

ISSUE BRIEF

Infusing Career and Technical Education into High School Reform – Lessons from California

This issue brief is one of a series supported by the Bill & Melinda Gates Foundation that addresses current educational issues informed by relevant research and also based on information gained through an AYPF site visit. This site visit was made to Sacramento, California in November 2008 to study the state’s policy work on Career and Technical Education (CTE), and the trip was exclusively for states selected by the National Governors Association Center for Best Practices to participate in their Policy Academy on Career and Technical Education. As such, this issue brief does not address every issue involved with CTE but highlights issues that California is addressing that we learned about during the trip.

Background

Career Technical Education (CTE) is receiving increased attention from policymakers, educators, and the public due to its potential to stimulate education reform and galvanize workforce and economic development.ⁱ Faced with disengaged students, a high school graduation rate that has held steady around 70 percent, escalating competition from the global labor market, and a pressing need for skilled workers, states are re-examining the role CTE can play in high school reform and economic development. They are recognizing the critical need to re-engage students by connecting their learning to real-world situations. Congress has also responded to this need by passing the Carl D. Perkins Career and Technical Education Act of 2006 (Perkins Act). This latest version of the Perkins Act provides funding for CTE programs that provide students with career pathways to postsecondary options and the skills necessary to compete in the workforce, whenever they choose to enter it.

The U.S. Department of Education’s Office of Vocational and Adult Education (OVAE) notes that most high school students take at least one career and technical education course, and one in four students take three or more courses in a single program area. However, a challenge has been ensuring that students are exposed to rigorous CTE coursework that has application in the real world and is linked to labor market demand. Part of the challenge is evident in the findings of a 2005 report, where 81 percent of students who dropped out of high school declared that “real world learning” might have influenced them to stay in school.ⁱⁱ On the positive side, research assembled by the Association for

From Vocational Education to Career and Technical Education

The concept of career and technical education originated from vocational education programs begun by the federal government in 1917 through the Smith-Hughes Act. Vocational education programs have often been stigmatized for their original purpose of tracking students, primarily minority and low income, into work-only prospects after high school. Today the term “vocational education” still carries a negative connotation, and policy leaders and educators are exerting efforts to revise the instruction provided and the outcomes for students. Thus the term “Career and Technical Education” is now used to differentiate the more rigorous academic and technical instruction from vocational education programs that only prepared students for a specific job. Today, effective CTE programs prepare students for further postsecondary education and careers, include more academic content in their curricula, and demonstrate more clearly how academic concepts are applied to technical or occupational settings.

Career and Technical Education underscores the gains in academic achievement and earnings that CTE can produce, such as increases in reading, math, and science achievement and improved employment outcomes.ⁱⁱⁱ Career and technical instruction can significantly contribute to student progress, academic achievement, and career success and equip students with 21st century skills, such as critical thinking, problem-solving, communication, self-direction, teamwork, and collaboration, vital to functioning in the global economy.

But exposure to CTE coursework in high school is not sufficient. Most jobs that offer substantive compensation, as well as occupations that are increasingly technical, require postsecondary education, and the challenge remains that too few students make a successful transition from high school through postsecondary completion. Ewell and Kelly note that only 67 of every 100 students who begin ninth grade graduate high school on time. Of the 100 students, only 38 will enter postsecondary education immediately, and only 18 will graduate with a bachelor's degree within six years, or an associate degree within three years.^{iv}

CTE offers students an opportunity to attain the skills needed for successful entry into challenging jobs by bridging secondary and postsecondary education. Through CTE, students may participate in programs such as Tech Prep, which is a component of the Perkins Act and was created in the early 1990s to connect high schools and community colleges. The Tech Prep programs combine instruction for the last two years of secondary education with at least two years of postsecondary education, with the aim of graduating students with an associate degree or two-year certificate. The new focus on career pathways also helps students prepare for and transition to postsecondary education. Programs such as these thus place students on the path to postsecondary success. However, attention still needs to be paid to ensuring students are ready to engage in a postsecondary curriculum, without requiring remediation, and that supports are in place to ensure postsecondary persistence and completion.

CTE at the State Level: Focus on California

California provides a useful blueprint for others ready to infuse CTE into their college and career readiness initiatives.

In November, 2008, the American Youth Policy Forum (AYPF) hosted a professional learning opportunity in Sacramento, California for state policy leaders from Arizona, Nebraska, New Jersey, Ohio, and Oklahoma. AYPF worked collaboratively with the National Governors Association Center for Best Practices (NGA Center), providing this trip as one of the components for states chosen to participate in NGA Center's recently-launched one-year [CTE Policy Academy](#). The academy funds five states as they develop comprehensive state-led action plans to accelerate the shift towards more rigorous CTE courses that prepare students for college and careers.

The goals of the AYPF field trip, funded by the Bill & Melinda Gates Foundation, were for policy leaders to learn about California's efforts at improving CTE, to witness the interaction between state initiatives and district implementation, and to examine the impact of the reform at the school level by visiting schools

and hearing from principals, teachers, and students. California was selected due to the progress the state has made in infusing CTE into high school reform.

Participants learned about aspects of CTE in California from a variety of presenters, including Jack O'Connell, State Superintendent of Public Instruction, California Department of Education (CA DOE); Paul Navarro, Deputy Legislative Secretary, Office of the Governor; Patrick Ainsworth, Assistant Superintendant and Director of Secondary, Post-Secondary and Adult Education, CA DOE; Dr. Jack Scott, Chairman, Senate Education Committee; Sue Wilbur, Director of Undergraduate Admissions, Office of the President, University of California; David Butler, Chief Executive Officer, LEED (Linking Education and Economic Development); Steven Ladd, Superintendent, Elk Grove Unified School District and LEED Board member; and Gary Hoachlander, President, ConnectEd. Visits to two high schools in Sacramento rounded out the trip: At [Arthur A. Benjamin Health Professions High School \(HPS\)](#) AYPF was hosted by Principal Matt Perry, and at [Luther Burbank High School](#) by Principal Ted Appel.

Presentations and site visits focused attention on a number of important issues related to infusing CTE into a college and career ready agenda, and promoting economic development. These included:

- Identifying Imperatives to Change
- Importance of Legislative Support to Promote Change in CTE
- Curriculum Standards and Framework
- Teacher Credentialing and Professional Development
- Engaging the Higher Education Community in CTE Reform

Identifying Imperatives to Change

Career technical education has become a priority for the state of California with the support of Governor Schwarzenegger. He was instrumental in urging an integration of CTE with academic instruction, and increasing funding for these endeavors.

Furthermore, the high school dropout rate in California is viewed as impeding the attainment of a highly skilled workforce. In a 2008 radio address, Jack O'Connell, the State Superintendent of Public Instruction, commented, "Now we must face the alarming news that one in four students is dropping out of our California public high schools. These high school dropouts will struggle to find employment, let alone find a job in which their true potential flourishes. What's even more troubling is that the dropout rate is even higher among our African American, Hispanic, and low-income students. This achievement gap is a crisis. The loss of potential for students who do not finish school is simply staggering. And it is a major loss to our state's economy. To keep California's economy competitive, we need the jobs a well-educated workforce attracts. According to the California Dropout Research Project, each yearly wave of dropouts will cost California \$46 billion through increased spending and reduced taxes."^v



Jack O'Connell

Aware of the growing crisis posed by dropouts and the impact on the economy, in March of 2007 the Governor hosted a CTE summit to draw attention to the importance of Career Technical Education and

its impact on California's economy, arguing that in order to maintain the economic success of the state, California students need to have the skills necessary to compete in the global market. The convening of key stakeholders included the Legislature, California Department of Education, businesses, industry sector representatives, community colleges, university systems, foundations, and members of the public. The governor encouraged all these stakeholders to participate in identifying the need to change, and he urged them to renew their focus on CTE. He pledged funding support, acknowledging that CTE not only fulfills the needs of the workforce, but also provides students with "multiple pathways to success."

These multiple pathways consist of a variety of career pathways open to students. A career pathway is a coherent sequence of rigorous academic and technical courses that allow students to learn how to apply their academic knowledge and develop technical skills in a curricular area. Career pathways prepare students for successful completion of state academic and technical standards and more advanced postsecondary course work related to the career in which they are interested. Students pursue pathways within California's 15 major industry sectors: Agriculture and Natural Resources; Arts, Media, and Entertainment; Building Trades and Construction; Education, Child Development, and Family Services; Energy and Utilities; Engineering and Design; Fashion and Interior Design; Finance and Business; Health Science and Medical Technology; Hospitality, Tourism, and Recreation; Information Technology; Manufacturing and Product Development; Marketing, Sales and Service; Public Services; and Transportation. Within each major industry there may be two or more pathways for students to choose from. For example, the Building Trades and Construction industry sector contains four pathways: Cabinetmaking and Wood Products, Engineering and Heavy Construction, Mechanical Construction, and Residential and Commercial Construction. The business sector has responded to the call for collaboration and active involvement by creating advisory groups that work with schools and universities, and providing local internships and various forms of work-based learning. Furthermore, a regional, rather than state-wide, focus for economic development allows individual regions to highlight and advance industry strengths. These various partners have strongly supported improvements to the CTE system.

Importance of Legislative Support to Promote Change in CTE



Paul Navarro

Governor Schwarzenegger has set the tone in California by communicating the value of CTE. The 2005-06 Governor's Budget expanded CTE opportunities for middle and high school students and improved the linkages between the career and technical curricula of the public schools and community colleges. The approved budget for 2007-08 provided \$52 million to enhance CTE curriculum, to fund the construction of facilities, to assist teacher recruitment and training, and to integrate academics into CTE courses. In addition, over \$500 million in bonds were approved for facilities, and \$200 million was added to the budget to

provide guidance and counseling services. Legislation (AB1412 and SB 1934) has been put into place to grant CTE the same status as the core academic subject areas and the arts by mandating the oversight of CTE curriculum standards and framework. Thus the state has set the bar: to meet the standards, CTE must be academically rigorous and offer real world relevance. Pat Ainsworth, Assistant Superintendent and Director of Secondary, Post-Secondary and Adult Education, emphasized that "as we moved



Pat Ainsworth

forward to making changes to our CTE programs, it was critical to have the legislation requiring the development of curricular frameworks. That provided us the impetus for doing this work, as well as political cover. We could tell districts that it wasn't just the Department of Education pushing for these changes, it was the legislature."

Curriculum Standards and Framework

In 2002 Assembly Bill 1412 (Wright) required the development of the CTE model curriculum standards. In addition to the standards, a CTE Framework has also been created, mandated by the passage in 2002 of Senate Bill 1934 (McPherson), a companion bill to the earlier Assembly Bill 1412. The [CTE Standards](#) and [Framework](#) represent a collaborative effort between key stakeholders, including secondary and postsecondary educators, representatives from industry and key educational organizations, legislators, students, and families. This combined effort has resulted in documents that combine information about career options, technology, and the skills needed for students to be successful in life. In California the adoption of model curriculum standards, organized around the state's 15 industry sectors, has elevated CTE programs to focus on high wage/high skill industries. The aim of developing the standards is clear, as is attested to in the document: "With [the standards] in place, our schools can create, implement, and strengthen a CTE curriculum that benefits our youth, our communities, and our economy."

The standards reveal California's historical respect for local control by describing what to teach, not how to teach, and thus at the local level the standards can be used to design specific instructional strategies and curricula to best teach students. Care has been taken to base the standards in research,^{vi} to ensure the standards are rigorous and relevant, and connected to the state's content standards in English language arts, mathematics, history – social science, science, and visual and performing arts.

The standards include eleven different skill sets that all students need to master to be successful:

- Academics, Communications
- Career Planning and Management
- Technology
- Problem Solving and Critical Thinking
- Health and Safety
- Responsibility and Flexibility
- Ethics and Legal Responsibilities
- Leadership and Teamwork
- Technical Knowledge and Skills
- Demonstration and Application

While the standards specify learning goals in 58 career pathways organized around 15 industry sectors, the framework serves as a much more detailed guide for implementing the standards, and for developing CTE pathways, courses, and assessments. The first part of the Framework provides extensive detail on a variety of topics applicable to all 15 industry sectors, such as information about lesson planning, establishing an effective administrative structure for a CTE program, and ways to engage the community. The second part of the Framework highlights each industry sector and presents

selected examples of standards-based curriculum and lesson planning for each pathway, including a sample course sequence, a sample authentic or project-based performance task assignment that integrates standards, sample rubrics, and possible pathway careers. Teachers, administrators, and curriculum specialists thus have access to a significant number of tools as they work to integrate academic instruction with real-world applications for students.

Teacher Credentialing and Professional Development

California's interest in expanding quality CTE has necessitated an increase in the supply of CTE teachers, as well as the need to improve the quality of CTE teacher preparation. Legislation has supported these efforts, with the passage of SB 52, which resulted in the creation of a California Career Technical Education Panel. The panel met for the first time in March 2007, and by January 2008 this body had drafted standards for CTE teacher preparation programs, updating the previous standards that had been adopted in 1993. The standards included putting into place a comprehensive and integrated CTE program design, providing early orientations for program candidates, supporting beginning teachers, and having professional programs be responsible for recommending candidates for a credential. The impetus to revise the preparation programs arose from strained linkages between CTE academic teachers and industry that continue to result in questions regarding teacher qualification. Traditionally, CTE teachers had much stronger connections to industry. The panel recommended that the pathways transitioning from industry to the classroom be strengthened, and that CTE teachers need to participate in practical summer externship experiences. The panel has also addressed creating program standards for the 19 education agencies approved by the state of California to provide CTE teacher preparation programs. These agencies include the California State University, the University of California, private and independent institutions of higher education, county offices of education, and school districts.

Teachers experience difficulty in meeting credential requirements, and thus California faces a shortage of CTE instructors. To address this challenge, the panel is working on increasing the CTE teacher supply by rewriting credential requirements. Further challenges include exploring ways to improve the professional development of CTE and academic teachers, who need to be able to work together effectively to meld career technical education and academic instruction.

Engaging the Higher Education Community in CTE Reform

Several years ago, the University of California (UC) system put in place a policy to encourage high school students to complete the ["A-G" requirements](#) in order to be adequately prepared for participation and for minimum eligibility for freshman admission in the University of California system. Initially, the bulk of classes that were approved to meet the A-G requirements were academic courses, but Sue Wilbur, from the University of California, shared with participants: "We are beginning to infuse academic and CTE courses into the A-G standards so that there are more options for students."

Wilbur noted that the University of California system is the only state university system in which high school CTE courses are reviewed to make sure they meet university entrance requirements. This university system is accomplishing this task on the largest scale in the nation. College faculty play a critical role in setting the criteria for



Sue Wilbur

approval, as they discuss and formulate the criteria on a regular basis. The progress made to date has been impressive. Ms. Wilbur stated: “We have reviewed over 8,000 CTE courses that were submitted by high schools over the past year. In 2000-01, there were 258 CTE courses approved; in 2008 there are now 6,000 CTE courses approved, which represents about 25% of all CTE courses. We expect this number to grow, as we are making tools available on the web so high schools can learn how to better develop CTE courses to meet the A-G requirements. We are also working with parents and students to make clear to them that students do not only have to take academic courses in order to meet A-G requirements, we want them to be aware that they can also take certain CTE courses, and that they can prepare for both college and careers.” She admitted that some courses, such as heavy equipment or culinary arts, are not approved or appropriate for university-level study and would never get approval because they are not taught at the university level.

As she contemplated the lessons learned, Wilbur noted the difficulty of working across sectors, as well as the challenge in reaching agreement on the level of rigor courses need to have to ensure that students are university-ready. However, on a positive note, she acknowledged the very interesting new courses that have been created that blend academics and CTE, including automotive physics, which was recently approved. As she urged the creation of academically rigorous CTE courses, she observed that it is easier to motivate the CTE teachers to take this on and to reach out to the academic teachers than it is to motivate the academic teachers to work with CTE teachers. Thus UC has provided some seed money to encourage this process. She concluded, “Because we have a shortage of CTE teachers, we need to be flexible in the way we certify CTE teachers and find ways to encourage those with industry experience to enter teaching. We also recognize that we have problems in that private universities and colleges in the state will not necessarily accept the CTE courses we have approved.”

California’s ongoing commitment to integrating the higher education community in its CTE initiative is evident in recent 2008 legislation. Assembly Bill 876 directs the UC and CSU systems to provide assistance and expertise in developing a statewide, integrated model CTE curriculum. The legislation also directs the UC and CSU systems to publish an online resource that lists academic and technical courses at California Community Colleges that meet the A-G admission requirements. Additionally, the online resource must identify partnerships between high schools and postsecondary institutions that grant university credit or advanced standing for students who complete specific high school pathway programs.

School-level Challenges

Site visits to two schools highlighted some of the immediate challenges faced by high schools as they work to integrate CTE and academic instruction. Providing students with adequate guidance and counseling regarding career options or courses to take remains a challenge, given the shortage of guidance counselors, or staff with the expertise to engage in this kind of mentoring. At Health Professions High School there is only a part-time counselor who is shared with other schools in the district. In his keynote address to participants, Gary Hochlander, President, [ConnectED](#) added his observations about this problem, noting that the small number of counselors has hampered schools’ efforts to develop a personalized learning plan for every student. The solution was often that teachers needed to act as advisors, which further increases their workload.



Matt Perry

School personnel shared other challenges, for example the provision of sufficient technical instruction, and the challenge of rearranging the school's master schedule to accommodate the curriculum changes. As the principal of Health Professions High School, Matt Perry noted, "We know that we need to improve the process for technical capstones. We are pretty good about preparing students for college, but we need more focus on the technical side of the curriculum. We feel like we need to build in more technical skills into 11th and 12th grade classes, but it's hard to work into our master schedule." Perry was referring to the fact that at present the school only has one capstone course, BIO 100 Anatomy and Physiology, and they are in the process of developing capstone courses such as BioTech and BioImaging, with grant assistance from the California Department of Education. Typically capstone courses provide students with opportunities to integrate their knowledge learned over a period of time, showcase their analytical, interpretive, and reflective skills, and examine issues in a complex way.

Matt Perry also noted the difficulty in getting business to contribute or provide internships for students. These internships are a vital component of the CTE learning experience, and thus a great deal of time is spent organizing them, but finding enough positions for all CTE students is a challenge.

Recommendations for States

1. Identify key industries requiring skilled labor, and clarify the qualifications workers should have. Make the case for linking education and economic development.
2. Invite all relevant stakeholders to the table - all levels of the education pipeline, legislature, business and industry and the public - and work with them to develop an education and workforce system that is aligned and integrated.
3. Use the governor's bully pulpit to stress the value of CTE, emphasizing the importance of skill development and preparation for college and the workplace. Ensure legislative support to mandate the development and oversight of standards and curriculum for CTE, revitalize facilities and provide necessary technology, and ensure a well-trained supply of CTE teachers.
4. Integrate teacher recruitment and preparation into an overall CTE program design. Establish clear mechanisms to provide teachers with the necessary credentials, ensuring a strong link between CTE teachers and industry. Implement program standards that are consistent across credentialing agencies.
5. Ensure a smooth transition for students from high school to institutions of higher education. Work with institutions of higher education to develop integrated CTE curricula, and provide relevant information about qualifying coursework more readily to community colleges and high schools.

Conclusion

At a time when states are working to reduce dropout rates, improve young people's chances of postsecondary success, and offer students a variety of learning opportunities, California's efforts in promoting career and technical education are worth close examination. CTE initiatives in California have benefitted from a supportive and active governor and legislature, who recognize that CTE is an important strategy to improve college and career readiness. The state has put into place a CTE

Framework and curriculum standards, is addressing teacher recruitment and preparation, and is working with postsecondary partners and community leaders to create a smooth educational pipeline for students. The goal is to create citizens who are lifelong learners, skilled to participate in a global economy.

ⁱ Betsy Brand, "Supporting High Quality Career and Technical Education through Federal and State Policy," (American Youth Policy Forum, Washington, DC: 2008)

ⁱⁱ John M. Bridgeland, et al. *The Silent Epidemic: Perspectives of High School Dropouts*. A report by Civic Enterprises in association with Peter D. Hart Research Associates for the Bill and Melinda Gates Foundation, March 2006, p. 12

ⁱⁱⁱ Association for Career and Technical Education, "Research Demonstrates the Value of Career and Technical Education." Research Fact Sheet, retrieved 2/12/2009 <http://www.acteonline.org/cteresearch.aspx>

^{iv} Ewell, Peter, Dennis Jones, and Patrick Kelly, *Conceptualizing and Researching the Educational Pipeline* (Boulder, CO: National Center for Higher Education Management Systems, 2003), p. 2.

^v Jack O'Connell, Radio Address on CA Drop Out Rate Crisis, <http://edjustice.blogspot.com/2008/07/california-drop-out-rate-crisis.html>, Retrieved 2/12/2009.

^{vi} The 1991 U. S. Secretary of Labor's report *Secretary's Commission on Achieving Necessary Skills* served as a source of information about the necessary foundation knowledge and skills global workers need.