the

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employer surveys in Georgia, show that those who try apprenticeships like them. Apprenticeships can provide a way for educational institutions to meet the need for skilled workers and improve educational outcomes with no capital expenditure and minimal instructional costs. **I**

## Endnotes

- 1 The OECD's "Learning for Jobs" report is available from [www.oecd.org/edu/learningforjobs](http://www.oecd.org/edu/learningforjobs).
- 2 Bishop, J. H., and Mane, R. (2004). "The Impacts of Career-technical Education on High School Labor Market Success." *Economics of Education Review*, 23, 381-402.
- 3 Information on registered apprentices was provided by Michael Trupo, Office of Public Affairs, U.S. Department of Labor, in a personal communication dated September 22, 2010.
- 4 A full list of occupations for which apprentice programs have been approved is available from [www.iowaworkforce.org/apprenticeship/apprenticeableoccupations.pdf](http://www.iowaworkforce.org/apprenticeship/apprenticeableoccupations.pdf).
- 5 The information presented here is summarized from a Wisconsin Department of Workforce Development Web site [www.dwd.state.wi.us/youthapprenticeship/history.htm](http://www.dwd.state.wi.us/youthapprenticeship/history.htm).
- 6 Information on Georgia's Youth Apprenticeship program was provided by Dwayne Hobbs, Career, Technical, and Agricultural Education, Georgia Department of Education, in a personal communication dated October 12, 2010.
- 7 Silverberg, M., Bergeron, J., Haimson, J., and Nagatashi, C. (1996). "Facing the Challenge of Change: Experiences and Lessons of the School-to-Work/Youth Apprenticeship Demonstration" (Final Report). Princeton, N.J.: Mathematica Policy Research.
- 8 Aspen Institute. (2009). "Construction Pre-Apprenticeship Programs: Results from a National Survey". Washington, D.C.: Author.
- 9 The Urban Institute. (2009). "The Benefits and Challenges of Registered Apprenticeships: The Sponsors' Perspective." Washington, D.C.: Author.

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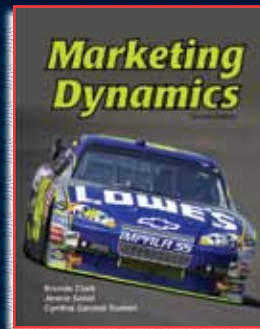
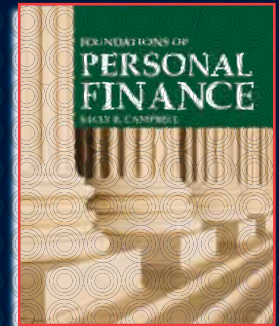
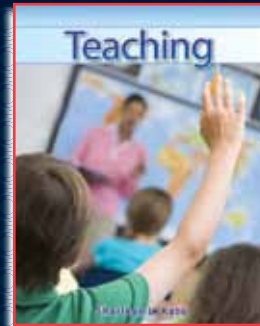
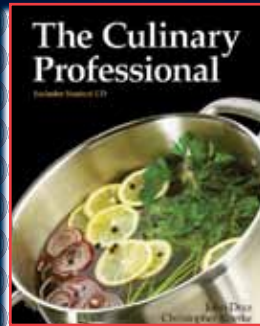
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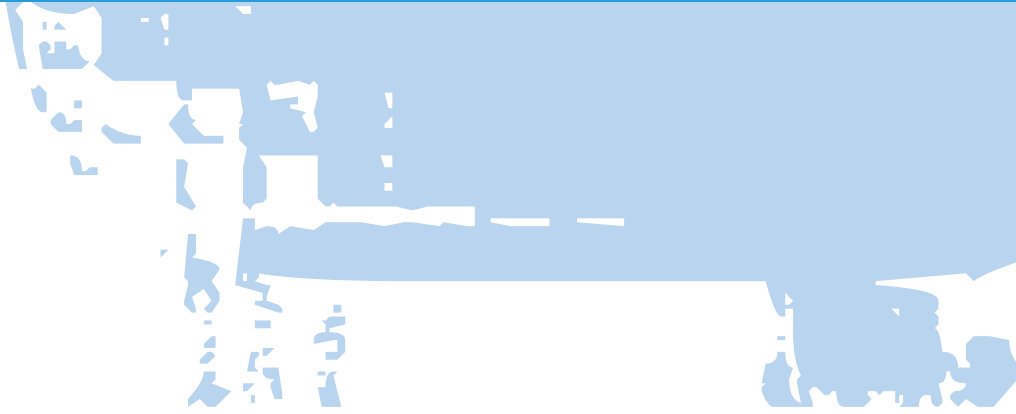


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REASONS

WHY REGISTERED APPRENTICESHIP  
WORKS!



**BY JANE OATES AND JOHN V. LADD**

**I**n an economy that has experts making comparisons to the Great Depression, everyone has a stake in finding new and innovative ways to help promote job creation and provide career pathways for underemployed and unemployed workers alike. Career and technical education (CTE) has never been more important for U.S. workers as businesses seek employees who are prepared to perform from day one. A degree no longer guarantees employment. Today, solid skills and credentials that prove that a worker has reached a certain level of skill attainment are the best way for a job seeker to catch an employer's eye. A potential strategy that can help expand and advance the efforts of CTE providers is one that offers high-level job training that doesn't just prepare you for a job; it *is* a job from day one. The solution may be collaboration with one of America's longest running, and most successful, career training models. The solution may be Registered Apprenticeship.

Registered Apprenticeship has long been known in the United States as a great training option for workers looking to learn a new skill and become an expert-level craftsperson in their trade. Be it traditional industries or those that are only now becoming better known, the ap-

prenticeship model has long been a part of the training strategies employers in the United States have relied on to prepare their workforce. Increasingly, this model offers workers a head start on their way to a lifelong career.

Entry into a Registered Apprenticeship program to support or directly follow completion of a CTE discipline is a great way for a worker to expand the array of "tools in their bag." Entrance into a Registered Apprenticeship program, coupled with graduation from a CTE program, has the potential to offer workers one of the best chances to enter a new career, learn new skills and provide an opportunity to see their wages grow as their skills increase.

Many people still only think of Registered Apprenticeship as an opportunity for young men who do not plan to attend college to learn new skills and enter a trade. Today's Registered Apprenticeship is much more. All Registered Apprenticeship programs have always required some classroom training, and today many programs often allow apprentices to earn college credits. Additionally, as Registered Apprenticeship continues to diversify and expand, underrepresented populations are finding increased opportunities and pathways into new careers. Registered

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**"Today, solid skills and credentials that prove that a worker has reached a certain level of skill attainment are the best way for a job seeker to catch an**

**EMPLOYER'S EYE."**

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apprenticeship offers these individuals access to both classroom and on-the-job training that give them the skills to succeed in sustainable careers.

Today's 21st century Registered Apprenticeship offers women the same opportunities for economic self-sufficiency. In traditional industries such as construction, as well as emerging industries such as advanced manufacturing, green-related technologies and health care, apprenticeship is an opportunity for women to access quality training that provides pathways to lifelong careers.

## Registered Apprenticeship is a Win-Win for All

Registered Apprenticeship, nearing its 75th anniversary as one of the premier training models used throughout U.S. industry, needs to be reconsidered in efforts that aim to help people, regardless of

age or work experience, embark on a solid career path. Registered Apprenticeship is a win-win for both U.S. workers and businesses. The program allows workers to pursue good jobs that pay good wages, while employers have access to well-trained, highly skilled employees. Why

Registered Apprenticeship? Why now? Let's explore 50,000 reasons Registered Apprenticeship works!

## 50,000 New Apprentices in the Last Six Months

Over the last six months, a time many experts say was one of the worst in terms of job creation, the National Apprenticeship system still registered more than 50,000 new apprentices (with approximately 100,000 registered in the last year). Remember that Registered Apprenticeship is an "earn while you learn" model that combines employment with on-the-job learning and related technical instruction. So that's 50,000 jobs! That's 50,000 jobs in a down economy. That's an average of nearly 1,000 jobs per state during a time when hiring has been slow and job opportunities have been scarce. The number of new apprentices registered over the past few years has averaged approximately 100,000, and reached as high as 200,000 as recently as 2007. And these are not just temporary jobs. These are well-paying, sustainable careers for workers that meet employers' needs for highly skilled, highly motivated and well-trained employees.

## 50,000 Credentials

During this same period, the Registered Apprenticeship system has been "graduating" an average of 50,000 apprentices who have successfully completed their program with an industry-recognized, nationally portable credential. As the economy improves, the number of apprentices completing their programs will increase, which results in a larger pool of skilled workers with nationally recognized industry certifications.

In today's competitive global economy, these certifications and credentials are increasingly important for U.S. workers to remain competitive. In President Barack Obama's inaugural address to Congress, he challenged every American "to commit to at least one year or more of higher

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**“Collaborations between the CTE community and Registered Apprenticeship can only increase a worker’s ability to**  
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education or career training. This can be community college or a four-year school; vocational training or an apprenticeship. But whatever the training may be, every American will need to get more than a high school diploma. And dropping out of high school is no longer an option.” Registered Apprenticeship helps workers meet that challenge.


**Value of RA Credential = \$50,000**

Finally, what is a Registered Apprenticeship credential really worth? Data shows that apprentices who complete their program earn on average more than \$50,000 per year. The average earning is actually \$54,000, with many earning much more. A recent study conducted for Washington State by the UpJohn Institute (Workforce Training Results Report—December 2008) calculated that the net benefit of completing an apprenticeship program in the short term (2.5 years) was \$50,000, while the lifetime benefit was nearly a quarter of a million dollars in additional earnings.

The National Apprenticeship system has been a part of the fabric of the American dream since the signing of the National Apprenticeship Act, also known as the Fitzgerald Act, in 1937. Generations of workers have benefited

from this system in traditional industries such as construction and manufacturing; now new generations are engaged in this unique model in emerging industries such as information technology and health care. Registered Apprenticeship has always been able to successfully adapt to the changing needs of workers and employers, while never straying from the core belief that structured on-the-job training combined with related classroom instruction, are the best way to ensure U.S. workers remain the most skilled, highly trained workforce in the world.

Collaborations between the CTE community and Registered Apprenticeship can only increase a worker’s ability to attract employers. For more information on Registered Apprenticeship, we encourage you to visit the Registered


Apprenticeship Community of Practice. Join other stakeholders and share in robust discussions on all things Registered Apprenticeship at <https://21stcenturyapprenticeship.workforce3one.org/page/home>. 

**Jane Oates**

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 Interested in exploring this topic further? Discuss it with your colleagues on the ACTE forums at [www.acteonline.org/forum.aspx](http://www.acteonline.org/forum.aspx).

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# 21st Century Apprenticeships:

# Embracing Nontraditional PARTNERSHIPS and TECHNOLOGIES

BY GAYLA STONER, BRUCE BIRD AND JOHN GAAL

While concerns for skill shortages within the world of trades workers have been a focal point of a variety of recent studies and reports, the reactive alarm has not been sounded in the modernized registered apprenticeship program. Registered apprenticeship is a combination of on-the-job learning (OJL) and related classroom and shop instruction. There are more than 1,000 careers registered through apprenticeship programs with the U.S. Department of Labor's (DOL) Employment and Training Administration's (ETA) Office of Apprenticeship (OA) or federally recognized State Apprenticeship Agencies. A number of existing federally registered apprenticeship programs (RAPs) have

proven to be proactive and forward-thinking in their approach to meeting the needs of skilled trades workers.

Several such programs are overseen by John Gaal, director of training and workforce development for the Carpenters' District Council of Greater St. Louis and Vicinity; Gaal recently completed seven years of service as a member of the DOL's Federal Advisory Committee on Apprenticeship. To be sure, Gaal played an instrumental role in expanding the Code of Federal Regulation's Title 29, Part 29's (29CFR29) venues for approved training, to include nontraditional aspects such as online coursework and instructor quality not previously considered. (For more on career and technical education (CTE) instructor quality, please refer to *Certifying*

*High-Quality CTE Educators* in the January 2011 issue of *Techniques*.) On October 29, 2008, the ETA issued updated regulations of the National Apprenticeship Act of 1937. Significant historical changes of the traditional apprenticeship training process are happening as a result of modifications to 29CFR29.

## 2010 Versus 1969 Study

Manpower Inc. released the *2010 Talent Shortage Survey* of 35,000 global employers in August 2010. First on the list of employer challenges was the lack of skilled trades workers. Manpower's analysis report of the survey noted a plethora of concerns for the skilled trades. The shortage of skilled trades workers stems from several problems, including the retire-



PHOTO BY STOCK.XCHNG.COM

## Education and training is a vital part of any employer's business today, and education and training will increase and maintain the competitiveness of a skilled workforce.

ment of older blue-collar workers without adequate replacements, technical training that is not meeting businesses' needs, and the higher status accorded knowledge work over more manual forms of labor among those beginning their careers.

In addition, the report made recommendations to address the skill shortages that include: (a) the promotion of positive attitudes toward skilled trades work; (b) aligning technical training with business needs; (c) developing international certifications to accelerate mobility; and (d) using strategic immigration policies alongside long-term domestic solutions.

Interesting to consider and compare with these findings is the *Reducing Skill Shortages in Construction* study produced by Weinberg (1969) concerning the issues of "manpower problems," and the report of a Presidential Task Force on apprenticeship programs. Forty-one years ago, Weinberg found four problems affecting the adequacy of the construction labor source consisting of (a) adequacy of train-

ing; (b) barriers to the entry of minority workers; (c) high toll of work accidents; and (d) obstacles to worker mobility.

Put side by side, great strides have been taken within the world of skilled trades workers since 1969; however, considerable similarities exist in the findings throughout these two reports. In 1969, there was great concern for quality of training and a need for an increased number of skilled trades workers. The 2010 report noted that an alignment between educational institutions and employer demands of the skilled trades worker is necessary. Today, the call exists for media and K-12 schools to create innovative avenues and approaches for technical training that will encourage positive attitudes of the skilled trades worker. Consequently, media intervention is evidenced by means of Giegerich's (2010, p. A1) claim, "While a tight labor market continues to shut out everyone from a recent college graduate to workers with years of experience, area industries have erected a permanent "help wanted" sign for highly qualified machinists and tradesmen."

### Promote Positive Attitudes and Align Training of Skilled Trades Workers

Social stigma is declared by Manpower as one of the barriers blocking our youth from entering the skilled labor market. How does our nation overcome stigma? Education! Careers are chosen for a multitude of reasons—including financial security, advancement prospects and job mobility. The Occupational Employment Statistics reported in May 2009 that the nation employed 743,760 carpenters with an annual average salary of \$43,640. Educating society through the establishment of an accurate rundown of this occupation is vital in the efforts to prevent an ongoing skill shortage.

One such example of a K-12 innovative industry-based partnership is the Bayless High School Floor Layers Middle Apprenticeship Program (MAP). (Refer to [www.youtube.com/watch?v=CEKQCQ8nWS0](http://www.youtube.com/watch?v=CEKQCQ8nWS0) for more information.) Herein, the St. Louis Floor Layers Joint Apprenticeship Program (FLJAP) worked collaboratively with the Special School District of St. Louis County (SSD), the Bayless School District (BSD), and Ivy Technical College to create a first-of-its-kind spinoff of the Gates Foundation's Middle College Experience model that was solely trade related.

Secondary students spend their 11th- and 12th-grade years completing the related classroom and shop experiences that a formal postsecondary FLJAP apprentice would over the course of four years. Upon high school graduation, MAP graduates begin the OJL portion of their apprenticeship while concurrently completing five prescribed (three credit) courses over the course of the next four years. Successful MAP graduates who finish the FLJAP will not only receive a DOL journey-worker completion certificate, but an associate degree, too!

Another recommendation of the Manpower study is for the alignment of training with the needs of businesses. Accordingly, Terry Nelson, executive

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**“Apprenticeship learning has its roots in the pre-industrial agrarian age, where an apprentice would work alongside a master to learn a trade. This practice lives on in many forms, and it still predominates in the skilled trades of electricians, carpenters...” Hay and Barab (2001, p. 286)**

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secretary-treasurer for the Carpenters’ District Council of Greater St. Louis and Vicinity, makes this parallel statement, “Creating and maintaining a partnership with contractors will help them be profitable and successful which, in turn, will create more man hours for our members” (SoIL CJAP, 2010). Considering that the Carpenters’ District Council consists of nearly 60 Local Unions spread over 120 counties covering Missouri, Kansas and Southern Illinois, the potential alliances for business and skilled trades workers is colossal.

An additional aspect of the alignment of training with the needs of businesses is the connection the St. Louis Carpenters Joint Apprenticeship Program (CJAP) has with industries and manufacturers, especially in the southeast Missouri area. Throughout Missouri, local industrial partners collaborate and participate with training consortiums which are aligned with community colleges. The primary focus of these training consortiums is to provide training for incumbent workers within the industrial and manufacturing facilities. These facilities have found it necessary to provide updated and cutting-edge training for their employees as an approach to remain competitive in today’s globalized economy. By their participation within a consortium, various training opportunities are much more to their avail in areas such as mechanical maintenance, electric and electronic maintenance, hydraulics, and pneumatics; leadership training such as quality control and inspection procedures; as well as safety training.

The CJAP not only participates within

these consortia, but also provides some of their training efforts in areas such as precision measurement, welding and mechanical components. By this intervention the CJAP has a close relationship with not only the construction arena, but also the industrial and manufacturing employers in the area. Education and training is a vital part of any employer’s business today, and education and training will increase and maintain the competitiveness of a skilled workforce.

### **Develop Certifications to Increase Mobility**

The CJAP has taken a proactive approach that follows Manpower’s recommendation that, “Employers, skilled trades associations, governments and educators should partner in this effort, making sure to acknowledge the velocity of change and the impact of technology on particular job categories” (2010, p. 3). In this geographic area, the prevention of skill shortages includes the creation of appropriate green certification programs for carpenters from a local and national standpoint.

The CJAP has partnered with the Home Builders Institute (HBI), which is the workforce development arm of the National Association of Home Builders (NAHB), in weatherization skills as well as green (PACT) certifications. These efforts are being overseen by the St. Louis Green Building Advisory Committee (GBAC) as a result of this collaborative undertaking. The GBAC is made of community professionals such as architects, green builders as well as local community colleges.

### **Modernism and Innovation**

Innovation is a term that may have different meanings to different individuals, but Merriam-Webster states that innovation is “the introduction of something new” or “a new idea, method or device” (RealInnovation.com, 2010). Additionally, eInnovation is a term that has been coined by educational institutions to mean innovation with the use of electronic technology. It could be said that the DOL believes in eInnovation by their recent update of 29CFR29, the National Registered Apprenticeship System, in which one major addition includes permission to utilize electronic media as a tool for instruction:

“Increased options for using electronic media to provide related technical instruction to apprentices. This change is designed to take advantage of technological advances that allow for distance learning and other technology-based instruction,” according to a DOL News Release, Oct. 29, 2008.

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Technology is changing our world in construction as in any other environment; students, such as young apprentices, are quite different today than just a few years ago because the majority of them know a world where the Internet is part of their everyday life and always has been.

However, Taylor (2010, p. 135) insists, “Courses that use the latest media and communications technologies should supplement and not replace traditional courses.”

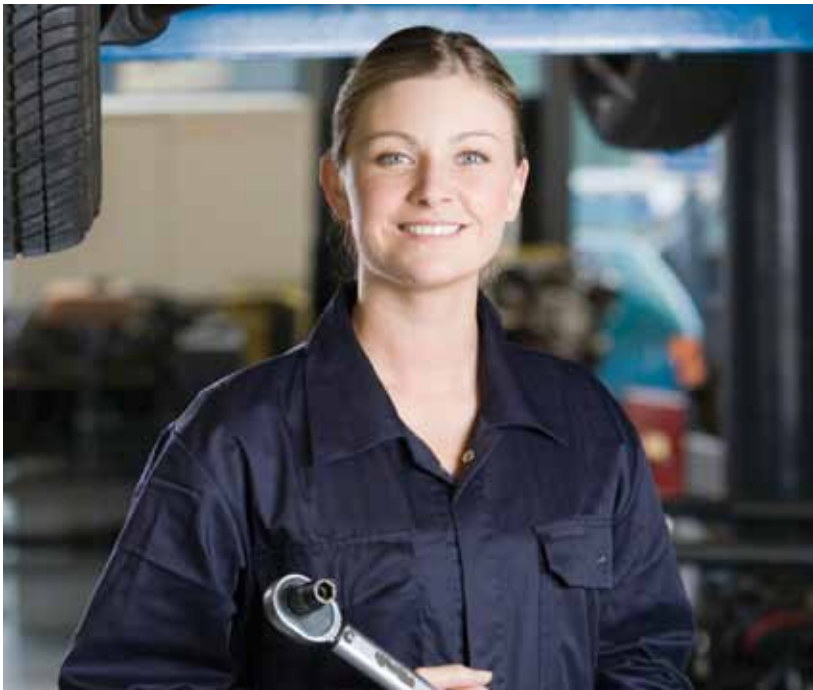
As noted earlier, under the guidance of Gaal, the CJAP was also involved

in a pilot eLearning or online training initiative that satisfies the distance learning feature of the updated registered apprenticeship regulations. The CJAP is very much involved and on the cutting edge of their eLearning and technological endeavors, and agree wholeheartedly with the statement by Carol A. Twigg, 2001, from The Pew Learning and Technology Program with the Center for Academic Transformation when she says:

“When we think about how to utilize technology to improve learning, the key is to focus on what we can do with IT that we cannot do without it. Technology can create environments that provide individualized learning approaches that serve each person in ways that he or she can most benefit” (p. 9).

Online distance learning and the use of technology provide opportunities for learning not found in the traditional face-to-face environment, especially for the technologically advanced student or apprentice of today. Not only does it offer anywhere, anytime learning, online distance learning is self-regulated learning and provides a collaborative initiative not found in the traditional classroom. As found in a report prepared for the U. S. Department of Education: “Students in online conditions performed modestly better, on average, than those learning the same material through traditional face-to-face instruction” (2010, p. 14).

The CJAP will use a blended approach to much of its eLearning undertakings whereby the technical areas will be available online, and the manipulative areas will be conducted at one of their training centers. The CJAP believes that with this approach, an extended curriculum can be implemented to better prepare the apprentice for the construction field as well as set in motion a norm of lifelong learning.



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**Without a doubt, modernizing the system through the addition of classroom instruction via electronic media delivery, encouraging positive attitudes of skilled trades workers, and thinking outside the box in regard to technical training, have the potential to impact in a positive manner the global competitiveness of the skilled workforce within the United States.**

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### Where Have We Been and Where are We Going?

As reported by Weinberg (1969, p. 3), “Between 1967-1975, the construction industry will require, according to projections by the Bureau of Labor Statistics, an increase of about 12 percent, or some 100,000 workers annually, in the amount of skilled manpower to meet the anticipated high levels of construction activity and to replace those workers who die or retire.”

From 2008 through 2018, employment is projected to increase up to 18 percent within the construction industry, per the Bureau of Labor Statistics. Indeed, carpenters are listed as one of the top 20 occupations with the largest new growth by 2018, through means of new jobs expected to grow by 165,400. Today, there are approximately 30,000 program sponsors representing 225,000 distinct employers that offer registered apprenticeship training to more than 300,000 apprentices, as reported by the U.S. DOL.

Clearly, 29CFR29 and forward-looking leaders as those within the St. Louis CJAP, address many of the 2010 recommendations of the Manpower study. Updating the National Apprenticeship System’s regulations with allowance for the provision of related instruction via electronic media will push through

the major barriers of social stigma by revolutionizing the apprentice’s learning experience. In addition, the mobility of skilled workers will be increased through the development of innovative certifications. Without a doubt, modernizing the system through the addition of classroom instruction via electronic media delivery, encouraging positive attitudes of skilled trades workers, and thinking outside the box in regard to technical training, have the potential to impact in a positive manner the global competitiveness of the skilled workforce within the United States. To this end, U.S. Secretary of Education, Arne Duncan (2010, p. 68), proclaims, “The United States must educate its way to a better economy.” **I**

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## Resources

Duncan, A. (2010, November/December). “Back to School: Enhancing U.S. Education and Competitiveness.” *Foreign Affairs*, 89, 65-74.

Giegerich, S. (2010, Nov. 21). “Manual Labor Defies the Odds.” *St. Louis Post-Dispatch*, p. A1, A7.

Hay, K. and Barab, S. (2001). “Constructivism in Practice: A Comparison and Contrast of Apprenticeship and Construction Learning Environments.” *Journal of the Learning Sciences*, 10, 281-322.

Manpower, Inc. (2010, August). *Strategic Migration—A Short-Term Solution to the Skilled Trades Shortage*.

ReallInnovation.com. (2010). *Innovation – What is Innovation?*

Southern Illinois Carpenters Joint Apprenticeship Committee (Soll CJAP). (2010, June). *New business (CJAP Minutes, June 2010)*. Belleville, IL: Author.

Taylor, M. (2010). *Crisis on Campus: A Bold Plan for Reforming our Colleges and Universities*. New York, NY: Alfred A. Knopf.

Twigg, C. A., (2001). *Innovations in Online Learning—Moving Beyond No Significant Difference*.

U.S. Department of Education. (2010, September). *Evaluation of Evidence-Based Practices in Online Learning: A Meta-Analysis and Review of Online Learning Studies*.

U.S. Department of Labor News Release. (2008, Oct. 29). *U.S. Department of Labor Issues Regulations Increasing Flexibility of National Registered Apprenticeship System*. (Release Number: 08-1491-NAT).

Weinberg, E. (1969, February). “Reducing Skill Shortages in Construction.” *Monthly Labor Review*, 92, 3-9.

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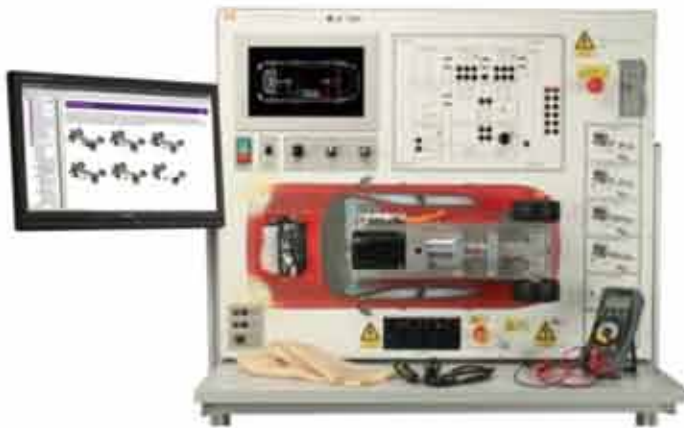
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# A LEGACY

*of*



**BY SUSAN REESE**

**A**pprenticeships are a time-honored way of passing along skills in an art, trade or craft, and many notable figures in American history began their careers as apprentices. Benjamin Franklin learned the printing trade through apprenticeship, and Paul Revere served as an apprentice in his family's silversmith business. Apprenticeships have long been an important element of career and technical education (CTE), where they traditionally incorporate systematic programs of on-the-job training led by skilled professionals, along with classroom and laboratory instruction.

## **Automotive Apprenticeships in Colorado at ACC**

Annually about 18,000 credit and non-credit students attend Colorado's Arapahoe Community College (ACC), where more than 100 degree and certificate programs are offered at its Littleton and Parker campuses. Among those programs is the Associate of Applied Science Degree in Automotive Service Technology, which is certified by the National Automotive Technicians Education Foundation (NATEF) and taught by Automotive Service Excellence (ASE) certified instructors. The two-year program and automotive technology certificate programs prepare students for employment as professional technicians and for the ASE certification examinations.

PHOTO COURTESY OF ARAPAHOE COMMUNITY COLLEGE



# LEARNING

According to ACC Automotive Service Technology Director Jerry Viola, the program has recently received several impressive honors, including being featured in the national publication, *Tomorrow's Technician*, and being recognized by a special guest from Washington, D.C.

"Last April, Dr. Jill Biden visited our program and recognized it as one of the premier training programs in the country," says Viola.

Each class in the program requires five credits and 45 additional hours of hands-on and/or Web-based training in addition to scheduled class hours. The program is organized into five tracks:

- ASEP (General Motors Automotive Service Educational Program)
- CAP (Chrysler College Apprenticeship Program)
- Nissan (Nissan Denver Technician Apprenticeship Program)
- ATEC (the general apprenticeship program for professional automotive technicians)
- PACT (Honda apprenticeship program)

Since the corporate-sponsored apprenticeship programs require the student to obtain and maintain an apprenticeship position at a manufacturer dealership for the duration of the program, the ACC program faculty assists the students in finding suitable placement. In addition,

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**"Apprenticeships have long been an important element of career and technical education (CTE), where they traditionally incorporate systematic programs of on-the-job training led by skilled professionals, along with classroom and laboratory instruction."**

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students take Web-based manufacturer technician training courses, and their sponsoring dealerships receive training credit for the students upon their graduation with the associate degree.

Viola sees the apprenticeship component of the program as invaluable in making students what he calls "real-world savvy." As he explains, "Some things you just don't find in books, so observational education is just as important to long-standing success."

The ATEC program allows students to obtain an apprenticeship position with any dealership or independent automotive repair facility. This track also requires students to maintain an apprenticeship position in automotive repair for the duration of the program, and is a degree program only.

ACC's Automotive Service Management Certificate program is designed as an apprenticeship program for those interested in a job as an automotive service writer/consultant. ACC notes that

dealerships are particularly interested in female service writers, since women are underrepresented in the automotive service field. The Advanced Automotive Electrical/Electronics Certificate is designed as an apprenticeship program for those interested in a job as an advanced drivability specialist or those who would like to further their knowledge and training in advanced engine performance. According to ACC, dealers are particularly interested in this specialty due to the advances in technology on current model vehicles with increasing electrical/electronics devices.

Most of the major automotive manufacturers have donated to the more than \$1 million in vehicles and technology that have kept the ACC training current. The automobile companies benefit from having a pipeline of technicians who come into the workforce well prepared on today's technology, and the students graduate with the ability to work on the latest models of vehicles. Another huge bo-

nus to apprenticeship is that the students are earning money while in school. With the affordability of community college, a student can finish the program debt free, with a college degree and with two years of work experience. According to Viola, a two-year follow-up study of their graduates found them to be averaging about \$50,000 a year working in the industry. "It's a win-win-win situation," he says.

Viola sometimes refers to his program as "the Harvard of automotive training," and notes that today's technician has to be more of a mechanical or electrical engineer than just being able to lift heavy things. He is passionate about the program and says, "It's a real opportunity for those who want the best possible training for the best possible success." He is also very proud of its students, noting, "A lot of

our graduates have gone on to be service managers of \$5 million operations or own their own businesses. Some have continued their education and become automotive engineers."

With all the evidence of its success, the ACC automotive service technology program has certainly earned the accolades it has recently garnered, and as Viola has found, "Apprenticeship is invaluable learning, and it's vital to our overall success."

### Construction Trades Apprenticeships in Florida

Seminole State College of Florida (formerly Seminole Community College), one of the nation's fastest growing two-year colleges, has six sites and an enrollment of more than 32,000. As a full-service

institution, the college offers a full array of construction programs, from apprenticeships to credit certificates to associate in science (A.S.) degrees, and bachelor's degrees. Seminole State will offer bachelor of science (B.S.) degrees in architectural engineering technology, business information management, construction and information systems technology starting this August.

Like ACC, Seminole State also offers an A.S. degree in automotive technology, and it is fully accredited by NATEF, Ford and General Motors. The program won the 2007 ACTE Award for Excellence in Automotive Training in the category of Postsecondary-Manufacturer Affiliated, and the curriculum combines the latest in automotive technology education and relevant industry experience (now referred to as internships rather than apprenticeships). This project-based approach produces graduates of the highest caliber who are ready to work.

While the automotive technology program designates its industry experiences as internships, apprenticeships are part of the construction and design programs at Seminole State. Seminole State offers apprenticeship training programs in electrical, plumbing technology and fire sprinkler systems. Postsecondary adult vocational (PSAV) programs in HVACR (heating, ventilation, air conditioning and refrigeration) and welding are also offered.

Each apprentice must complete on-the-job training and related classroom instruction. As the apprentices' skills and knowledge increase, so do their wages. The total number of hours for each of the three programs varies, and each of the certificate programs includes application-based courses and labs that encompass on-the-job training performance and proficiency.

Apprenticeship training for the commercial electrical program is provided in conjunction with local electrical subcontractors and Florida Electrical Appren-

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ticeship and Training. In the fire sprinkler apprenticeship program, training is provided in conjunction with local fire sprinkler companies and the Florida Automatic Sprinkler Training Association. The plumbing apprenticeship program utilizes local plumbing subcontractors for the on-the-job portion of the training, and all theory and technical training is provided by curriculum developed by the Plumbing Industry Professional Education Association.

Students who complete one of the apprenticeship programs will receive 18 hours of articulated credit toward Seminole State's A.S. degree in building construction. The college says this program bridges the gap from vocational training to college credit career opportunities. A student obtaining this A.S. degree will be eligible to pursue the new B.S. degree in construction from Seminole State. The college is also working on a master's degree articulation with the University of Central Florida and the University of Florida.

### A Chef Apprenticeship in Louisiana

New Orleans is known as a city with some of the best food in the world, so it is only appropriate that it should be home to a thriving culinary arts program with a chef apprenticeship option. At Delgado Community College (DCC), the Chef Apprenticeship Option in Culinary Arts, Associate of Applied Science Degree, was organized by Les Chefs de Cuisine de la Louisianne, a local chapter of the American Culinary Federation Foundation, in cooperation with the Board of Trustees of the Culinary Apprenticeship Programs of Louisiana. It follows traditions of the European culinary apprenticeship programs by providing students practical work experience under the supervision of executive chefs in hotels and restaurants in metropolitan New Orleans. It is accredited by the American Culinary Federation Educational Institute Accrediting Commission, and students have the



PHOTO COURTESY OF DELGADO COMMUNITY COLLEGE

- ▲ The culinary arts program at Delgado Community College in New Orleans includes the Chef Apprenticeship Option in Culinary Arts, Associate of Applied Science Degree.

opportunity to earn certification.

The required courses of the chef apprenticeship program include general education credits and courses with topics such as culinary skills; food safety and sanitation; food service purchasing; nutrition; food sales, beverage and labor cost control; and restaurant and hospitality su-

pervision. The students also study baking; the theory of meat, poultry and seafood; soups, stocks and sauces; and American regional cuisine and international cuisine.

Students in the DCC program are also required to complete a minimum of 4,000 hours of on-the-job training under the supervision of an executive chef, and 900

hours of related classroom instruction under the direction of culinary arts faculty. The on-the-job training is monitored by the Bureau of Apprenticeship Training under the auspices of the federal Department of Labor and the State of Louisiana Apprenticeship Council.

Many famous chefs began as apprentices, such as Jamie Oliver, who was an apprentice in his parents' pub/restaurant. Emeril Lagasse also began learning culinary arts from his mother, and as a teenager worked at a bakery where he mastered pastry and bread making. Both men now encourage young people to enter the profession, Oliver through his Fifteen Foundation, which operates training restaurants, and Lagasse through his foundation to support children's educational programs that inspire and mentor young people through the culinary arts, nutrition, healthy eating, and important

life skills. With the inspiration of Lagasse and training such as that offered by DCC, the future of New Orleans should be just as delicious.

### Building Skills for Growing Opportunities

In today's complex workplace and ever-changing economy, apprenticeships are not just for young people entering the workforce. They may also help older workers find new careers or upgrade their skills. Alabama's Calhoun Community College offers free pre-apprenticeship classes for dislocated workers who are interested in careers in the construction industry. At some community colleges, such as Washtenaw Community College in Ann Arbor, Michigan, and Rock Valley College in Rockford, Illinois, apprenticeship programs are offered in cooperation with trade unions.

There are many ways that apprenticeships are being utilized in today's CTE to help young people find a craft and acquire the skills to master it, but this traditional path also has been modernized to help adults upgrade their careers. What still remains, however, is the goal of transforming novices into masters so that valuable skills can be passed on to the next generation and continue to benefit society. **T**

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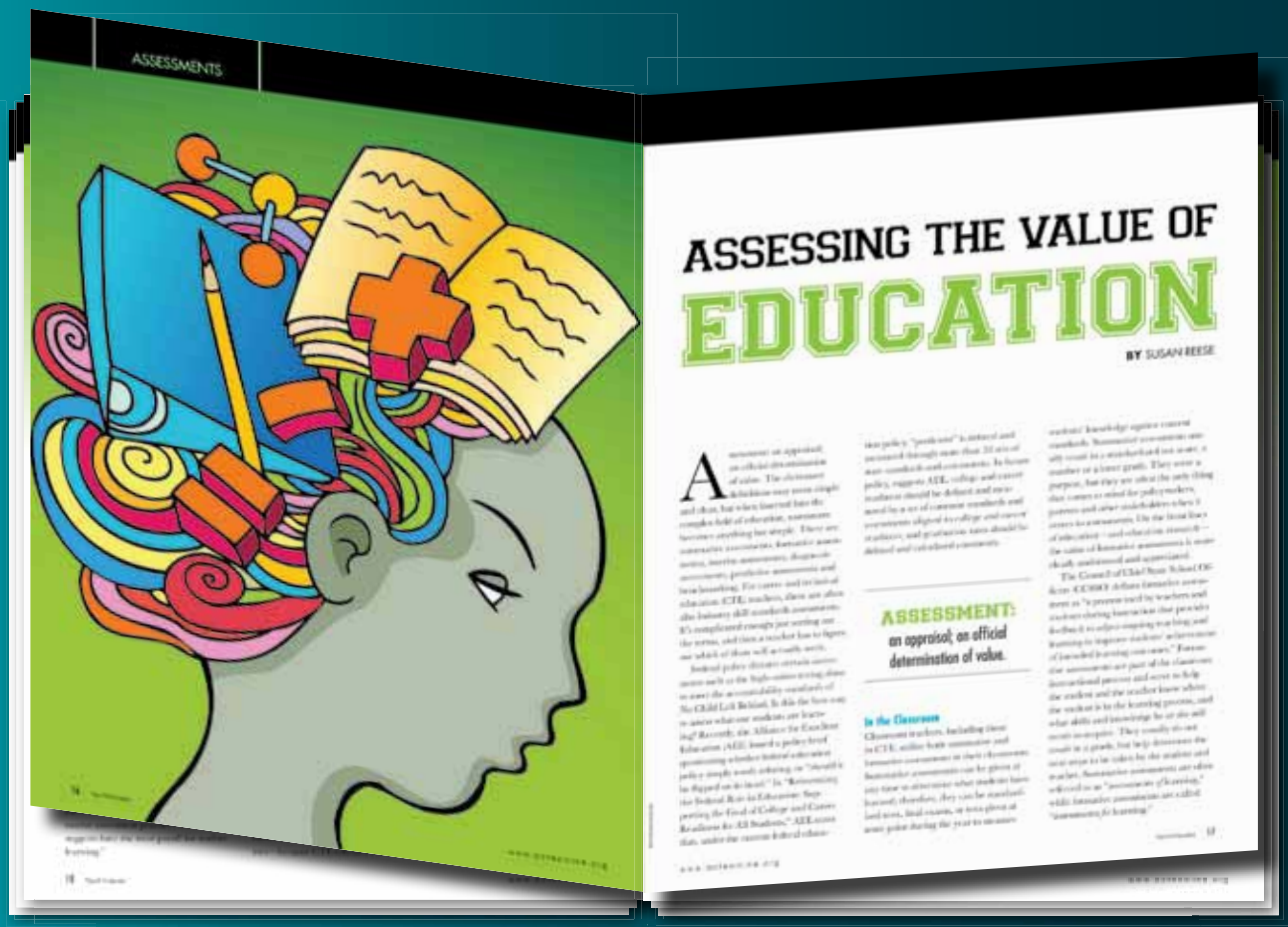
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# Secret

BY CARL CIMINO

**A**re you truly dedicated to your craft? If you were asked to refrain from most vices, avoid getting married, and to work for little or no compensation in exchange for learning a craft—would you be willing to commit? In the early 1800s these were the requirements young apprentices committed to in order to learn from master craftsman in fields such as carpentry and furniture making. Apprenticeships were also very gender specific; clearly Title IX was not a factor in those days. Fortunately, apprenticeships have evolved over the years! While today's apprenticeship programs continue to include the much needed hands-on training that was afforded our predecessors, apprenticeship programs now include a classroom component, doing away with the draconian practices of yore.

In California, apprentices enroll in programs that are accredited through the Office of Apprenticeship (OA) at the federal level and the Division of Apprenticeship Standards (DAS) at the state level.

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**“While today’s apprenticeship programs continue to include the much needed hands-on training that was afforded our predecessors, apprenticeship programs now include a classroom component, doing away with the draconian practices of yore.”**

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Just a few years ago, California, the largest player in apprenticeship in the country, boasted more than 70,000 apprentices. New York, the next closest state had less than half that amount.

The U.S. Department of Labor (DOL) describes an apprenticeship as “a combination of on-the-job training (OJT) and related instruction in which workers learn the practical and theoretical aspects of a highly skilled occupation.” As part of their commitment to DAS, apprenticeship programs monitor a student’s OJT hours and partner with a Local Educational Agency (LEA) to develop the supporting

classroom component. The goal is for the instruction in the classroom and the instruction on the jobsite to complement one another—promoting stronger competencies on both sides of the equation.

Related supplemental instruction focuses on the principles an individual must understand in order to learn on the jobsite. Related math and science classes, as well as safety- and building code-related courses, lay the groundwork for jobsite learning. LEAs are typically community colleges or regional career and technical education (CTE) centers that help with curriculum development,



PHOTO COURTESY OF CINDY AMARAL, LOYD E. WILLIAMS PIPE TRADES TRAINING CENTER

▲ The Loyd E. Williams Pipe Trades Training Center offers state-of-the-art labs for hands-on learning, including the backflow lab shown above.

instructor training and evaluation, so that classroom experience is up to par with a college environment.

Many of the programs sponsored by building trades unions receive help from their national unions in the form of fully developed curriculum and accompanying textbooks, as well as instructor training programs which are often the envy of the industry. These programs have worked with organizations like NOCTI to create valid and reliable assessments, as well as curriculum which contains daily lesson plans and presentation materials covering every moment of class time. To the local union's credit, this kind of development is supported by their own resources and generally very little public funding is utilized.

## A Comprehensive Program for Journeymen in San Jose

The Loyd E. Williams Pipe Trades Training Center in San Jose, California,

prides itself in going beyond the scope of traditional apprenticeship by offering a comprehensive "Journey Level Training Catalog," thus encouraging journeyman graduates to continue their training. The catalog contains a full slate of courses that can be utilized to add new skills in the form of certification such as medical gas installer, backflow prevention, foreman training, green awareness, and biopharmaceutical piping. The center also offers a variety of no-cost refresher courses to assist journeymen in updating skills in a process they may not regularly use in the field, such as rigging and tube bending.

Because of its success and popularity, gaining entry into the center's programs sometimes requires patience. When an opening date is advertised over a one-week period in July, between 250 and 300 candidates apply for approximately 45 openings. In September, applicants are given exams in math, mechanical reason-

ing and employability skills. NOCTI's intimate knowledge of the standards and curriculum made it the natural choice for creating a tool to measure the abilities of the applicants; this offers a means to insure those who qualify are able to succeed in the program. Qualifying individuals are placed on a waiting list based on the year of their test and their weighted, aggregate score.

Based on a number of factors, these individuals are hired by an employer and enrolled in a three-night workplace readiness course that informs them and prepares them for the rigor of the trade they have chosen. After a period of demonstrated commitment, they begin their five-year apprenticeship. The starting pay of \$20 per hour plus pension and medical benefits is clearly a big draw. Combine that with the prospect of earning more than \$50 per hour at the conclusion of their apprenticeship, and this becomes all

the motivation most applicants need.

Apprentices are evaluated by their employers every month in their first year and every six months thereafter. They are also given access to a “field coordinator” who visits jobsites and reviews the employer evaluations in addition to OJT reports. The field coordinator acts as a mentor, providing assurance to apprentices concerned about their progress and evaluating whether the apprentice is being exploited by his/her journeyman, foreman or employer. In the past, unscrupulous employers would teach a person a singular work process, like drainage piping for example, and never allow the apprentice to move on to other aspects of the trade. Unfortunately, at the end of the apprenticeship, the individual was so specialized in a singular process that they were undesirable to employers looking for plumbers skilled in the entire trade. The field coordinator is a primary reason the center boasts a graduation rate of more than 85 percent.

### Reaching Out

Part of the center’s success can be attributed to the outreach in neighboring schools. Center leaders visit high schools, middle and elementary schools speaking to students about the opportunities available in plumbing-related trades. Local CTE programs are also visited; as part of the outreach to the plumbing and HVACR classes, students receive a tour of the training facility. The facility is 96,000 square feet and houses multiple labs and hands-on working areas.

The center hosts a Hands-On Career Fair during which students can learn and try out various construction trades. Center director Carl Cimino enthusiastically notes, “I could also spout off several ethereal reasons for the center’s popularity, like the satisfaction one draws from hard work, but let’s face it, almost all are here because the training is excellent and the compensation package is top shelf!”

### Ensuring a Future of Skilled Tradespeople

Building Trades Unions have built apprenticeship programs with a strong focus on the welfare of the apprentice. They have structures in place in national and local training programs that are a boon to the industry, and have provided the foundation for a strong cooperative working relationship between labor and management. **I**

Visit our Web site at [www.pipetradestraining.org](http://www.pipetradestraining.org) for a virtual tour, or key in “pipe trades training center” to take part in a facility tour on YouTube.

#### Carl Cimino

is the director of the Loyd E. Williams Pipe Trades Training Center in San Jose, California. He can be contacted at [carl@pttc393.org](mailto:carl@pttc393.org). Questions regarding NOCTI’s work can be addressed to [nocti@nocti.org](mailto:nocti@nocti.org).

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By Martin Nikirk

# Introducing Interactive Technology—“Toy Story 3”

“COMPUTER GAME DEVELOPMENT AND ANIMATION (CGDA) PROGRAM STUDENTS AND STUDENTS FROM THE MULTIMEDIA PROGRAM WORKED TOGETHER TO DISCOVER AND EXPLORE THE COMPONENTS OF INTERACTIVE MEDIA WITH THE DISNEY/PIXAR’S ‘TOY STORY 3’ THEME.”



PHOTO COURTESY OF MARTIN NIKIRK

**“TO INFINITY AND BEYOND!”** is the catchphrase of Buzz Lightyear, Universe Protection Unit space ranger, a character in the Disney/Pixar “Toy Story” franchise. The three films in the franchise—“Toy Story,” 1993; “Toy Story 2,” 1999; and “Toy Story 3,” 2010—incorporate an innovative blend of many different genres, having spun off video games and dozens of film and game-related consumer products.

The film was used to introduce students at Washington County Technical High School—located in Hagerstown, Maryland—to interactive media. Computer Game Development and Animation (CGDA) program students and students from the multimedia program worked together to discover and explore the components of interactive media with the Disney/Pixar “Toy Story 3” theme. Eight teams learned about media development, logo, continuity and franchising components through eight-minute visits to each of eight stations with activities to complete. The CGDA teacher selected and organized the stations to introduce learning objectives from several of the digital media standards for the CGDA and multimedia programs.

The CGDA instructional program is unique in that students learn the whole-to-part relationship of the interactive media profession, then learn the skills to build each of the assets. Students experience a real-world connection for product development while learning about movie, video game, music, toy, and book production interrelated to an interactive media theme. The teams then reported what

they learned from their activities.

Each year the digital entertainment industry releases several blockbuster multimedia products built on interactive technology models where movies, video games and franchised products engage consumers. Last year, the Walt Disney/Pixar franchise earned \$920 million worldwide; this was the highest grossing computer animated film.

## Why Teach This Relevant, Whole-to-Part Learning Lesson?

Students new to interactive technology or interactive multimedia need to clearly know the big picture—the “whole-to-part” association of the types of before-market, market and aftermarket products that are designed, franchised manufactured and sold. “Toy Story 3,” a movie that many students greatly enjoyed with their friends or family, provided a relevant and rich media collection for in-school learning from the students’ world, including local newspaper advertisements, press releases, journal articles, franchised toys, a highly interactive video game for several platforms, and movie-related products.

Students learned from reading and researching about the movie; they found out that extensive planning took place in writing and drawing “Toy Story” on paper four years in advance, and that 3-D models were built to support the planning for every film, interactive game and multimedia project. The concept development into story writing, interactive storytelling and storyboarding takes place long before the Gantt chart



PHOTO COURTESY OF WALT DISNEY STUDIOS HOME ENTERTAINMENT/PIXAR ANIMATION STUDIOS. ALL RIGHTS RESERVED.

(a type of bar chart that illustrates a project schedule) is tasked for building marketable products. Likewise in the game development, animation and multimedia tech areas, students now know that planning the “big picture” with each of its parts is an integral part of the learning.

### Full Spectrum Teaching

Multimedia lessons can connect students to the real world at many different levels. Before delivering this lesson, consider the full spectrum teaching approach in your tech area. As humans we have sensory receptors that when stimulated create new “brain wiring” and learning. Think of your tech area as the environment to facilitate such learning. Consider these questions:

**“STUDENTS EXPERIENCE A REAL-WORLD CONNECTION FOR PRODUCT DEVELOPMENT WHILE LEARNING ABOUT MOVIE, VIDEO GAME, MUSIC, TOY, AND BOOK PRODUCTION INTERRELATED TO AN INTERACTIVE MEDIA THEME.”**

1. What planning and learning environment activities or room changes will cause the student to learn and talk about this lesson for the next several weeks or months?
2. Will the stations have tactile experiences and visual experiences?
3. How will you use audio to enhance learning such as classroom background music, or composing video game music?
4. How will lighting affect the learning? Should I consider different lighting such as lamps or other?
5. How will station signage impact learning, following directions, curiosity?
6. How will traffic patterns in the classroom encourage participation?
7. What follow-up activities need to be planned and co-led by students?
8. During the lesson, what plushies and

giveaways will make everyone smile, laugh and remember this lesson?

## “Toy Story 3” Stations at Washington County

There were eight learning stations located in the CGDA area for students to visit and interact with:

- 1. Published works: articles**  
Students reviewed several articles to learn about the “Toy Story 3” development process.
- 2. Published Works: books**  
Students skimmed several books to identify audience, style of writing, purpose of book and where each fit

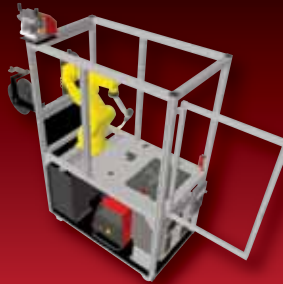
into the marketing plan.

- 3. The Pixar Blog**  
Students discovered what is blogged about the movie.
- 4. Media: DVD and Blu-Ray**  
Students viewed trailers and teasers about the movies. As a teacher you may also want to review “How the Film was Made” video clips.
- 5. Music and Soundtracks**  
Students listened to songs (and sang along) from the “Toy Story” production.
- 6. Games—Video**  
Students played a small section of the Xbox 360 video game.
- 7. Toys**  
Students played with some of the “Toy Story” toys.
- 8. Movie Premier and Tickets**  
Students found local listings for the movie and how to purchase tickets online.

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## Lesson Objectives

Students learn the whole-to-part concept and unique components of film and interactive media development through completing activities at eight stations, where they write on paper:

- specific skills needed for professionals building each of these components;
- who the audience is and why they think those products were created and licensed;
- the licenses, trademarks and copyrights they think are required for making products seen at the stations;
- the factors that must be considered when creating and franchising each of these products;
- the types of continuity required in developing these products over the lifetime of the concept: and
- what other products they think should be developed in each category for “Toy Story 3” and who the audience would be for each.



▲ Students review "Toy Story 3" images and written content at the independent news site Pixar Blog, <http://pixarblogspot.com>.



PHOTOS COURTESY OF MARTIN NIKIRK

▲ Students identify Web sources, print and read online articles about "Toy Story 3" development.

From meeting with each other, collaborating and completing exercises at these stations, the students learned the similarities and uniqueness of the CGDA team compared to the multimedia program at Washington County Technical High School. Students found

that Buzz Lightyear was right: "To infinity and beyond!"—the creative, marketing and licensing possibilities are unlimited in the concept, design, creation, engineering, production and marketing of an interactive media production. **T**

## Resources

### A Reminder to Teachers:

Since Web content can change, teachers should read articles and Web content before using any sources in class.

### Articles

Print several articles for students to review (be sure to read those first). Here are a couple:

"Animating a Blockbuster: How Pixar Built Toy Story 3," *Wired magazine*, May 2010

"More Toys Than Ever Before," *Computer Graphics World*, July 2010

### Books

The Art of Toy Story 3

### Blog

The Pixar Blog <http://pixarblog.blogspot.com/2010/05/toy-story-3-in-wired.html>

## Explore More

Animation careers

[www.allartschools.com/art-careers/animation/animation-career](http://www.allartschools.com/art-careers/animation/animation-career)

CG Society: Society of Digital Artists

[www.cgsociety.org](http://www.cgsociety.org)

Disney Corporate

<http://corporate.disney.go.com/careers/index.html>

Pixar

[www.pixar.com](http://www.pixar.com)

Walt Disney Animation Studios

[www.disneyanimation.com](http://www.disneyanimation.com)

### Martin Nikirk, M.Ed.,

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Interested in exploring this topic further? Discuss it with your colleagues on the ACTE forums at [www.acteonline.org/forum.aspx](http://www.acteonline.org/forum.aspx).

By Johnny J. Moye

# Real Integration—Where the Rubber Meets the Road

**“PUTTING CORE ACADEMICS INTO CONTEXT, CTE COURSES PROVIDE AN EXCELLENT PLATFORM FOR STUDENTS TO LEARN THE RELEVANCE OF SCIENCE, TECHNOLOGY, ENGINEERING AND MATHEMATICS (STEM) AS WELL AS LITERATURE, ARTS AND SOCIAL STUDIES.”**

PHOTO BY ISTOCK.COM



## **INTEGRATION OF CORE ACADEMICS INTO CAREER AND TECHNICAL EDUCATION**

(CTE) is not new. Integration already occurs and some programs have been very successful (Moye, 2008; Reese, 2003). Putting core academics into context, CTE courses provide an excellent platform for students to learn the relevance of science, technology, engineering and mathematics (STEM) as well as literature, arts and social studies. Students learn to use this information by applying it to real-world situations. Not only is integration a good idea, it is also a requirement if a school division uses federal Perkins Act funds, (Brustein, 2006). A teacher desiring to integrate core academic information into his or her CTE course needs to understand integration as well as what and how to integrate.

State and/or local school divisions determine the content of each CTE course. In Virginia, for example, courses are built upon frameworks. Teachers use these frameworks to develop their lessons, activities and assessments. These frameworks are built upon national academic standards such as mathematics (National Council on Teaching Mathematics, 2000) and science (American Association for the Advancement of Science (AAAS, 1993)) standards. When a CTE course is correctly taught, “Education should not be viewed as vocational versus academic. Vocational and academic are interrelated” (Cutshall, 2003). Once teachers understand the national standards in which their courses are built upon they can accomplish true integration. This

article will discuss two forms of integration, integrated curriculum and interdisciplinary curriculum. Both terms identify valuable approaches to integration

### **Understanding the Definitions**

A CTE teacher uses an integrated curriculum when he or she includes information from other courses to explain or support a lesson within his or her course. Using an integrated curriculum is a way to teach students that “attempts to break down barriers between subjects, and make learning more meaningful to students,” according to Connect 4 Education’s *Integrated Curriculum Guide*. An interdisciplinary curriculum is “an educational approach where students study a topic and its related issues in the context of various academic areas or disciplines,” according to the International Technology Education Association (ITEA, 2000, p. 239). “Interdisciplinary methods work to create connections between traditionally discrete disciplines such as math, the sciences, social studies or history, and English language arts,” according to Learn NC, a program of the University of North Carolina at Chapel Hill School of Education.

### **Getting Started**

The integrated curriculum method is probably the easiest method to start. A teacher should review his or her course framework and national standards to ensure that he or she specifically addresses the correct standards in their lessons. For example, one sixth- to eighth-grade geometry standard is to use visualization, spatial reasoning and geometric modeling





PHOTO BY ISTOCK.COM

to solve problems (NCTM, 2000). In Virginia, eighth-grade students learn these terms and principles in their math courses as well as in their technology education course. During instruction, and reinforced by a balsa bridge building activity, technology teachers use the same terminology and stress the same principles as do math teachers. Technology teachers should make every possible connection with the math course and inform students that what they are doing in the technology course is applying the information that they learned (or will learn) in their math course. The integrated approach simply uses the same terms and principles

that other courses present to students. A technology teacher could use the integration approach very easily. To realize the greatest success, the teacher should communicate with the math teacher(s) and learn specific uses of facts, figures and terminology. The teachers may then desire to start working more closely together and attempt an interdisciplinary approach to instruction.

CTE and core teachers must work closely together to use the interdisciplinary curriculum method. The method is beneficial when a student receives information in one course and that information is reinforced in another. For example,

a family and consumer sciences teacher will explain that food sources were once living organisms made of complex molecules, including carbohydrates, fats and proteins. The lesson would discuss the origin of foods but it would also address cellular composition, multi-cellular organisms, and ecosystems, all of which are middle school science standards (AAAS, 1993).

During the lesson, the culinary arts teacher would explain how these factors affect taste as well as how the human body reacts to them. Students would benefit the most if the culinary arts teacher would present this information concu-

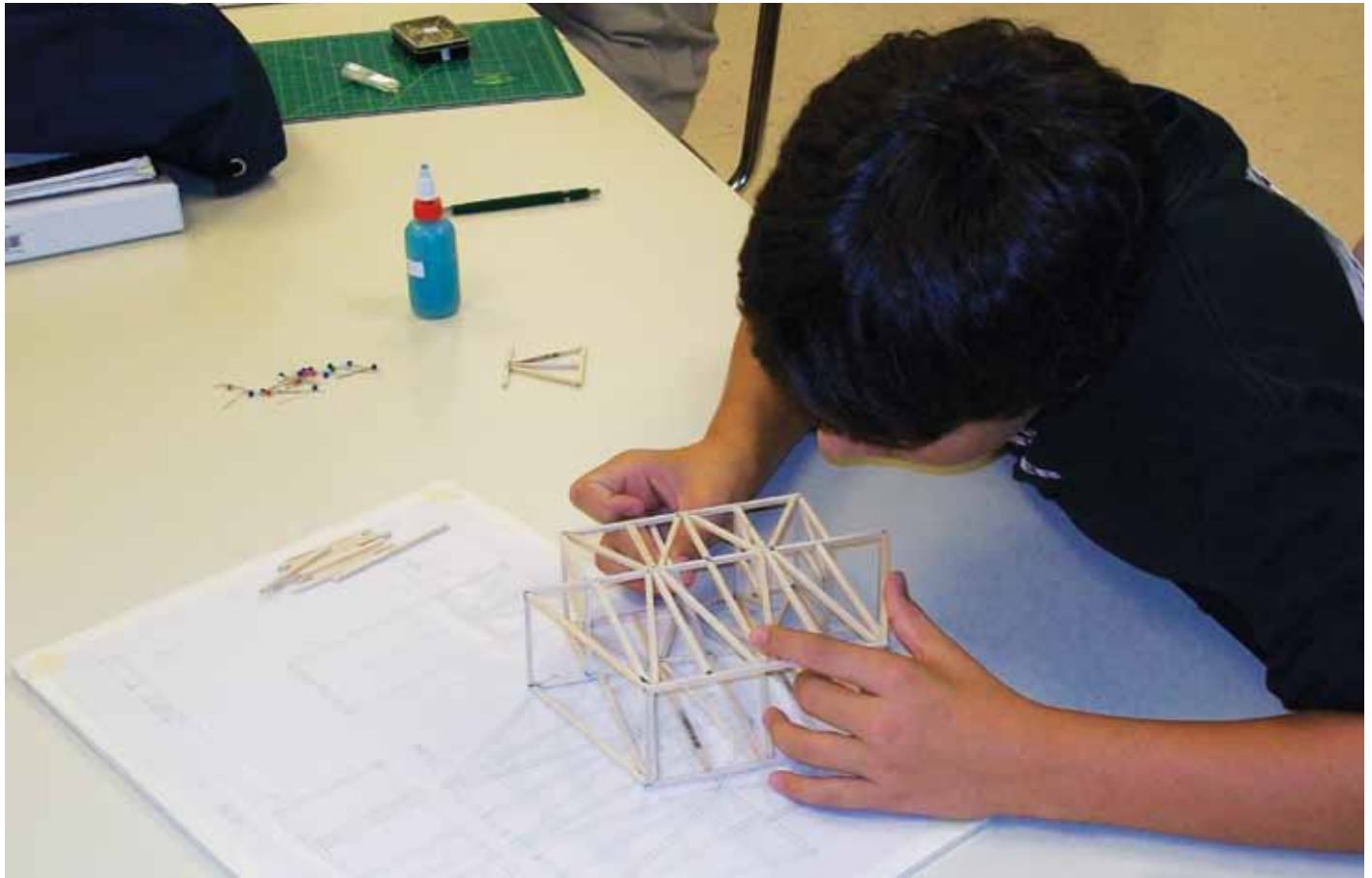


PHOTO COURTESY OF RON PASKO.

▲ This eighth-grade student used mathematics, science and engineering principles to construct a balsa bridge.

rently with the earth science teacher. This interdisciplinary curriculum method requires close coordination between teachers. Students benefit because they can make connections between real-world actions and abstract information. Not all culinary arts students will be enrolled in an earth science course during the same semester. Many students will be enrolled in other courses. The most effective teachers will know the courses in which their students are enrolled, and what type of information should be presented in their course—and when to present it.

Teachers can present core academic information either horizontally or vertically. A teacher accomplishes horizontal integration by presenting information learned in another course during the

same grade or semester. Vertical integration occurs when a teacher presents information that students previously received or will receive in a subsequent course. Either form of integration takes proper planning and execution. Most educators and administrators understand this concept but understanding is only part of the equation. Teachers must know what, when and how to present specific information to improve students' core academic and CTE course success.

### Recommendations

**Start out simple**—Initially, producing integrated lessons may be overwhelming. Teachers should expound on current information and introduce new integrated coursework when he or she feels comfortable in doing so.

**Professional development**—Teachers need to perform research to determine current local, state and federal initiatives and use those resources. Learning and using correct integration techniques and terminology is also important. Once a teacher becomes better equipped, he or she can speak more convincingly to those who need to support the initiative. When discussing the initiative using correct terminology, teachers will receive assistance from other CTE teachers, core teachers, administrators, and school board members.

**Create a long-range plan**—Planning is essential. Integration is not a one- or two-year project. A successful teacher will create a plan to guide him or her for the rest of his or her teaching career. Start off easy and create a one- or two-year

## “LEARNING AND USING CORRECT INTEGRATION TECHNIQUES AND TERMINOLOGY IS ALSO IMPORTANT. ONCE A TEACHER BECOMES BETTER EQUIPPED, HE OR SHE CAN SPEAK MORE CONVINCINGLY TO THOSE WHO NEED TO SUPPORT THE INITIATIVE.”

plan and then ask yourself; “Where do I want my program to be in 10 years?” Then, using the backward design method (Wiggins, and McTighe, 1998), determine the required actions between now and 10 years. Students’, parents’ and administrators’ input is essential. Collect and use their input and your plan will be solid. Over the course of time, modify the plan as necessary; but the primary goal, real integration, should remain intact.

**Determine level of success**—Prudent decision makers base their decisions on data. In today’s world of education, many decisions are made in response to standardized testing results. If students score high on their tests, decision makers feel that the current plan is working. Conversely, if students do not score well, then changes are made. CTE teachers with integrated courses can (or receive help to) perform studies that identify how their courses help improve students’ core academic testing success.

For example, say that a culinary arts teacher included cellular information in her course and that information appeared in a standardized test; with the assistance of the earth science teacher, the CTE teacher could determine how her students

faired in answering those questions compared to an equal number of students who did not take the culinary arts course. If it was concluded that the culinary arts students performed better in that section of the standardized test, it could be inferred that the information students received in their CTE course helped them achieve better scores. This type of testing has been used to support CTE courses across the nation (Dugger and Johnson, 1992; Dyer, Reed, and Berry, 2006; Frazier, 2009; Scarborough and White, 1994).

### Looking ahead

Much has been written concerning the integration of core academics into CTE courses. This article only touches on the subject and was written to describe that successful integration is very achievable. It just takes time and effort to do what is

most beneficial for students. Real integration has been around for many years but it comes down to the teacher. Concerning real integration—teacher involvement and effort is where the rubber meets the road! **T**

**Editor’s Note:** For more information on career and technical education and academic integration, see Research Report on page 52, “Crosswalks and Quality: Linking Mathematics Language and Career and Technical Education Standards.”

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**ACTE** Interested in exploring this topic further? Discuss it with your colleagues on the ACTE forums at [www.acteonline.org/forum.aspx](http://www.acteonline.org/forum.aspx).

### Resources

American Association for the Advancement of Science (AAAS). (1993). *Benchmarks for Science Literacy*. Oxford University Press: New York.

Brustein, M. (2006). *Perkins Act of 2006: The Official Guide*. Alexandria, VA: Association for Career and Technical Education.

Connect 4 Education. (n.d.). *Integrated Curriculum Guide*.

Cutshall, S. (2003). “The Core Connection: CTE and Academics: A Perfect Fit.” *Techniques*, 78(6), 18-21.

Dugger, J., and Johnson, D. (1992). “A Comparison of Principles of Technology and High School Physics Student Achievement Using a Principles of Technology Achievement Test.” *Journal of Technology Education*, 4(1), 18-25.

Dyer, R. R., Reed, P.A., and Berry, R. Q. (2006). “Investigating the Relationship Between High School Technology Education and Test Scores for Algebra 1 and Geometry.” *Journal of Technology Education*, 17(2), 7-17.

Frazier, M. T. (2009). “The Effect of Technology Education on Students’ State Standardized Test Scores.” Unpublished doctoral dissertation, Old Dominion University, Norfolk, VA.

International Technology Education Association (ITEA). (2000). *Standards for Technological Literacy: Content for the Study of Technology*. Reston, VA: Author.

Learn NC. (n.d.). *Interdisciplinary Curriculum*.

Moye, J. J. (2008). “Starting a New Technology Course? An Opportunity to Develop Student Technological Literacy.” *The Technology Teacher*, 68(2), 27-31.

National Council on Teaching Mathematics, (NCTM). (2000). *Principles and Standards of School Mathematics*. Reston, VA: Author.

Reese, S. (2003). “A Role to Play in School Reform.” *Techniques*, 78(6), 39-41.

Wiggins, G., McTighe, J. (1998). *Understanding by Design*. Merrill Education/Prentice Hall.

Scarborough, J. D., and White, C. (1994). “Phy-ma-tech: An Integrated Partnership.” *Journal of Technology Education*, 5(2), 31-39.

# Crosswalks and Quality: Linking Math Language and CTE Standards

By Elizabeth Often

## WE ALL USE MATH EVERY DAY IN CAREER AND TECHNICAL EDUCATION

(CTE) areas, in academic areas and in our lives outside of school. Yet recent research done by the International Center for Leadership in Education (ICLE, 2006) found that the math skills required by most entry-level jobs and in day-to-day living was well below the standards of high school-level math courses. Many CTE teachers that I worked with have told me that the math their students are learning and that teachers are being asked to support in the technical areas is math that these instructors were never taught in school (Piper, Estee, personal communication, 2007). So, when CTE instructors are called on to include grade-level standards in their technical area, it can be a real challenge.

However, support of high-level math skills is increasingly required under the most recent Perkins Act. Perkins IV called on the states to “integrate rigorous and challenging academic and career and technical instruction (section 2).” Also, as with No Child Left Behind, Perkins IV demands accountability. States must show that students are reaching proficiency in *both* academic content and technical content (section 113), rather than demonstrating this through standardized testing; however, Perkins IV requires states to complete a series of reports detailing spending and outcomes for CTE concentrators.

The quality of math standards within career paths is an important one, as it can indicate whether CTE students

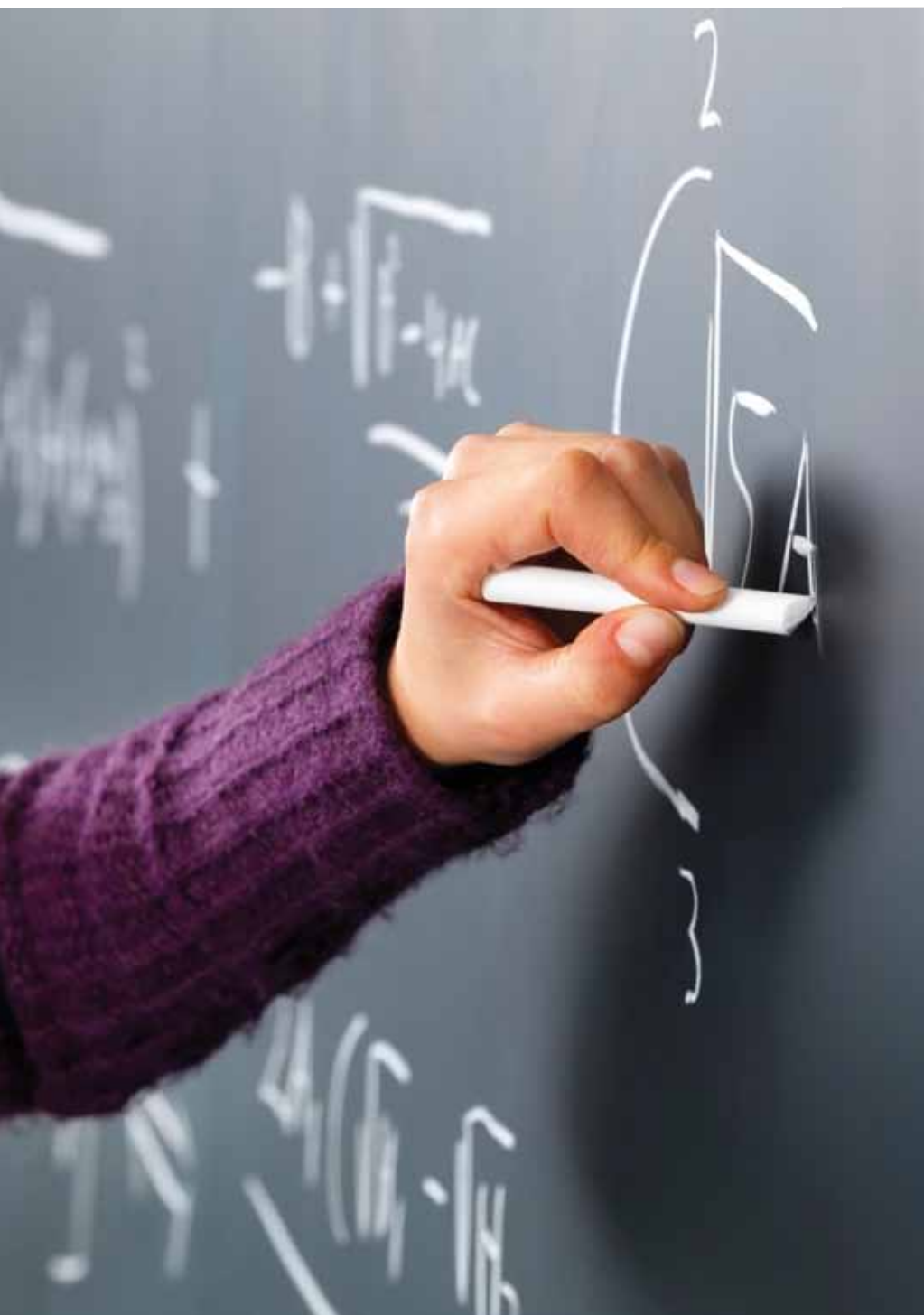


PHOTO BY ISTOCK.COM

are receiving a rigorous academic and technical curriculum. This is especially important as the CTE field has expanded to include technology and pre-engineering (often called STEM fields) as well as more “traditional” fields, and many CTE concentrators go on to postsecondary education. Finally, the requirements laid out in the standards can have an influence on what CTE instructors choose to teach, and how they use (or fail to use) the standards in planning their instruction.

## Questions and Methods

I was inspired by the work of Castellano, Harrison, and Schneider (2008), who performed a review of CTE standards in all 50 states and the District of Columbia (Puerto Rico, U.S. Virgin Islands, Guam, and the Mariana Islands, while covered by Perkins IV, were not included). They concluded that there was a large variation in the quality and consistency of career and technical standards across states, and that while many states had developed standards, a much smaller number had cross-walked these standards—that is, explicitly linked them to academic standards. It is interesting to note from Castellano *et al.*'s (2008) research that some states which had only partly completed the development of statewide CTE standards, had done so while concurrently linking academic and CTE standards. They noted that Mississippi, Louisiana, Ohio and North Carolina were leaders in the development of CTE state standards (Castellano *et al.*, 2008).

Using their research as a jumping off point, I reviewed the embedded academic standards in CTE disciplines in eight states—Nebraska, Georgia, New Hampshire, Massachusetts, Connecticut, Maine, Alabama and Louisiana. Through a review of state CTE standards, state academic standards, and crosswalk documents, the amount and type of state math standards linked to CTE was evaluated. These standards

**“THESE CAN SERVE AS REMINDERS THAT, AS ONE MASSACHUSETTS DEPARTMENT OF EDUCATION EMPLOYEE SAID, ‘YOU CANNOT TEACH TECHNICAL STANDARDS WITHOUT ALSO TEACHING OTHER CONTENT.’”**

were compared with the Common Core (2010) academic standards to determine whether the requirement for academic rigor that Perkins IV requires was being met.

Overall, I wanted to answer the following questions: Are states now, four years after the passage of Perkins IV, more thoroughly aligning CTE and academic standards? Does the academic language of math used in the alignment represent the teaching and learning of a “rigorous” curriculum? And, finally, what is the implication of including the academic language directly within the embedded academics frameworks for CTE? Who serves to gain or lose from this academic language?

## Data Review Outcomes

The data revealed a wide variation in presentation of state standards, and the levels of math knowledge linked to CTE areas. Nebraska's CTE standards are cross-walked, linking math standards from grades four, eight and 12 into the CTE standards (Nebraska Department of Education, 2003). The specific math language of the standards is used, and there is a clear connection between the CTE standard and the academic standard.

In New Hampshire, the applied math is at a low level (fractions, decimals, percentages), and may not accurately reflect the complexity of problems encountered within a technical area. As of August 2009, the New Hampshire CTE frameworks have only been linked to science, which impacts the ability of researchers to evaluate the type of math that can be emphasized in CTE programs, and the level of academic rigor provided. The New Hampshire Department of

Education, however, indicated that the standards did not truly reflect the commitment to high math standards. The state is in its third year of implementing the National Research Center for Career and Technical Education's Math-in-CTE program, which partners academic math instructors with CTE instructors to create integrated lessons, and a representative from the state education department reported “success” with this program. In addition, at all levels, both Nebraska and New Hampshire said that integration of other academic areas into the CTE curriculum is required, and gave specific examples of integrated activities (Nebraska Department of Education, 2003; New Hampshire Department of Education, 2009).

In contrast, the CTE curriculum in Georgia is much more structured and rigorous (Georgia Department of Education, 2008). The CTE courses have been thoroughly cross-walked, so that it is clear to see which standard in the Plumbing I course links to a math course at the high school level (Georgia Department of Education, 2008). Georgia is slightly different from some of the other states surveyed by including process standards within its math standards, and referencing these in the cross-walked CTE documents (Georgia Department of Education, 2009). These can serve as reminders that, as one Massachusetts Department of Education employee said, “You cannot teach technical standards without also teaching other content” (Russell, personal communication, April 2010).

In Connecticut, the standards for CTE are not cross-walked with academic standards, and the language used is strictly

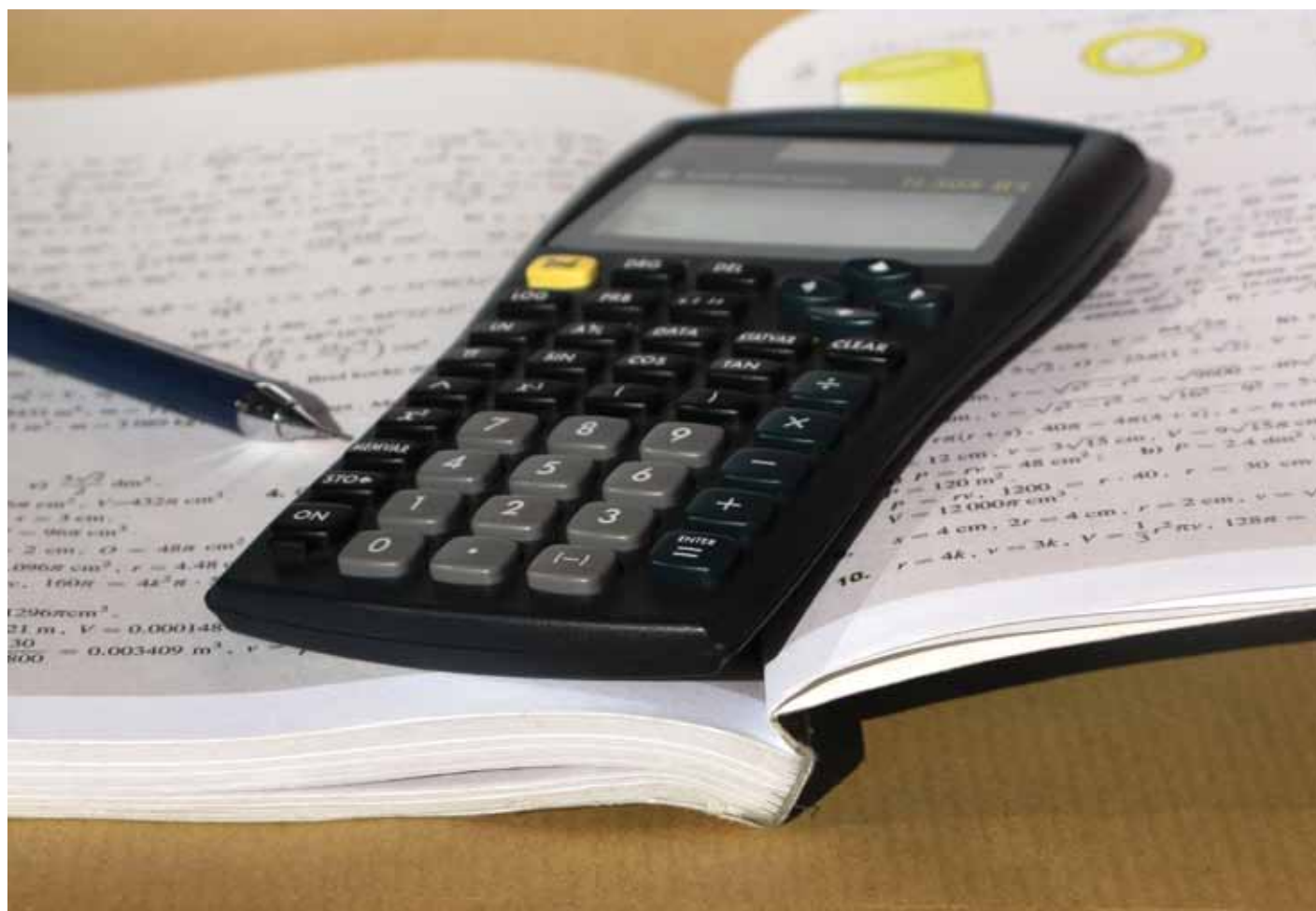


PHOTO BY STOCK.XCHNG.COM

the language of the trade being studied. This does not exempt the students from high-level math achievement. The state requires technical high school graduates to complete Algebra II, complete an approved project or elective course, or show proficiency on either a state or nationally normed exam (Connecticut Technical High School System graduation requirements). One such elective, Applied Math I and II, which links trade math with academic math, is offered for upperclassmen. Although it lacks the documentation of linkage between CTE and academics, by its graduation requirements, Connecticut certainly appears to be meeting the call from Perkins IV to increase rigorous academic content.

Massachusetts had developed a set of

statewide standards in each of the technical areas in 2005, but in 2007, the trade language was removed from the embedded academics portion of each CTE standard and replaced with appropriate academic curriculum standards. There is currently no cross-walking of academic and technical standards. An administrator at one technical school said that the sheer number of standards, covering everything from safety to general work skills, and including academic standards, was “overwhelming,” but that the lack of cross-walking was not controversial because schools could choose to address those in a variety of courses, including math, technical programs and related classes (Lussier, personal communication, April, 2010).

Maura Russell, from the Massachusetts Department of Elementary and Secondary Education, said that academic and CTE educators worked together on the embedded academic standards, in contrast with the earlier standards, which were created by CTE instructors (Russell, personal communication, April 2010; Traill, personal communication, April 2010). She admitted that some teams, in an effort to emphasize the very real connections that exist between academic math and technical math, may have created connections that were “tenuous,” and that in upcoming standards reviews, there were plans to ensure that academic standards were more clearly linked with the technical area.

## “MOST OF THE STATES REVIEWED STATED IN THEIR CTE DOCUMENTATION THAT **THE FUTURE OF CTE LAY WITHIN AN INTEGRATED EDUCATION, ONE THAT BLENDS CTE INSTRUCTION WITH INSTRUCTION IN THE ACADEMIC AREAS.**”

Overall, the results of the data review show that states are making progress toward defining a curriculum that is both rigorous and integrated. The level of math achievement in CTE continues to be a problem, though, with many standards not truly reaching the levels set forth in the Common Core curriculum for high school math courses (Council of Chief State School Officers, 2010).

### Integration Models and Stakeholders

There are some program models, such as High Schools That Work, and Math-in-CTE, that encourage collaboration between academic and technical instructors. As some of these programs have moved past the pilot stage, it has been possible to review the experiences of teachers who participated in full pilot studies or in less intensive experiences.

One follow-up study, *Sustaining the Impact* (Lewis and Pearson, 2007), found that more than 15 percent of CTE instructors who attended a two-day workshop on the Math-in-CTE approach were not teaching explicit math because they felt they “lacked the background [or] experience” (p. 13). The same number were not teaching explicit math because they lacked the support of a math teacher. This may indicate that only including the academic language of math within the CTE frameworks is not enough to encourage the teaching of explicit math. It may even discourage those teachers who feel they lack the qualifications.

However, this is no reason for states to avoid making clear links between academic and technical standards. Many CTE instructors who responded to Lewis and Pearson’s (2007) follow-up surveys indicated that they either planned to

teach explicit math in the following year, or that they wanted to be able to work more closely with a math teacher. Many of these instructors expressed a desire to have the time to understand the math embedded in their technical area in a more detailed way.

It is clear that even though many entry-level jobs do not require a high level of math, and daily living may not require math at the pre-calculus level (ICLE, 2006), students still stand to benefit from a rigorous math education. It then is the job of schools and districts to develop the programs that will aid not only students, but also teachers, in developing their math knowledge.

### Conclusions and Suggestions for Further Research

Most of the states reviewed stated in their CTE documentation that the future of CTE lay within an integrated education, one that blends CTE instruction with instruction in the academic areas. The quality and consistency of cross-walked state standards in CTE education still varies from state to state, reflecting the more localized control of education that has long been a hallmark of American education (McGuinn, 2006). However, it appears that most states are working to include higher levels of math knowledge within the integrated CTE frameworks. There are many avenues of future research, both in general educational policy and in math education policy. **T**

For more information on Math-in-CTE visit [www.nrccte.org](http://www.nrccte.org). For more information on High Schools That Work visit, [www.sreb.org](http://www.sreb.org).

## References

- Carl D. Perkins Career and Technical Act of 2006. Pub. L. No. 109-270. 120 Stat.683.
- Council of Chief State School Officers. (2010). *Common Core State Standards for Mathematics*.
- Connecticut Department of Education. (2007). Carpentry curriculum graduation requirements.
- Fletcher, E. (2006). “No Curriculum Left Behind: The Effects of No Child Left Behind Legislation on Career and Technical Education.” *Career and Technical Education Research* (31) 3. 157-174.
- Georgia Department of Education. (2008). Plumbing I.
- Georgia Department of Education. (2009). Mathematics 3.
- International Center for Leadership in Education (2006). Composite Quantile Data.
- Marks, H. and Nance, J. (2007). “Contexts of Accountability Under Systemic Reform: Implications for Principal Influence on Instruction and Supervision.” *Educational Administration Quarterly* (43) 1. 3-37. doi: 10.1177/0013161X06291414.
- Massachusetts Department of Elementary and Secondary Education (2007). Vocational Technical Education Frameworks.
- McGuinn, P. (2006). *No Child Left Behind and the Transformation of Federal Education Policy, 1965 – 2005*. Lawrence, KS: University Press of Kansas.
- Nebraska Department of Education. (2003). *Industrial Technology Education: Links to Standards Reports*.
- New Hampshire Department of Education. (2006). K-12 mathematics curriculum framework.
- New Hampshire Department of Education. (2009). Program competencies.

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**■ ACTE Board of Directors Election Results**

ACTE thanks all members who voted during the 2011 Board of Directors election. The results have been received and verified and ACTE is pleased to announce the results as follows:

- President-elect is Karen Mason from Granby, Missouri. She is the family and consumer sciences teacher at East Newton High School. Mason will join the Board in July 2011.
- Region I vice president is Bob Scarborough from Cincinnati, Ohio. He is a director at Great Oaks Institute of Technology and Career Development. Scarborough will join the Board in July 2011.
- Marketing Education Division vice president is LeAnn Dinsdale from Corpus Christi, Texas. She is a marketing teacher at Tuloso-Midway High School. Dinsdale will join the Board in July 2011.
- Adult Workforce Development Division vice president-elect is Andrea Pogue from Stillwater, Oklahoma. She is an adult and career development consultant at the Oklahoma Department of Career and Technology Education. Pogue will join the Board in July 2012.

is worth the investment. You're encouraged to make the commitment now to make a difference by attending the 2011 National Policy Seminar. For more information or to register, please visit [www.acteonline.org/nps.aspx](http://www.acteonline.org/nps.aspx).



**■ Mark Your Calendars Now for St. Louis**

The 2010 ACTE Annual Convention and Career Tech Expo may have come and gone, but the 2011 event is just around the corner! Mark your calendars now for the 2011 Annual Convention and Career Tech Expo, November 17-19, in St. Louis, Missouri. St. Louis is known as the Gateway to the West. Let it become your gateway to quality professional development, an extensive exhibit hall and excellent networking. Get the latest information by visiting [www.acteconvention.com](http://www.acteconvention.com).

to provide CTE professors and educators with scholarly/professional development opportunities while at the same time benefitting the ACTE membership as a whole. Interested in spending three to six months working with ACTE? A monthly stipend is provided. Visit the ACTE Web site for more information on the Scholar-in-Residence program at [www.acteonline.org/employment.aspx#scholar](http://www.acteonline.org/employment.aspx#scholar), and the Practitioner-in-Residence program at [www.acteonline.org/employment.aspx#practitioner](http://www.acteonline.org/employment.aspx#practitioner).



**■ ACTE Offering Consulting Services**

ACTE announces a new service that offers a wide variety of customized options to support organizational development, and to drive school improvement. As a leader in CTE, ACTE is a trusted resource for schools, districts and state educational agencies. The ACTE Consulting Service has gathered a cadre of knowledgeable and experienced experts to provide a range of services, including strategic planning, leadership development, marketing, data collection and analysis, energy sustainability program development and facilities management. Our expert consultants have a long history of supporting CTE teachers and leaders throughout the United States and internationally. For more information about the consulting services, please contact Jan Bray at [jbray@acteonline.org](mailto:jbray@acteonline.org).



**■ National Policy Seminar: March 7-9**

Career and technical education (CTE) advocates are needed this year more than ever before. The recent election resulted in many new Members of Congress and new staff who are unaware of CTE's value. This compounds an already challenging budget atmosphere; it is an uphill battle to convince Washington that CTE

**■ Scholar and Practitioner in Residence**

ACTE is pleased to announce Coleen Keffeler and Linda Moyer as the first two Practitioners in Residence. Both Practitioners will begin their work with ACTE this summer. Although the Practitioner in Residence positions have been filled for summer 2011, applications are accepted on a rolling basis for projects proposed for other times of the year. The intent of the Scholar-in-Residence and the Practitioner-in-Residence programs is

**■ Member-Get-A-Member Campaign**

A strong word-of-mouth campaign is the surest way to promote the growth of ACTE. Seventy-eight percent of people



trust their peer recommendations. And as an active member, you are the best advocate for membership.



You know firsthand of the value your membership provides in advancing your career as well as strengthening the CTE profession. Any member in good standing is eligible to participate. For more information and resources, please visit [www.acteonline.org/getamember.aspx](http://www.acteonline.org/getamember.aspx).



**Congratulations to the Schools that Achieved 100!**

ACTE wants to congratulate all of the schools that won our Achieve 100 Award. All of these schools have 100 percent ACTE membership for the 2010-2011 school year!

- Autry Technology Center
- Avondale High School
- Baldwin High School
- Canadian Valley Technology Center—Chickasha Campus
- Canadian Valley Technology Center—Czech Hall Rd Campus
- Central Technology Center—Drumright Campus
- Central Technology Center—Sapulpa Campus
- Chamblee Charter High School
- Choctaw County Career and Technology Center
- Colton High School
- Drake-Anamoose High School
- Francis Tuttle Technology Center—

- Portland Campus
- Francis Tuttle Technology Center—Reno Campus
- Francis Tuttle Technology Center—Rockwell Campus
- Green Country Technology Center
- High Plains Technology Center
- Indian Capital Technology Center—Stilwell Campus
- Indian Capital Technology Center—Tahlequah Campus
- Kiamichi Technology Center—Atoka
- Kiamichi Technology Center—Durant
- Kiamichi Technology Center—Hugo
- Kiamichi Technology Center—Idabel
- Kiamichi Technology Center—McAlester Campus
- Kiamichi Technology Center—Poteau
- Kiamichi Technology Center—Spiro Campus
- Kiamichi Technology Center—Stigler
- Kiamichi Technology Center—Talihina
- Kiamichi Technology Center—Wilburton
- Lake Career and Technical Center
- Madison Career and Technical Center

- Meade County Area Technical School
- Metro Technology Center—Career Academy (MCA)
- Newton Career Center
- Northwest Technology Center—Alva Campus
- Northwest Technology Center—Fairview Campus
- Petal High School Career and Technical Education
- Pioneer Technology Center
- Pontotoc Technology Center
- Pope School
- South Panola High School
- Southern Technology Center
- Southwest Technology Center
- Susquehanna County Career and Technology Center
- Tri County Technology Center
- Webster County Career and Technology Center
- Wes Watkins Technology Center
- Western Technology Center—Hobart Campus
- Western Technology Center—Weatherford Campus
- Western Technology Center—Sayre Campus **†**

ACTE.....	<a href="http://www.acteonline.org">www.acteonline.org</a> .....	38, 39, C3
American Technical Publishers.....	<a href="http://www.go2atp.com">www.go2atp.com</a> .....	11
Chico State University.....	<a href="http://www.csuchico.edu">www.csuchico.edu</a> .....	62
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# Pharmacy Technician

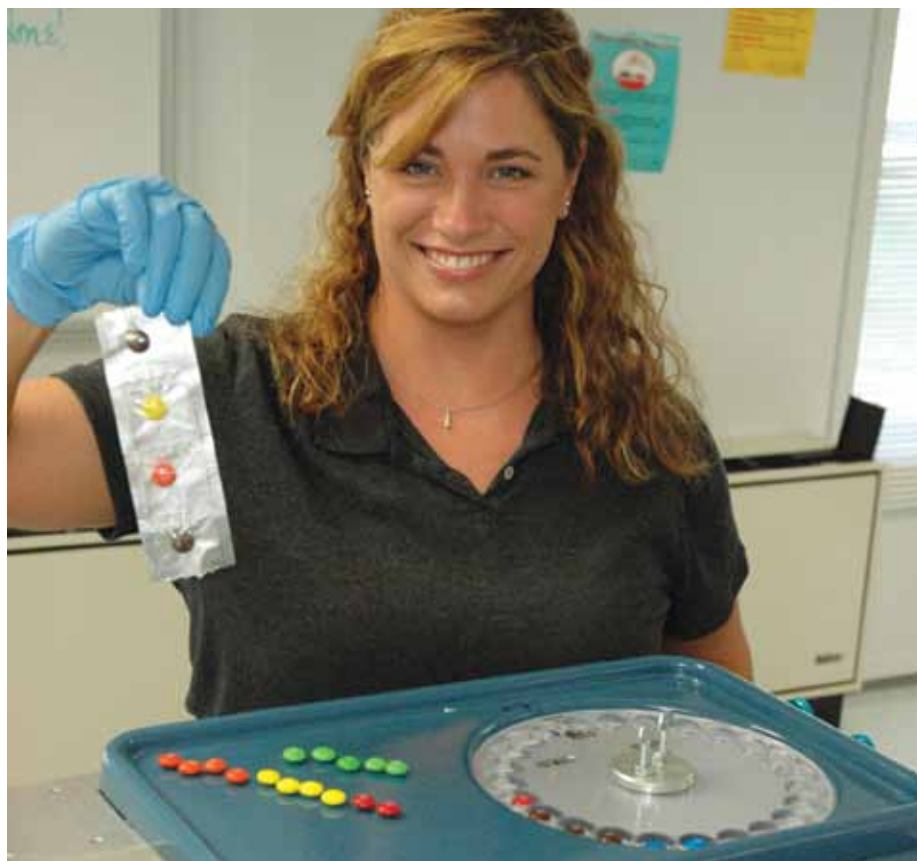


PHOTO COURTESY OF SOUTHEAST COMMUNITY COLLEGE

**PHARMACY TECHNICIANS WORK UNDER THE SUPERVISION** of a licensed pharmacist preparing prescription medications, providing customer service and performing administrative tasks. Their duties may include measuring, mixing, counting, labeling and recording amounts of dosages of medications. They receive written or phone requests from patients and prescriptions sent electronically from doctors, and may schedule and maintain workflow and assist with inventory and ordering.

## The Workplace

Pharmacy technicians work in retail and mail-order pharmacies, hospitals, nursing homes, assisted-living facilities, in the military and in education/training programs.

## Educational Requirements

According to the U.S. Bureau of Labor Statistics, although there is no national training standard for pharmacy technicians, employers favor job applicants who have formal training, certification or previous experience. Pharmacy technician programs are offered at a number of community colleges and technical schools, and usually range from six months to two years. Students may earn certificates, diplomas or associate degrees.

## Earnings

The U.S. Department of Labor's *Occupational Outlook Handbook* reports that the median hourly wages of pharmacy technicians in May 2008 were \$13.32,

with the highest 10 percent earning more than \$18.98 per hour. Certified technicians earned more on average than those lacking certification.

## Job Outlook

According to the National Pharmacy Technicians Association, the current job growth is 28.8 percent, and the *Occupational Outlook Handbook* projects employment of pharmacy technicians to increase by 31 percent from 2008 to 2018. Like most health care-related professions, pharmacy technicians' job prospects will be excellent due to our aging population and the need to replace those who leave the workforce. **T**

## Explore More

For more information about the career of pharmacy technician and the training and education it requires, here are some places to turn.

Accreditation Council for Pharmacy Education  
[www.acpe-accredit.org](http://www.acpe-accredit.org)

American Association of Pharmacy Technicians  
<http://pharmacytechnician.com>

American Society of Health-System Pharmacists  
[www.ashp.org](http://www.ashp.org)

Council on Credentialing in Pharmacy  
<http://pharmacycredentialing.org>

National Pharmacy Technician Association  
[www.pharmacytechnician.org](http://www.pharmacytechnician.org)

Pharmacy Technician Certification Board  
[www.ptcb.org](http://www.ptcb.org)

Pharmacy Technician Educators Council  
[www.rxptec.org](http://www.rxptec.org)

## SCHOOL SPOTLIGHT

# Southeast Community College

### SOUTHEAST COMMUNITY COLLEGE (SCC) WAS ORIGINALLY ESTABLISHED

to meet the occupational education needs of the entire state of Nebraska, and today it still serves 15 counties in the state through its Lincoln, Beatrice and Milford campuses. The school offers almost 50 career tech and academic transfer programs. Its programs are accredited by the Higher Learning Commission of the North Central Association, and many have additional accreditation as well.

Among the offerings at SCC is the Pharmacy Technician Program, a 12-month program that provides students with a concentrated basic study and laboratory practice in pharmacy technician fundamentals. Courses in the program include pharmacology/pharmaceutical products, pharmacy calculations, pharmacy operations, pharmacy law and ethics, professional trends and issues, and pharmacy clinical education.

The program teaches the concepts, principles, skills and attitudes needed to work with patients and pharmacists, and is offered at the Beatrice campus. For the winter quarter of 2011, SCC began offering the program online. Until that time, the program had only been available as a face-to-face format, and SCC does continue to offer that option to students as well.

According to Elina Pierce, program chair and instructor for the SCC Pharmacy Technician Program, “The entire program is online except for the lab portion. While most of the lab work is online, students are still required to come to the Beatrice campus three or four times per year to do their lab work and to complete check-offs.”

Pierce, who was honored as the 2010



PHOTO COURTESY OF SOUTHEAST COMMUNITY COLLEGE

▲ Nebraska's SCC provides students in the Pharmacy Technician Program with a concentrated basic study as well as laboratory practice in pharmacy technician fundamentals.

Technician of the Year by the Nebraska Pharmacists Association, has helped the diploma program achieve accreditation through the American Society of Health-System Pharmacists (ASHP), and it is the only Nebraska program listed as accredited on the ASHP Web site. She also organized an advisory committee that includes members from the surrounding communities who are passionate about the pharmacy field. They come from pharmacies that include B&R stores, Creighton University School of Pharmacy, Saint Elizabeth Regional Medical Center, BryanLGH, University of Nebraska Medical Center School of Pharmacy, Clabaugh's Pharmacy, Novartis, Shopko, Lincoln Regional Center, Jefferson Community Health Center, and others.

The program's success rate is impressive, with most of the 2009-2010 graduates either finding employment or continuing their education. Pierce calls putting the program online probably her biggest accomplishment, but she is not

stopping there. “I've had a lot of positive feedback on the program and the type of students who graduate from it, but I want to take the program to a new level,” she says. “Eventually, hopefully, I would like to make the degree an associate degree. We are also partnering with National Pharmacy Technicians Association to offer certified compounding training—both aseptic and non-aseptic—to current technicians or graduates of the program through our continuing education department.”

So thanks to SCC and to Pierce, Nebraska residents will continue to benefit from this program by having skilled and well-trained technicians in their pharmacies, and students will continue to benefit by graduating with the opportunities and the education to succeed. ■

*For more information about Southeast Community College and its pharmacy technician program, visit [www.southeast.edu](http://www.southeast.edu).*



1

**THESE FREE TOOLS ARE NOT AS WELL KNOWN AS SOME OTHER INTERNET SERVICES** that have sprung up in the past several years, but could still prove extremely useful for career and technical education (CTE) educators looking for online resources to improve efficiency and liven up activities in the classroom.

**1 Web-Chops**  
Web site

[www.web-chops.com](http://www.web-chops.com)

**The 411:** Web-Chops is a site that lets you clip content from the Web and organize it into your own custom topic page. With this free tool, teachers can create pages for their classes on a particular subject—pages that avoid irrelevant material as well as advertising or inappropriate content. Text, video clips, audio, flash applications and forms can all be clipped and imported into Web-Chops. The service is easy to use: download the toolbar for Internet Explorer or Firefox, copy a portion of the page, save it and position it on your topic page. In addition, users can make topic pages public, friends only or private.

to share timelines on social networks, embed timelines, e-mail timelines and subscribe via RSS to timelines. CTE students can use Timetoast to make timelines about the development of particular types of technology or the evolution of medical processes. Best of all, the site is free and easy to use.



2

**2 Timetoast**  
Web site

[www.timetoast.com](http://www.timetoast.com)

**The 411:** With Timetoast, teachers and students can create interactive timelines. Users can add individual events as well as timespans that are complete with links and images. Other features allow users

**3 Cacao**  
Web site

<http://cacao.com>

**The 411:** Cacao is an online drawing tool for creating diagrams such as wire frames, site maps and network charts for computer science classes and other courses. Diagrams are created through the use of stencils that users drag and drop into place. Users can also upload their own images to add to charts. Multiple students can edit the same diagram in real time and use a chat feature to help collaboration. When edits are complete, the diagram is automatically updated anywhere it is linked. The free version allows up to 15 users per diagram. **T**



3

## ENGAGE ONLINE WITH ACTE



### CTE Professionals on the Web

Periodically, we will be profiling an ACTE member who is using the Internet and social media to connect with CTE students and educators. **Christine Hollingsworth** is the family and consumer sciences supervisor and FCCLA state adviser for the Missouri Department of Elementary and Secondary Education. Hollingsworth is also an online enthusiast who maintains a blog and Twitter and Facebook accounts for Missouri FCCLA, in addition to using online tools for her own professional development. Under her guidance, Missouri FCCLA ([twitter.com/mofccla](https://twitter.com/mofccla)) and ACTE hosted a Tweet Chat last fall with Chef Jeff Henderson.



### Seen on the Blog

“Believing that student engagement and achievement are best facilitated through hands-on learning environments, a Boston middle school is utilizing an old staple of CTE: woodshop. Traci Walker Griffith, principal at Eliot School in the North End, instituted mandatory woodworking courses at the beginning of the school year. ‘It’s really important for students to feel they are the drivers rather than the passengers of their own learning,’ Walker Griffith said. Under the new program, all sixth-, seventh- and eighth-grade students at the Eliot School spend one period a week at the North Bennet Street School, where they build a project under the guidance of master craftsmen. Woodshop instructor Ben Kellman is excited by the renewed emphasis on hands-on learning.”

—Chris Hemmelman in the *CTE Policy Watch* Blog post “*Policy Trends in Action: Boston Middle-School Utilizes Woodshop Classes to Boost Student Engagement and Achievement*”



### Heard on the Podcast


“It’s just that the kids of today are so bright, they’re so technically savvy and we have to find ways to engage them and get them a more hands-on educational program instead of just ‘chalk and talk.’ We put a program together here where we take the different aspects of our

business and try to build those hands-on educational programs around the different portions of our business. Let’s say that there are three students who come in and they have a budget to work with. They have to hire a driver, they have to hire a crew, they have to buy equipment. Three or four other students come in, they would handle the logistics of hotel rooms and airfares and have it all work within the budget. And then another side takes a simulation program and builds how the car would perform on the race track.”

—IndyCar’s John Barnes in an episode of the *Career Tech Talk Podcast*



### 2010 Convention Social Media Roundup

In case you missed the conversation, ACTE’s social networks were buzzing with dialogue during the 2010 Convention and Career Tech Expo. On the Convention Blog, attendees Chris Droessler, Janet Goble, Tracey Newman and Amanda Sollman shared experiences and takeaways from the ACTE event and the concurrent NAAE Convention, including sessions, exhibits, awards ceremonies and fun on the town. In addition, attendees used Twitter to live tweet from the general sessions, and exhibitors promoted special offers and giveaways. Get involved with ACTE social networks year round at [www.acteonline.org/e-media.aspx](http://www.acteonline.org/e-media.aspx). 



To visit these online resources and explore other spaces where your colleagues are talking, such as ACTE on Facebook, LinkedIn and Twitter, visit [www.acteonline.org/e-media.aspx](http://www.acteonline.org/e-media.aspx).

Tenure-Track Position

COLLEGE OF AGRICULTURE—AGRICULTURE/AGED

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THE COLLEGE

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THE UNIVERSITY

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California State University • CHICO • *Today Decides Tomorrow*

THE COMMUNITY

Located in the Sacramento Valley near the foothills of the Sierra Nevadas, Chico retains the charm of a small town with reasonable cost of living while offering excellent medical services, public and private schools, and many cultural and recreational activities.

APPLICATION/NOMINATIONS

To view the full job description and for information on application process please visit our website at: [www.csuchico.edu/agr/](http://www.csuchico.edu/agr/)

Application review begins **April 4, 2011**.

Applications received after that date may be considered. Open until filled.

Send application materials to:

**Brad Dodson, Ph.D.; Chair of the AGRI/AGED Search Committee**  
California State University, Chico  
Chico, CA 95929-0310

Phone: 530-898-6170 E-Mail: [Bdodson@csuchico.edu](mailto:Bdodson@csuchico.edu)

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**ACTE 2011 ANNUAL CONVENTION AND CAREER TECH EXPO**



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ACTE

**NOVEMBER 17–19**  
**ST. LOUIS, MISSOURI**

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# Hands-on Training Solutions

Questech's hands-on trainers prepare students for careers in the growing green economy

**NEW!**



**Solar Thermal Technician**



**Solar Panel Installer**



**Wind Turbine Technician**



**Weatherization Technician**

## Green Collar Zone Trainers:

- Are easy to teach and come complete with curriculum package, workstation, professional tools of the trade, equipment, and consumable supplies.
- Are equipped for three class periods.
- Have 20 hour, STEM based curriculum that leads students through a series of hands-on activities to apply new concepts in skills practice.
- Also work in conjunction with 35 different Construction Zone hands-on trainers to integrate construction skills and energy technology skills.

## Free 50 Page Color Catalog Includes:

Workstation Descriptions • Specifications • Complete Pricing

Call 800-229-0018 or Request at  
[www.greencollarzone.com](http://www.greencollarzone.com)  
[www.constructionzones.com](http://www.constructionzones.com)