

COLORADO SUCCEEDS

great schools are good business

SUMMARY REPORT

Engineering the Future: Career and Technical Education Redesigned for Today's Students

**Remember vocational education?
Shop class? Home economics?**

**Meet today's vocational education:
Career and Technical Education (CTE):**

- *Biotechnology*
- *Aviation technology*
- *Multimedia graphic design*
- *Agribusiness*
- *Process technology*
- *Health care administration*
- *Forensic science*
- *Aerospace engineering*
- *Teacher Cadet*
- *Fire science technology*
- *Rural entrepreneurship*
- *E-commerce*
- *Sports medicine*
- *Renewable energy*

***"CTE should be an important aspect
of a state's broader high school
redesign strategy."***

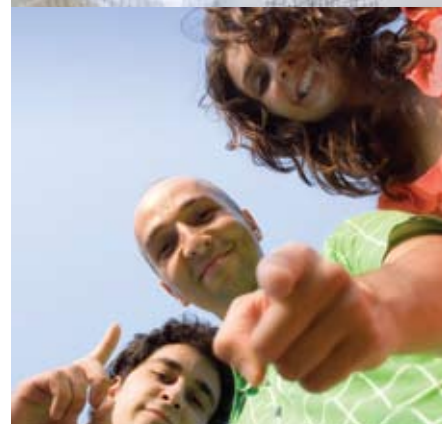
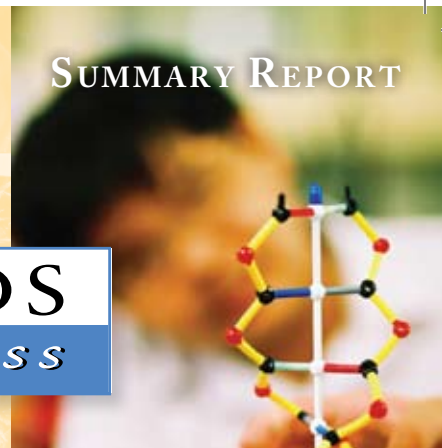
National Governors' Association, 2007

More than just a name change,
this is a revolution.

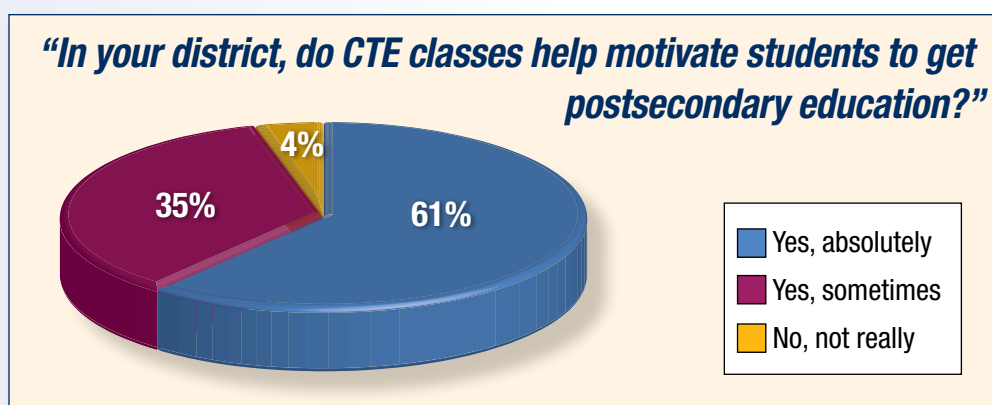
The best of today's CTE classes work at the intersection between academic content and practical application, focusing on content knowledge as well as skill acquisition. Students who take CTE classes not only learn math, science, and language arts – but they also know why learning is important as they apply their newly-acquired skills in a real-world context and plan for their own careers.

- At Loveland High School, students learn geometry by building housing for the homeless. The math credit they earn is exactly the same as if they had learned the content solely from a textbook, and they gain skills in teamwork, communication, construction, and business.
- At East High School in Denver, students in *Project Lead the Way*, a pre-engineering program, can choose among specialized courses such as Civil Engineering and Architecture, Biotechnical Engineering, and Aerospace Engineering, while taking foundational engineering courses and college preparatory mathematics courses.
- In the Wray School District in Yuma County, CTE students and their instructor developed a plan to save the district money by purchasing a wind turbine to offset energy costs and create revenue through the sale of renewable energy credits.
- In middle college programs at Pickens Technical College in Aurora and CEC Middle College in Denver, students graduate with a high school diploma, a technical certificate, *and* an associate's degree, prepared to enter the workforce or to continue their post-secondary education.

Continued on page 2



The Old Vocational Education Model	The New Career and Technical Education Model
Designed to teach specific skills to students who will go directly into the workforce after high school	Designed to teach both academics and technical skills to students who will have the choice about whether to go directly into the workforce or to continue their education
Targeted at students who are not “college material”	Targets all students, from those who want to go to work immediately to those who want to pursue graduate degrees
Did not link to postsecondary education	CTE plans of study include both high school and college courses, and there are many opportunities for students to gain both high school and college credit for the same course
Did not encourage lifelong learning	Provides numerous entry and exit points for work and education along a career pathway; assumes continuous learning



Continued from page 1

Colorado Succeeds kept hearing about this revolution in bits and pieces. As a group of business leaders focused on improving Colorado’s education system, we wanted to know more. What was going on? How was it affecting students? What potential did this new approach have for Colorado’s economy? As Colorado moves forward in finding ways to implement Governor Ritter’s ambitious goals of halving the high school dropout rate and doubling the number of postsecondary certificates and degrees awarded, what role should CTE play in this discussion? Here’s a very brief summary of what we learned (*for much more, see our full report at www.coloradosucceeds.org*):

First, prestigious national research organizations are embracing the new CTE.

As the National Governors’ Association Center for Best Practices states: “Career technical education has the power to engage and motivate all students by giving them chances to learn in applied settings.”¹ The National Dropout Prevention Center lists CTE as one of 15 research-based strategies for improving high school graduation rates.² The American Youth Policy Forum sponsored a series of forums in 2007 for policy makers to learn about the role of CTE in effective high school reform and improved student outcomes.³ When these prestigious groups are talking about CTE, it’s a clear signal for our state to include CTE in our discussions as well.

We took a look at research around the country on achievement for students focusing on CTE, and we found that when academics are explicitly integrated into

technical courses, students perform well in both areas. For example, when CTE students in Colorado and other states took courses that taught math content in the CTE context, they performed well in both math and CTE assessments.⁴ After Arizona redesigned its CTE curriculum to center around its academic content standards, students who took two or more CTE courses outperformed the general high school population in the reading, writing, and math portions of the state’s high school graduation tests.⁵

We asked Colorado’s school districts to share data about the academic outcomes of their students. We found results like those in Loveland’s Geometry in Construction class, where students taking a class that taught rigorous geometry concepts through a construction context outperformed students in regular classroom settings. At CEC Middle College in the Denver Public Schools, a magnet CTE school, students outperformed other DPS students on the ACT even though the rate of low-income students in CEC is identical to the rate in DPS as a whole.

We asked Colorado’s school districts about their views of CTE. **One hundred percent** of the districts that responded to our survey agreed with this statement: “In your district, do CTE classes help at-risk students stay in school?” One hundred percent stated that students who took three or more CTE classes had similar or higher grades than students who did not, with 30 percent stating that CTE students had higher grades. Ninety-one percent of districts reported that CTE students had similar or higher standardized test scores than general education students.

Because Colorado desperately needs to improve postsecondary achievement rates as well as high school graduation rates, we reviewed the ways in which the new CTE might encourage postsecondary education. We found a system in an exciting state of transition, moving to a framework

1 NGA Center for Best Practices (2007). “Retooling Career Technical Education.” Issue Brief. (Washington, DC: Author). Online at <http://www.nga.org/Files/pdf/0706TECHED.PDF>.

2 National Dropout Prevention Center/Network. “Effective Strategies for Dropout Prevention.” Online at <http://www.dropoutprevention.org/effstrat/default.htm>.

3 See “Role of Career and Technical Education in High School Reform” at <http://www.aypf.org/projects/CTEInHighSchoolReform.htm>.

4 Stone, J.R. et al. (2006). “Building academic skills in context: Testing the value of enhanced math learning in CTE.” (St. Paul, MN: National Research Center for Career and Technical Education). Online at www.nccte.org.

5 Arizona Department of Education (2005). “Career and Technical Education 2004 Data Snapshot.”

built on logical and seamless pathways from high school to postsecondary education that provide ways for students to plan for highly-skilled, high-paying careers in a variety of interest areas. We also found numerous CTE-related partnerships between high schools and postsecondary institutions. For example, in many cases, students take their CTE classes at local community colleges or regional technical colleges, earning credit for both high school and college. Several of our state's most prominent middle college initiatives are taking place in a CTE context, such as the collaboration between Pickens Technical College and the Community College of Aurora where graduates will earn a high school diploma, a technical certificate, and an associate's degree. Not surprisingly, Colorado districts overwhelmingly agree that CTE classes help motivate students to continue on to college. (See pie chart at left.)

The new "career cluster" model of CTE provides pathways and plans of study that operate as stair step approaches to both education and careers. A career cluster clearly demonstrates to students the connections between both high school and postsecondary education and a variety of occupations. This is a model of continuous education that general education would do well to imitate as technology leads to rapid changes in job descriptions and entire industries.

Finally, the benefits of CTE are not just for students. CTE links what happens in our schools with what happens in our workplaces and communities, benefiting employers and local and regional economies. This makes sense to business, and it makes sense to Colorado Succeeds. Scott Wylie, president and chief executive of First Western Bank and Trust, says: "CTE imparts important academic, technical, and workplace behavior skills that are valued by employers and that highlight the relevance of school to students." ■

**For much more,
see our full report at
www.coloradosucceeds.org**

Realizing the Promise of CTE: What Will it Take?

Colorado Succeeds is bullish on the promise of CTE for Colorado's education system and its economy. However, to realize this promise, we need to take steps to make CTE the best it can possibly be so it deserves a starring role in comprehensive education reform. The state's business leaders will be key to formulating exemplary CTE programs and guiding state-level policy so that high-quality CTE is incentivized rather than crowded out by other less meaningful reforms. A full description of what it will take to get the full benefits of the new CTE in Colorado is contained in the full version of this report, available at www.coloradosucceeds.org. Here are a few key recommendations:

Colorado must have state-level policies that expand high-quality CTE:

- **HIGH SCHOOL REFORM:** State legislation and rules should reflect the role of CTE as a key strategy for education reform. This means that high school graduation requirements, higher education admission requirements, and the like should explicitly recognize that high-quality CTE classes are academically rigorous as well as relevant.
- **FUNDING:** State-level financial support for CTE should reflect that rigorous and relevant CTE is a key strategy for education reform in the state. School districts currently pay for 75% of the additional costs of providing CTE opportunities to students. Our community colleges are struggling to provide high-quality programs as a result of devastating budget cuts.
- **HIGH-QUALITY CTE INSTRUCTORS:** State-level institutions should support the efforts of districts and institutions to find and retain high-quality CTE instructors. The new CTE requires instructors who are knowledgeable about both academic and CTE content – and school districts report that they already have difficulty finding and retaining CTE instructors.

Colorado must have business support for high-quality CTE:

- **ACCOUNTABILITY AND ADVOCACY:** Business must hold state policy makers accountable for integrating high-quality CTE into the state's comprehensive education reform plan by monitoring and advocating for the state-level policies listed above. If business does not support the new CTE as embodying the rigor and relevance that business has been seeking from education, CTE is not likely to survive.
- **PUBLIC-PRIVATE FUNDING PARTNERSHIPS:** Business must support targeted funding to improve CTE offerings, using models of public-private partnerships in states such as Texas. Such funding can be used to expand innovative and research-based CTE programs such as the Project Lead the Way pre-engineering curriculum and CTE-focused career academies.
- **PUBLIC AWARENESS:** Business must participate in a statewide public awareness campaign to bring attention to the promise of the new CTE. Policy makers and educators need to know that business considers the new CTE to be an important investment in human capital. Students and their families need to know that CTE represents an engaging way to learn about career interests in high school and in college, and that CTE careers are built on highly-skilled, high-paying jobs.
- **REGIONAL STRATEGIES:** Regional business leaders and economic development corporations must develop regional strategies for ensuring that CTE programs important to the region have access to the latest technologies, expertise, space, job shadowing, and internships for students, and technical training and development for teachers.

Based on what we've learned, Colorado Succeeds believes that high-quality CTE is critical to Colorado's economic success and should serve as a key strategy for improving education in our state. In the year to come, we will be visible and vocal in supporting CTE at the state and local levels. Please join us. ■



730 17th Street, Suite 940 ■ Denver, CO 80202

Colorado Succeeds is a non-profit, non-partisan coalition of business leaders committed to improving education for workforce development and economic growth. The organization was founded on the premise that the business community has the obligation, opportunity and capacity to improve the state's education system to prepare every student to succeed in a competitive international environment.

For more information, contact:

Tim Taylor, President of Colorado Succeeds
ttaylor@coloradosucceeds.org



730 17th Street, Suite 940
Denver, CO 80202
(303) 893-0707

www.coloradosucceeds.org

Colorado Succeeds Board of Directors

- **Zack Neumeyer**, Board Chairman – *Chairman, Sage Hospitality Resources*
- **Hank Baker** – *Senior Vice President, Forest City Stapleton*
- **Rob Cohen** – *Chairman & CEO, IMA Financial Group*
- **Bob Deibel** – *President & Owner, OfficeScapes*
- **Bill Gold** – *Chairman, Gold Bug*
- **Pat Grant** – *President & CEO, National Western Stock Show*
- **Steve Halstedt** – *Managing Director, Centennial Ventures*
- **Ed Haselden** – *CEO, Haselden Construction*
- **Marty Herzog** – *CEO & Owner, J. Herzog & Sons*
- **Steve Lake** – *President, CBIZ*
- **Tony Lewis** – *Executive Director, Donnell-Kay Foundation*
- **Donna Lynne** – *President, Kaiser Permanente Colorado*
- **Trygve Myhren** – *President, Myhren Media*
- **Richard Rivers** – *Executive Vice President, Great-West Healthcare*
- **Hassan Salem** – *President, U.S. Bank*
- **John Shaw** – *Senior Vice President and General Manager, Opus*
- **Mark Smith** – *Managing Partner, East West Partners*
- **Teresa Taylor** – *Executive Vice President, Qwest*
- **Georg Weibecke** – *President, Roche Pharmaceutical*
- **Ron Williams** – *President & CEO, Gary Williams Energy*
- **Scott Wylie** – *CEO, First Western Trust Bank*