Career and Technical Education Review Panel

Recommendations For CTE TEKS Writing Teams

April 17, 2008

CTE Review Panel Membership

The statute establishing the Career and Technical Education (CTE) Review Panel specifies that the Panel is to be comprised of individuals who have expertise developing or administering career and technical education programs; and employers who hire students who have obtained certification or credentials under a career and technical education program.

Members

Michael Bettersworth
Associate Vice Chancellor
Texas State Technical College System

Drew Scheberle
Senior Vice President
Education and Workforce Development
The Austin Chamber of Commerce

Rich Froeschle
Deputy Director
Labor Market Career Information
Texas Workforce Commission

Cheryl Fuller
Director
Texas Workforce Investment Council

Paula M. Harris
DPM Alliance Home Health and Hospice
Houston ISD School Board Trustee

Patty Lyle Johnson
Director of Middle Level Services
Texas Assn of Secondary School Principles

Barbara Knaggs
Associate Commissioner
State Initiatives
Texas Education Agency

Robin Painovich
Executive Director
Career and Technology Association of Texas

Laurie Rich
Special Advisor to the Governor
Industry Clusters
Office of the Governor

Deanna Savage
Associate Vice President – Instruction
Midland Community College

Introduction

Background

In May 2007, the 80th Texas Legislature created the CTE review panel by passing House Bill (H.B.) 3485. Representative Susan King sponsored the original bill, which had several amendments before secured bipartisan approval from both the House and Senate. The final bill passed with only one dissenting vote.

Review Panel Charge

H.B. 3485 charges the CTE Review Panel with the following responsibilities:

Not later than November 1, 2007, TEA shall establish a panel to:

(1) review and recommend revisions to the career and technical education curriculum under Section 28.002(a) (2) (F); and

(2) review and recommend revisions for the program in which high schools and articulated postsecondary institutions allow high school students to take advanced technical credit courses.

Not later than November 1, 2008, the panel shall:

(1) complete the review as required by this section of:
   (A) the career and technical education curriculum; and
   (B) the program under which high schools and articulated postsecondary institutions allow high school students to take advanced technical credit courses; and

(2) make recommendations to the State Board of Education as necessary to:
   (A) increase the academic rigor of the career and technical education curriculum under Section 28.002(a) (2) (F); and
   (B) improve and increase participation in the program under which high schools and articulated postsecondary institutions allow high school students to take advanced technical credit courses.

Purpose

Currently, the high school graduation rate nationwide is between 68 and 71 percent. According to Civic Enterprises and Peter D. Hart Research Associates, 47% of high school dropouts surveyed said one of the major factors in their decision to dropout was that their classes were boring. Student disengagement is reflected also by the overwhelming number of high school graduates that are placed in remedial courses when they enter postsecondary institutions. Both types of students would likely experience greater success by taking a course of study that they believed was more relevant to their future. By gaining more from their educational experience, students will be better prepared to enter college and the workforce, and thus contribute more to the state's economy.

Data collected by the Texas Education Agency indicated that about 73% of students in Texas take career and technical education (CTE) classes. Almost half, however, took only one. There is evidence that students taking a sequence of CTE courses have better attendance, higher test

scores and higher graduation rates than those who do not. Most good jobs today require some sort of postsecondary training or degree and many CTE course sequences that begin in high school lead students into college and result in certificates, licenses and degrees that meet industry standards.

Employers across Texas have many current job openings they cannot fill because of a shortage of qualified applicants, and they anticipate even greater challenges replacing the large numbers of skilled workers that will retire over the next few years. The workforce shortages are hampering productivity, disrupting delivery schedules and making it difficult for businesses to operate in Texas. In more and more instances, the situation is approaching crisis proportions. Many of these positions require just the sort of preparation provided by a solid coherent sequence of CTE courses.

The purpose of this bill was to raise awareness about the value of career and technical education in Texas by including it in existing policies that impact student course-taking decisions. In this way, students, parents, and educators will consider CTE to be a course of study through which students can experience educational success, prepare for postsecondary opportunities, and take advantage of the many present and future prospects in the Texas job market.

The CTE Review Panel will operate and develop policy recommendations within the broader context of the:

Texas High School Completion and Success Initiative Council
http://www.tea.state.tx.us/ed_init/thscsic/
College Readiness Standards
http://www.thecb.state.tx.us/collegereadiness/TCRS.cfm
Texas Workforce Investment Council
http://www.governor.state.tx.us/divisions/twic
Governor's Competitiveness Council
http://www.governor.state.tx.us/gcc

Guiding Principles

1. *Rigorous a*cademic content needs to be integrated into the CTE curriculum in Texas.

    a. CTE is rigorous when it develops student capacity to improve and expand their thinking and reasoning skills, to make use of content information in rigorous ways, and to recognize real-world applications of these skills [Commission for a College Ready Texas (CCRT), 2007].

    b. Rigor as defined by the CCRT is characterized as:
    - Expanding students' vocabularies, especially their ability to use technical terms and phrases to make precise, succinct statements;
    - Enlarging students' ability to think in abstract terms, using symbolic representations of real-world situations to carry out formal operations, analysis, comparisons, and evaluations;
    - Increasing students' skills in analyzing and comparing alternative explanatory models to account for past events and outcomes and predict future events;

- Improving students' abilities to gather and evaluate data that form the basis for evaluation;
- Enhancing students' skills in translating among narrative, numeric, graphical, pictorial, symbolic, and kinesthetic descriptions of things, processes, and events, and using any of these models of expression t produce equivalent descriptions; and
- Developing students' capacity to apply their knowledge to real-world problems, generalizing from previously learned principles and explanatory models to account for or anticipate new situations and events.

2. CTE is relevant when teaching and learning supports the application of content taught in academic courses and support mastery of industry standards and skills.

3. Students taking a CTE coherent sequence of courses perform better overall than students who take only one CTE course or the students that take no CTE courses. CTE students have higher graduation rates, lower drop out rates, and score higher on the TAKS exams in every category. There is also evidence that they enter and persist in postsecondary education at higher rates. Moreover, they complete postsecondary education at accelerated rates.

4. Participation in CTE should be an option for every student. Once students choose to participate in a CTE program of study, students must always have the option of changing their program of study, course-taking, and career goals. Students choosing to participate in CTE must be taught to the same challenging academic proficiencies as are taught to all other students (Perkins Law 109-270, Section 122, (c) (7) (C)).

CTE Review Panel Recommendations
TEKS Writing Teams

1. Develop coherent sequences of CTE courses that:
    a. Lead to an industry-recognized credential or certificate at the postsecondary level, or an associate or baccalaureate degree;
    b. Support and reinforce cluster knowledge and skills;
    c. Support challenging academic and technical standards;
    d. Align to postsecondary programs;
    e. Align with high skill, high wage, or high demand occupations in current or emerging fields; and
    f. Lead to technical skill attainment.

2. Incorporate the following steps into the review process:
    a. Incorporate the cluster knowledge and skills;
    b. Determine the need for courses based on enrollment and industry relevance;
    c. Consolidate courses as appropriate and eliminate or update courses with outdated content, including introductory courses;
    d. Identify courses that may be appropriate in the middle school;
    e. Identify academic and technical prerequisites;
    f. Update technical content to align with industry standards using up-to-date industry-based competency standards or certifications;
    g. Ensure that each course is built within course requirements of the Recommended High School Program or Distinguished Achievement Program;;
    h. Embed college readiness standards;
    i. Identify advanced courses to satisfy fourth year math or science requirements and/or develop new rigorous courses to satisfy fourth year math or science requirements, ensure courses contain substantially rigorous and relevant science or math content and college readiness standards;
    j. Review innovative courses and recommend high quality, rigorous courses for approval to be offered statewide;
    k. Develop or recommend new courses for emerging fields based on workforce and industry projections; and
    l. Provide for regional input from industry representatives.

3. Advanced Technical Credit (ATC) and articulation issues:
    a. Determine which new and revised courses align with postsecondary education for college credit; and
    b. Provide input and recommendations regarding articulation issues to the CTE Review Panel.

4. Recommended clusters for accelerated review and revision:
    a. Identify programs of study appropriate for review and revision on a three year cycle to ensure they are up to date with changing technology, industry standards and aligned with entry level college course requirements;
    b. Identify courses, including innovative courses, where industry experiences a dynamic rate of change in knowledge and skill requirements; and
    c. Consider impact on instructional materials necessary for the dynamic knowledge and skill updates.

Attachment
Texas Administrative Code (as amended by HB 3485, 2007)

Sec. 28.0022. REVIEW PANEL FOR CAREER AND TECHNICAL EDUCATION CURRICULUM.

(a) Not later than November 1, 2007, the agency shall establish a panel under this section to:
  (1) review and recommend revisions to the career and technical education curriculum under Section 28.002(a) (2) (F); and
  (2) review and recommend revisions for the program in which high schools and articulated postsecondary institutions allow high school students to take advanced technical credit courses.

(b) The panel established under this section shall consist of:
  (1) individuals who have expertise developing or administering career and technical education programs; and
  (2) employers who hire students who have obtained certification or credentials under a career and technical education program.

(c) A member of the panel serves on a voluntary basis without compensation.

(d) Not later than November 1, 2008, the panel shall:
  (1) complete the review as required by this section of:
    (A) the career and technical education curriculum; and
    (B) the program under which high schools and articulated postsecondary institutions allow high school students to take advanced technical credit courses; and
  (2) make recommendations to the State Board of Education as necessary to:
    (A) increase the academic rigor of the career and technical education curriculum under Section 28.002(a) (2) (F); and
    (B) improve and increase participation in the program under which high schools and articulated postsecondary institutions allow high school students to take advanced technical credit courses.

(e) Not later than September 1, 2009, the State Board of Education by rule shall revise the essential knowledge and skills of the career and technical education curriculum as provided by Section 28.002(c) based on the recommendations of the panel under Subsection (d). The State Board of Education shall require school districts to provide instruction in the career and technical education curriculum, as revised under this subsection, beginning with the 2010-2011 school year.

(f) This section expires September 1, 2014.

SECTION 2. Section 28.009, Education Code, is amended by amending Subsection (a) and adding Subsections (c) and (d) to read as follows:

(a) Each school district shall implement a program under which students may earn the equivalent of at least 12 semester credit hours of college credit in high school. On request, a public institution of higher education in this state shall assist a school district in developing and implementing the program. The college credit may be earned through:
  (1) international baccalaureate, advanced placement, or dual credit courses;
  (2) articulated postsecondary courses provided for local credit or articulated postsecondary advanced technical credit courses provided for state credit; or
  (3) any combination of the courses described by Subdivisions (1) and (2).

(c) Each school district shall annually report to the agency:
(1) the number of district students, including career and technical students, who have participated in the program and earned college credit; and
(2) the cumulative number of courses in which participating district students have enrolled and college credit hours the students have earned.

(d) In this section:
(1) "Career and technical student" means:
(A) a secondary education student who has entered the first course in a sequence of two or more technical courses for three or more credits in a career and technical education program; or
(B) a student who:
(i) is enrolled in an academic or workforce course that is part of a sequence of courses leading to an industry-recognized credential, certificate, or degree; and
(ii) has declared that sequence of courses as the student's major course of study.
(2) "Sequence of courses" means career and technical education courses approved by the State Board of Education, innovative courses approved by the State Board of Education that are provided for local credit, or a tech-prep program of study under Section 61.852.

SECTION 3. Section 28.0212, Education Code, is amended by adding Subsection (g) to read as follows:

(g) Each school district is encouraged to establish for each student entering grade nine a personal graduation plan that identifies a course of study that:
(1) promotes:
(A) college and workforce readiness; and
(B) career placement and advancement; and
(2) facilitates the student's transition from secondary to postsecondary education.

SECTION 4. Section 28.025, Education Code, is amended by amending Subsection (b-1) and adding Subsection (b-2) to read as follows:

(b-1) The State Board of Education by rule shall require that:
(1) except as provided by Subsection (b-2), the curriculum requirements for the recommended and advanced high school programs under Subsection (a) include a requirement that students successfully complete four courses in each subject of the foundation curriculum under Section 28.002(a)(1); and
(2) one or more courses offered in the required curriculum for the recommended and advanced high school programs include a research writing component.

(b-2) In adopting rules under Subsection (b-1), the State Board of Education shall allow a student to comply with the curriculum requirements for a mathematics course under Subsection (b-1)(1) taken after the successful completion of an Algebra II course or science course under Subsection (b-1)(1) taken after the successful completion of a physics course by successfully completing an advanced career and technical course designated by the State Board of Education as containing substantively similar and rigorous academic content. A student may use the option provided by this subsection for not more than two courses.

SECTION 5. Section 42.154, Education Code, is amended by adding Subsection (a-1) to read as follows:

(a-1) Notwithstanding any other provision of this section, the commissioner shall develop and implement a pilot program under which a school district is entitled to additional funding for each student receiving career and technology instruction in grade eight. The commissioner shall select not more than five school districts for participation in the pilot program. In selecting school districts for participation, the commissioner shall consider school districts that can provide services under the program at the least cost. For each full-time equivalent student in grade eight in average daily attendance in an approved career and technology education program, a school district participating in the program under this subsection is entitled to an annual allotment equal to the adjusted basic allotment multiplied by a weight of 1.35. Funds allocated under this subsection, other than an indirect cost allotment established under State Board of Education rule, must be used in providing career and technology programs in grade eight under Sections 29.182, 29.183, and 29.184. A school district is entitled to an allotment under this subsection for each school year through the completion of the 2011-2012 school year. Not later than January 1, 2013, the agency shall prepare and deliver to each member of the legislature a report describing the effectiveness of the pilot program described by this subsection. This subsection expires February 1, 2013.

SECTION 6. This Act takes effect immediately if it receives a vote of two-thirds of all of the members elected to each house, as provided by Section 39, Article III, Texas Constitution. If this Act does not receive the vote necessary for immediate effect, this Act takes effect September 1, 2007.

House Bill 3485 Implementation Team
Career and Technical Education

CTE Review Panel

Name	Title	Organization
Patti Lyle Johnson	Director of Middle Level Services	Texas Association of Secondary School Principals
Drew Scheberle	Senior Vice President Education & Workforce Development	The Austin Chamber of Commerce
Laurie Rich	Special Advisor to the Governor, Industry Clusters	Office of the Governor
Rich Froeschle	Deputy Director	Labor Market Career Information/Texas Workforce Commission
Cheryl Fuller	Director	Texas Workforce Investment Council
Robin Painovich	Executive Director	Career and Technology Association of Texas
Barbara Knaggs	Associate Commissioner, State Initiatives	Texas Education Agency
Deanna Savage	Associate VP-Instruction	Midland Community College
Michael Bettersworth	Associate Vice Chancellor	Texas State Technical College System
Paula M. Harris	Business Representative and Houston ISD School Board Trustee	DPM Alliance Home Health and DPM Alliance Home Hospice

TEA Staff

Lizzette Reynolds	Deputy Commissioner	Texas Education Agency
Sharon Jackson	Associate Commissioner	Standards and Programs
Anita Givens	Deputy Associate Commissioner	Standards and Alignment
Karen Batchelor	CTE State Director	Curriculum Division
Esther Camacho	CTE Director	Arts, A/V Technology & Communication
John Ellis	CTE Director	Architecture & Construction; Manufacturing; STEM
Kathleen Park	CTE Director	Government & Public Administration; Health Science; Law, Public Safety, Corrections & Securities
Diane Salazar	CTE Director	Education & Training; Hospitality & Tourism; Human Services
Ron Whitson	CTE Director	Agriculture, Food & Natural Resources; Transportation, Distribution & Logistics
Lucy Ybarra	CTE Director	Business, Management & Administration; Finance; Marketing, Sales & Services

CTE TEKS Writing Teams

Panel #1 - Business, Management & Administration; Finance; Marketing, Sales & Services

FIRST	LAST	NOMINATED BY	AREA
Antonia "Toni"	Flores	Agosto	Business Education Teacher/CTE Coordinator
Dr. James	Todd	Agosto/Mercer	Marketing Education Coordinator
Carol	Pearsall	Allen	Business Education Teacher
Nancy	Vera	Berlanga	Business Education Teacher
Ira	Wilsker	Bradley	Community College
Sharon	Watkins	Cargill	Secondary CTE
Virginia	Mosier	Craig	CTE Administrator
Laura	Silverman	Dunbar	Marketing Education Teacher
Candy	Slocum	Hardy	Business/Industry Employer
Jennifer	Sanders	Knight	Business Education Teacher
Denise	Kubecka	Leo	CTE Administrator
James	Moten	Lowe	Community College
Margie	Scott	Miller	Marketing Education Teacher
Dahlia	Acosta	Nunez	Business Education Teacher/CTE Administrator

Panel #2 - Arts, A/V Technology & Communications; Information Technology

FIRST	LAST	NOMINATED BY	AREA
Paula	Lopez	Agosto	Secondary CTE teacher
Catherine	Berlanga	Berlanga	Business/Industry
Juan	Garcia	Berlanga	Community College/technical faculty
Danna	Eichenold	Cargil	Secondary CTE teacher
Michael	Tivet	Cargil	Community College/technical faculty
Sue	Anthony	Craig	Secondary CTE teacher
Duane	Linter	Craig	Community College/technical faculty
Karen	Seimears	Hardy	Secondary CTE teacher
Becky	Kores	Knight	Secondary CTE teacher
Patty G.	Nilsson	Leo	Secondary CTE teacher
Lynne Cagle	Cox	Lowe	University faculty
Fred	Hills	Lowe	Community College/technical faculty
Miranda	Noack-Snider	Mercer	Secondary CTE teacher
Cindy	Wolf	Miller	Secondary CTE teacher
Jeff	Ermoian	Miller	Community College/technical faculty

Panel #3 - Architecture and Construction; Manufacturing; Science, Technology, Engineering & Mathematics (STEM)

FIRST	LAST	NOMINATED BY	AREA
Glen	Ball	Agosto	CTE Administrator
Barlett	Sheinberg	Allen	University faculty
Anita	Hinojosa	Berlanga	Community College/Technical faculty
James	Nelson	Cargill	University faculty
Dewayne	Wallace	Craig	Secondary CTE teacher
Timothy	Thompson	Hardy	CTE Administrator
Mike	Cooley	Knight	Community College/Technical faculty
Eric	Manuel	Knight	Secondary CTE teacher
Sonia	Greiner	Leo	Secondary CTE teacher
Shelly	Tornquist	Leo	Secondary CTE teacher
Gary	Cunningham	Lowe	Secondary CTE teacher
Dayman	Whittenburg	Lowe	Secondary CTE teacher
Art	Lacy	McLeroy	Business/Industry employer
Max	Davis	Miller	Business/Industry employer
Joe	Garcia	Nunez	Secondary CTE teacher

Panel #4 - Education &Training; Hospitality & Tourism; Human Services

FIRST	LAST	NOMINATED BY	AREA
Sandra Ann	Delgado	Agosto	Secondary CTE teacher
Tony	Desjardins	Berlanga	Community College/Technical Faculty
Leslie	Bartosh	Bradley	Community College/Technical Faculty
Brenda	Hampton	Cargill	Secondary CTE teacher
Cindy	Miller	Craig	CTE Adminstrator
Mary Jane	Sampson	Craig	Secondary CTE teacher
Janiece	Lee	Dunbar	Secondary CTE teacher
Deborah	Hawkins	Hardy	Secondary CTE teacher
Gregory E	Williams	Knight	Community College/Technical Faculty
Don	Hancock	Lowe	Business/Industry employer
Terri	Henson	Lowe	Secondary CTE teacher
Jane	Dennis	Lowe	University faculty
Linda	Clinton	McLeroy	Secondary CTE teacher
Karen	Mitchell	Mercer	Secondary CTE teacher
Angelina	Bencomo	Nunez	Secondary CTE teacher

Panel #5 - Agriculture, Food & Natural Resources; Transportation, Distribution & Logistics

FIRST	LAST	NOMINATED BY	AREA
Christyn	Mc Cann	Allen	Secondary Teacher
Della	Berlanga	Berlanga	Counselor
Adan	Gutierrez	Berlanga	Community College
Jason	Butler	Bradley	Secondary Teacher
Chad	Baskin	Cargill	Secondary Teacher
Robert	Herrington	Craig	University
Allen	Kaminski	Dunbar	Adminsitrator
Barney	McClure	Hardy	Secondary Teacher
Loucious	Newhouse	Knight	Business & Industry
Megan	Oliver	Leo/Dunbar	Counselor
Steve	Forsythe	Lowe	Secondary Teacher
Norris	Martin	Lowe	Community College
Kyle	McGregor	Lowe	University
Ned	Meister	Lowe	Business & Industry
Doug	Ullrich	McLeroy	University

Panel #6 - Government & Public Administration; Health Science; Law, Public Safety, Corrections & Security

FIRST	LAST	NOMINATED BY	AREA
Detna	Kacher	Allen	Secondary CTE teacher
Sandra J.	Arispe	Berlanga	Business/Industry employer
Sandra J.	Young	Cargill	Secondary CTE teacher
John	Smoot	Craig	Community College/Technical faculty
Mark	Bosher	Hardy	CTE Administrator
Severo	Perez	Knight	Secondary CTE teacher
Tana	Holmes	Leo/Dunbar/Allen	CTE teacher
Delores	Williams	Lowe	Community College/Technical faculty
Mary	Reeves	Mercer	Secondary CTE teacher
Beverly	Finley	Miller	Secondary CTE teacher

HB 3485 Implementation Timeline
Review of Career and Technical Education

February 28	CTE Review Panel meeting
April 3	CTE Review Panel meeting
April 17	CTE Panel Meets with Writing Teams
April 17 – 19	CTE Writing Teams meeting
May 22	TEA staff to provide State Board of Education with a progress report on CTE TEKS review and rewrite process
April – Jan.	CTE Writing Teams working meetings (10 months)
Feb. 2009	CTE TEKS go into rule text
Mar. 2009	SBOE discussion of CTE TEKS
May 2009	First reading and filing in Texas Register
July 2009	Second reading and adoption of CTE TEKS (SBOE to approve CTE TEKS no later than Sept. 1, 2009)

HIGH SCHOOLS THAT WORK

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Crafting a New Vision for High School:

How States Can Join Academic and Technical Studies to Promote More Powerful Learning

2008

Southern Regional Education Board

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HIGH SCHOOLS THAT WORK

This report was developed by Gene Bottoms, SREB senior vice president, and Marna Young, director of research for School Improvement. For further information, e-mail gene.bottoms@sreb.org or marna.young@sreb.org.

Introduction:

As we near the end of the first decade of the 21st century, state leaders may be surprised to learn that most high school graduates are unprepared for the college study or career training they need to get a good job. Frankly, the situation is actually worse than that.

Too many high school students in the United States *never even have the chance* to enter a two- or four-year college. At least one in four does not graduate from high school on time — if at all. Many of these young adults blame a curriculum that is neither relevant nor challenging as a central reason for their disengagement.

What's more, large numbers of students who *do* enter college will not finish. Barely one-half of those who begin a four-year degree graduate within six years (and the figure is far lower in many states). At community colleges, only about one in five students manages to complete an associate's degree or earn a specialized career certificate within three years.

This situation exists despite many notable efforts since the early 1990s to improve the nation's high schools and increase the college-going rate. *We believe there is a missing ingredient in these reforms* — a dynamic component that embodies many of the 21st-century skills now being advocated by leaders of today's business and industry. The good news is we will not have to search far to find this ingredient. Although it has often been overlooked and under-resourced in the past, this educational rejuvenator has been in our schools for years. It is ***career and technical education.***

We are convinced that harnessing the *applied teaching strategies* of career/technical education (CTE) and infusing them into *college-preparatory academics* can transform our secondary schools into high-performing centers of learning where students are both challenged and engaged. By pursuing this strategy, states can help many more students master both the academic content and the innovative thinking, problem-solving, communication and teamwork skills they will need for postsecondary studies and 21st-century careers.

High-quality CTE programs are far more advanced than their vocational predecessors, and many restless college-bound students are already attracted to career/technical (CT) courses in which they can apply the academic content they are learning in authentic, hands-on contexts. Students begin to see the "why" behind the knowledge and skills they are expected to gain. They are no longer asked by teachers to "wait and see" how the content of the academic curriculum will be relevant in their lives and careers.

Research shows that good CTE programs can reduce high school dropout rates and increase the earning power of high school graduates. More students stay in school when they can concentrate on career and technical studies. Students who struggle to learn specific academic skills in a traditional classroom environment are often better served through the project-based learning and problem-solving strategies that are hallmarks of today's best CT courses.

States have an unprecedented funding opportunity.

Increasingly, states are creating policies for career-oriented programs of study that combine rigorous academics with career/technical studies. And states are now in an exceptional position to accelerate the development of these policies. The 2007 version of the federal Carl D. Perkins Career and Technical Education Improvement Act *provides states with unprecedented latitude and funding* that may be used to align CT studies with broader high school reform.

For the first time, federal legislation requires that career-oriented courses teach essential academic skills — helping students meet the same academic standards required in traditional college-preparatory courses. The legislation also requires greater collaboration between high schools and postsecondary education and an increased focus on the needs of business and industry.

Last June, on Florida's Amelia Island, state education chiefs, CTE leaders and other decision-makers from 12 states gathered to explore more deeply the significant contributions career/technical education can make to high school reform. The conference, sponsored by the Southern Regional Education Board and the Council of Chief State School Officers, marked a decisive first step in crafting a new vision for high school success — one that calls on states and school systems to break free of long-held beliefs about the sharp division between academic and career/technical education and weld the strongest elements of both into a powerful engine of reform.

There was broad agreement among these state leaders that, while high school students are taking more academic courses than ever before, many still lack a deeper understanding of the underlying concepts and skills needed to succeed in challenging careers and support the vast technological and social infrastructure of our nation. They acknowledged that requiring students to pass an ever-increasing number of tests to graduate from high school will not improve students' ability to apply academic knowledge and skills — and that a narrow focus on testing and skill-and-drill remedial instruction has reduced student motivation and engagement in meaningful learning.

These state leaders recognized that career/technical studies can provide a fresh context for more powerful academic learning — rooted in the real problems, projects and activities faced by communities, states and the nation. They saw the good sense in rejecting remedial instruction and paper-and-pencil drills in favor of studies that provide in-depth experiences around problems faced by a changing world — aging infrastructures, the need for alternative energy sources, environmental and economic issues, security, and the effective application of developing technologies.

Career/technical studies, leaders agreed, can be leveraged to serve students at every level of achievement, further developing their abilities to both acquire knowledge and skills and *apply what they learn* to authentic tasks. For many students, this project- and problem-based learning approach can build deeper understanding of scientific, technical and mathematics concepts and a greater ability to comprehend and use language.

These forward-thinking leaders emerged from the Amelia Island conference with five challenges for state educators and policy-makers:

Challenge 1: Align new and existing career/technical curricula with essential college- and career-readiness standards.

Challenge 2: Create a flexible system of optional career pathways in high schools to better prepare all students for college and careers.

Challenge 3: Create a policy framework that keeps students' future options open by developing career/technical and academic programs that: (1) link high school to postsecondary studies and work, (2) blend academic and technical studies, and (3) connect students to a goal.

Challenge 4: Assess the contributions career/technical education can make to improving academic and technical achievement.

Challenge 5: Prepare and enable career/technical teachers to teach essential academic skills through application in authentic activities, projects and problems.

A new vision requires new actions.

This report details both the potential for an integrated academic and technical curriculum and the challenges that must be addressed by state, district and school leaders as they move forward. It also describes many successful policy initiatives already under way in states, demonstrating that what some have called the "impossible" marriage of academic and career/technical studies not only has been consummated, but is thriving. Decision-makers also will find recommended actions that states can use to address each of the five challenges that state leaders have identified.

We believe this report makes a compelling case that high school career/technical studies can help improve students' academic skills and fully prepare them to meet the demands of the nation's increasingly complex and technology-based economy. For too long, states have overlooked the contributions that high-quality CTE can make in solving the persistent problem of high school underachievement. This document, which draws upon the judgments of leading educators and researchers, can help states capitalize on the dynamic potential of CTE teaching strategies. State leaders, educators, policy-makers and the business community all share responsibility for crafting a new vision from its insights and understandings.

David S. Spence
President
Southern Regional Education Board

Gene Wilhoit
Executive Director
Council of Chief State School Officers

Crafting a New Vision for High School:

How States Can Join Academic and Technical Studies to Promote More Powerful Learning

Too many students leave high school unprepared for employment or college — the consequence of narrowly focused, shortsighted high school reforms and schools unwilling to change. At least one in four high school students drops out before earning a diploma.[1] Boredom significantly contributes to students' decisions to leave school, as high schools fail to meet the diverse needs of students and to keep them engaged, especially students who are behind in their credits and older than their classmates.[2]

"Career and technical education is the key to reaching our goals that many more students graduate and that they graduate college- and career-ready."

— **David S. Spence**, president, Southern Regional Education Board, 2007

Combining the essentials of a college-preparatory academic core with high-quality career/technical (CT) studies is a promising strategy that can help improve student achievement and increase high school graduation rates. *Education Week's Diplomas Count 2007* report showed that strong high school CT programs "can reduce high school dropout rates and increase short- and medium-term earnings for students."[3] More students stay in school when they can concentrate in career/technical education (CTE) in high school.

The Carl D. Perkins Career and Technical Education Improvement Act of 2006,[4] often called the Perkins Act, provides states unprecedented latitude to align CTE with broader high school redesign programs. To explore the latest revisions to the law, the Council of Chief State School Officers (CCSSO) and the Southern Regional Education Board (SREB) convened a two-day forum at Amelia Island, Florida, on June 22, 2007. State education chiefs, CTE leaders and other officials from 12 states met and discussed the contributions CTE can make to high school reform.

1 Sable, Jennifer and A. Garofano. *Public Elementary and Secondary School Student Enrollment, High School Completions, and Staff from the Common Core of Data: School Year 2005-07 (NCES 2007-352)*. National Center for Education Statistics, 2007.

2 Bridgeland, John M., J. Dilulio Jr. and K. Morison. *The Silent Epidemic: Perspectives of High School Dropouts*. Civic Enterprises, 2006.

3 *Diplomas Count 2007: Ready for What? Preparing Students for College, Careers, and Life After High School. Education Week*, Vol. 26, No. 40, 2007.

4 U.S. 109th congress. Carl D. Perkins Career and Technical Education Improvement Act of 2006 (Public Law 109-270). Signed into law by the president, August 12, 2006.

Opening remarks focused participants on the key role CTE should play in high school reform. "Career and technical education is the key to reaching our goals that many more students graduate and that they graduate college- and career-ready," SREB President David S. Spence asserted. He argued that CTE can provide greater context for academics and can help more students meet essential college- and career-readiness standards through authentic problems and projects. CCSSO Executive Director Gene Wilhoit noted that many states have overlooked the potential role of CTE in high school reform.

States Represented

Alabama	Massachusetts
Arkansas	Missouri
Delaware	North Carolina
Florida	Ohio
Georgia	Oklahoma
Indiana	South Dakota

Hans Meeder, president of Meeder Consulting Group and a former deputy assistant secretary for education in the U.S. Department of Education Office of Vocational and Adult Education, summarized the Perkins Act and its implications for improving students' college and career readiness. He said that CTE must emphasize: integration of essential academics, knowledge and skills into career/technical studies; greater collaboration between secondary and postsecondary education; and an increased focus on the needs of business and industry. He urged states to require school districts to align CT courses with state academic and industry standards, to develop more programs of study that connect secondary and postsecondary education, and to provide more comprehensive professional development for CT teachers.

Contributions Career/Technical Studies Can Make to High School Reform

High school career/technical studies can help improve students' academic skills to meet the demands of the nation's increasingly complex and technology-based economy. Today's high school students are taking more academic courses than ever, yet many lack the skills they need for college and career training. Too many students cannot read technical materials or apply mathematics to common, real-world problems and projects. They do not grasp the underlying technical concepts and skills needed to design, prepare, fix and maintain the vast technological infrastructure of this nation. Requiring students to pass an ever-increasing number of tests to graduate from high school will not improve their ability to apply academic knowledge and skills. Increasingly, the practice has led to skill-and-drill remedial instruction geared mainly toward requiring students to pass tests, which has reduced student motivation and engagement in meaningful learning — possibly contributing to low high school graduation rates, especially for at-risk students.

Too many students cannot read technical materials or apply mathematics to common, real-world problems and projects.

Career/technical studies have a unique ability to teach rigorous academics in the context of real-world problems, projects and activities and give students in-depth experiences for academic and technical learning. CTE can develop students' abilities both to acquire knowledge and skills and apply what they learn to authentic tasks. For many students, this builds deeper understanding of scientific, technical and mathematics concepts and a greater ability to comprehend and use language.

High-quality career/technical studies can bring balance to more traditional college-preparatory studies that, for many students, often are limited to acquiring, memorizing and recalling information. This works well for some students, but not all. Delaware Secretary of Education Valerie Woodruff reported at the Amelia Island forum that Delaware's high school students are saying, "Expect more of us." However, she cautioned that the common association of postsecondary education with only two- or four-year colleges "is not always the best for some students." For some students, "the rich technical courses in high school keep them motivated and, coupled with job training, prepare them to compete for good jobs that provide

Best State Policies and Practices

State policy in **Massachusetts** sets three outcome goals for career/technical programs. The policy aims to increase the percentages of students who: a) earn a high school diploma; b) receive the state's Certificate of Occupational Proficiency for mastery of a core set of academic skills, technical competencies and knowledge; and c) gain employment in a field related to their studies, or successfully enroll in postsecondary education or advanced training within 12 months of completing high school.

Alabama requires all high school career/technical programs to be certified by national certifying agencies or state industry-certifying entities if no national certifying agency exists.[5] Certification validates that the career/technical program meets industry standards; that its teachers hold current industry certification; and that its facilities, equipment and software are adequate to teach the curriculum.

Florida requires high school students to choose a major area of interest. State law requires students to complete eight credits in an academic or career major, minor or electives — in addition to the academic core curriculum required for all students.[6] The major area of interest can be a sequence of four courses in a career/technical program, fine and performing arts, or an academic content area. The other four credits can be used to pursue a second major or minor area or to take an elective, intensive reading or mathematics intervention, or a credit recovery course. Florida also has established accountability measures for a coherent sequence of career courses in a career and professional academy.[7] These courses must lead to industry certification or college credit linked directly to the career theme. For an organized sequence of courses to be offered a third year, at least 50 percent of students enrolled in the second year must achieve industry certification or college credit. At least 66 percent of students enrolled must achieve industry certification or college credit for the course to be offered a fourth year.

[5] Alabama Department of Education. *Alabama Career/Technical Education, Methods of Administration Manual.* Revised April 21, 2006.

[6] Florida 2006 Legislature. House Bill 7087. Effective June 5, 2006 — http://www.fldoe.org/gr/pdf/2006/EnrolledHB7087.pdf.

[7] Florida 2007 Legislature. Florida Career and Professional Education Act, Florida Statutes, Chapter 2007-216. Effective July 1, 2007.

a family with a living wage." Career/technical studies can help make learning meaningful for more students and can broaden the national college-readiness agenda to include preparation for college *and* careers. CTE offers opportunities for teachers to blend rigorous academics with theme-based career pathways and with occupation-specific career preparation.

Forum participants underscored the need for states to set goals to boost CTE's impact on meeting state work force needs. High-quality CT programs support work force development and supply qualified workers for new industries important to the states economies.

High school career/technical studies can help increase the supply of individuals prepared to fill critical, high-demand, high-skill, high-wage jobs by connecting high school and postsecondary programs to career goals. The supply and demand of appropriately prepared, skilled workers are out of balance. Too few students are preparing for occupational specialties that require an apprenticeship, certification, associate's degree, or bachelor's degree and beyond.[8] These are fields in which workers often need a strong foundation in mathematics, science, reading and writing, and they require strong critical thinking, communication and teamwork skills.

States no longer can fill highly skilled jobs by tapping into only 20 or 30 percent of the nation's population.

States no longer can fill highly skilled jobs by tapping into only 20 or 30 percent of the nation's population. Today, too many students entering postsecondary studies require remedial studies because they lack the necessary academic skills in mathematics, reading and writing. In fall 2000, 42 percent of recent high school graduates enrolling in public two-year colleges took at least one remedial course.[9]

Too many students also pursue further study in college or career preparation without a specific goal, and they tend not to persist until graduation. States need to create opportunities in high schools for students to discover a niche through broad career fields of study. Such experiences can help more students acquire the higher-order thinking, study, numeracy and communication skills needed for postsecondary studies and careers. Schools also can introduce students to the habits and ways of thinking of top-performing employees in highly specialized fields with impending shortages.

Seamless programs of study can help fill such shortages by connecting high school studies to an industry-recognized credential or licensure, an associate's degree and/or a bachelor's degree. Such programs would begin early in high school with a coherent sequence of rigorous academic and career courses that align to essential college- and career-readiness standards and target emerging career fields. Through coherent programs of study, schools can inform students, parents, teachers, counselors and others about the knowledge and skills needed to succeed in a host of career and postsecondary options.

High schools in 11 of the 12 states represented at the forum have adopted the Pathway to Engineering™ program developed by Project Lead The Way.® This four-year sequence of high school courses introduces students to the scope, rigor and discipline of engineering and connects these courses to a

[8] Gordon, Edward E. *The 2010 Meltdown; Solving the Impending Jobs Crisis.* Praeger, 2005.

[9] National Center for Education Statistics. *The Condition of Education 2004*, (Indicator 31).

sequence of rigorous mathematics and science courses, to postsecondary studies and to high-demand, high-wage career fields.[10] Project Lead The Way courses are aligned with mathematics, science and technology standards developed by national organizations and include standardized end-of-course exams.[11] They blend academic and technical content and use hands-on projects and problem-based learning through which students apply mathematics and science to assigned learning activities. Teachers must become certified during a two-week summer training institute at an affiliated university before they can teach a Project Lead The Way course. Students complete foundation courses during their freshman and sophomore years and progress into specialized courses in their junior and senior years. **This type of progressive, connected program of study introduces students to a high-demand, high-skill, high-wage career field in high school and can link to two- and four-year postsecondary programs.** It gives context to high school for students who typically have not been motivated to master the level of mathematics and science content they will need to succeed in science, technology, engineering and mathematics (STEM) fields.

Best State Policies and Practices

In addition to offering the Pathway to Engineering™ program in more than 230 schools, **Indiana** is one of eight states supporting the development of a biomedical sciences program of study aimed at introducing students to this broad career field. A sequence of biomedical science courses is being designed around authentic problems and projects, aligned with essential standards from mathematics, biology, chemistry and other areas of science. Field-testing of the first course in a four-course sequence was happening in the 2007-2008 school year in the eight states.

Career/technical education can become a robust strategy schools can use to meet the diverse learning needs of students and to motivate more students to graduate. The national high school reform movement focuses on preparing all students for college and careers, but too often it emphasizes only college preparation while overlooking the needs of likely high school dropouts and students who do not plan to pursue further study. It gives insufficient attention to preparing students for employment. Strong academic preparation is indispensable for college and work, but a student's ability to apply the knowledge is most essential for advancement in a career. Ignoring the need for high-quality career/technical education will halt the nation's progress toward improving achievement and increasing graduation rates for more students.

The National Governors Association reports that "career/technical education engages and motivates students by offering them real-world learning opportunities, leading to lower dropout rates."[12] Two recent studies by the National Research Center for Career and Technical Education tout the ability of high-quality CTE to empower high school educators to reduce dropout rates. One study found that high school students at all levels of achievement were least likely to drop out if they engaged in a combination

[10] Project Lead The Way. "Pathway To Engineering™" — http://www.pltw.org/curriculum/hs-engineering.html.

[11] Project Lead The Way. "End-of-Course Assessments FAQs" — http://www.pltw.org/faqs/exams.html.

[12] "Retooling Career Technical Education," *Issue Brief.* National Governors Association Center for Best Practices, 2007.

of academic *and* career/technical courses throughout their high school careers.[13] Another study found that students who took a blend of academic and career/technical courses were less likely to drop out of high school, regardless of the presence or type of reform or lack of identifiable high school reform.[14] Both studies found that students taking a moderate number of career/technical courses were more likely to graduate than those not taking any CT courses and those taking the majority of their classes in CT areas.

Academically at-risk students need the contextual learning found in CT studies to master academic standards at grade level, and they need this type of instruction starting by grade nine. Many of these students need immersion in occupation-specific programs of study early enough in high school to motivate them to stay in school and work toward an employer certification. Moreover, with a blend of academic and CT courses aligned with essential college-readiness standards, more of these students can be prepared not only for careers, but for two- or four-year college study or additional specialized career training.

Best State Policies and Practices

South Dakota aims to increase the number of high school students who graduate and go to college, technical school or advanced training by providing students with a rigorous and relevant high school experience that prepares them for further learning or training.[15] The state is strengthening its school guidance program to help students choose a program of study with a career focus. Schools will provide students opportunities to complete a senior project and develop student internships in broad career fields. The intent is to make high school education more engaging and relevant to students' goals.

North Carolina has 41 high schools in the Learn and Earn early-college program. The program is designed to motivate high school students to remain in school, earn an associate's degree and prepare for a high-skill job or for a transfer to a four-year college or university. High schools work with community colleges to co-design programs of study taught on a college campus.

Career/technical education can broaden academic rigor to include the application of academic skills in a variety of contexts. Through CTE, students can develop their abilities to apply knowledge and skills to analyze and solve authentic problems, deepening their understanding of academic concepts and increasing their retention of knowledge and skills. Students entering the work force often lack the ability to apply their knowledge in the workplace. In a 2006 work force readiness survey, more than 40 percent of human resource leaders reported that recent high school graduates lack the basic skills in reading comprehension, writing and mathematics needed for entry-level jobs.[16] About one-half of

[13] Plank, S. *Career and Technical Education in the Balance: An Analysis of High School Persistence, Academic Achievement, and Post-secondary Destinations.* National Research Center for Career and Technical Education, 2001.

[14] Castellano, Marisa, J. Stone and S. Stringfield. *What Makes It Work?* National Research Center for Career and Technical Education, publication in process.

[15] South Dakota Office of the Governor. "Governor provides vision, goals for education in South Dakota." Press release, January 4, 2006.

[16] The Conference Board. "Most Young People Entering the U.S. Workforce Lack Critical Skills Essential for Success." Press release, October 2, 2006.

manufacturers responding to a 2005 survey reported that current employees lacked problem-solving and critical-thinking skills, teamwork and collaboration skills, self-direction and a strong work ethic.[17]

The current view of rigor often is limited to taking a set of academic courses and meeting performance standards on conventional paper-and-pencil exams. High school redesign efforts often give too little emphasis to broadening the concept of rigor to meet students' diverse modes of learning. Meanwhile, wide performance gaps between student groups indicate that the learning needs of many students are not being met. Many students need more relevant courses that will help them connect high school studies to learning in college or career training.

Hands-on projects can help many students deepen their understanding by applying the high-level mathematics and science knowledge and literacy skills they are taught. Students need a variety of assignments to enhance their abilities to comprehend information and make analytical judgments and inferences. Students need experiences with mathematics that move beyond procedural knowledge: They need opportunities to make sense of numbers through activities (such as developing cost estimates for a career-oriented project or collecting, compiling, analyzing and categorizing data for a science experiment) and to use the language of mathematics and science to present their findings.

Best State Policies and Practices

The value of rigor through CT courses and applied teaching has been recognized by the **Texas** Legislature. One year after passing the 2006 legislation[18] to increase academic rigor with an emphasis on college readiness, legislators passed Texas House Bill 3485 to add a career/technical component.[19] The new law encourages ninth-graders to have a career emphasis in their required four-year plan and authorizes the award of academic credit for an advanced career/technical course designated by the state Board of Education as containing rigorous academic content.

Florida has implemented more than 400 career academies to better engage students in high school. These academies connect high school academic studies to careers and postsecondary goals by using focused career studies that lead to an industry certification, an associate's degree or a bachelor's degree. Florida's academies are "research-based programs integrating a rigorous academic curriculum with a business-and-industry-driven career curriculum."[20] Career areas of emphasis are driven by local employer needs. The state Department of Education reports that career academy students are better-prepared for postsecondary studies, have fewer absences and have higher achievement and graduation rates than other high school students. Many career academy students earn employer certification and university credit through dual credit, special projects or Advanced Placement exams.

[17] *2005 Skills Gap Report — A Survey of the American Manufacturing Workforce.* National Association of Manufacturers, 2005.

[18] Texas Education Agency. "Briefing Book on House Bill 1, 79th Texas Legislature" — http://www.tea.state.tx.us/comm/briefingbookspecial.pdf.

[19] Texas Legislature. House Bill 3485. Effective June 15, 2007.

[20] Florida 2006 Legislature. House Bill 7087. Effective June 5, 2006 — http://www.fldoe.org/gr/pdf/2006/EnrolledHB7087.pdf.

Career/technical education needs to be part of comprehensive strategies to improve traditionally low-performing high schools. Johns Hopkins University research estimates that one in eight high schools nationally has 60 percent or less of entering freshmen enrolled in their senior year three years later.[21] These high schools need reforms that will help more students reach their senior year and graduate, and career/technical education can play a valuable role. When schools organize into small learning communities with an emphasis on broad career fields and hands-on instruction, they can personalize learning and improve student achievement.

States, local school boards and district leaders, teachers, parents and all stakeholders in education need to take greater responsibility for low-performing high schools and students. High schools with low-performing, unengaged students need special ninth-grade initiatives to help make learning relevant — not narrowly focused remedial instruction, but opportunities for students to learn academics through application. Career/technical education should be part of redesigning the high school to offer students choices through theme-based and career-focused small learning communities that lead to a postsecondary credential and/or employer certification. Such small learning communities can provide opportunities for teams of academic and career/technical teachers to work together to improve student achievement and completion rates.

Best State Policies and Practices

In **Ohio**, career/technical education plays an integral role in high school reform designed to create more personalized learning environments. The state uses CTE to expose more students to a challenging curriculum that prepares them for success in postsecondary studies, careers and citizenship. Both career/technical centers and comprehensive high schools that have implemented these elements into their school reform designs have seen steady improvement in student achievement.

Missouri also has recognized CTE's potential for improving low-performing schools. Career/technical educators have been appointed to the state Department of Education school improvement teams to assist schools struggling to make Adequate Yearly Progress (AYP) as required by federal law.

[21] Johns Hopkins University. "Dropout Factories." Associated Press, 2007.

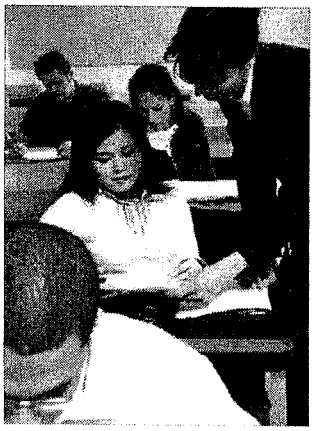
Challenges States Face in Realizing CTE's Contributions to High School Reform

States need to change the high school experience and accountability system from a one-size-fits-all model to one with multiple pathways and assessments that serve the full range of students. State education agencies, boards of education, legislators and executive branches face the challenge of creating a modern and flexible program of high school career/technical studies that aligns with essential college- and career-readiness standards and leads to improved graduation rates. States and schools need to:

- recognize the value of quality, applied learning experiences.
- assist students in setting goals that postsecondary studies can help them achieve.
- introduce more high school students to high-demand, high-skill, high-wage jobs.
- assess students' learning in multiple ways.

CHALLENGE 1: Align new and existing career/technical curricula with essential college- and career-readiness standards. The Perkins Act now stipulates that states will align career/technical courses with state academic content standards. Since few CT courses are currently aligned with academic standards, states need to select from the lengthy standards lists the most essential college- and career-readiness standards in reading, writing and mathematics to embed into CT courses. Most essential standards are those that are believed to be the best predictors of student success in a career and further study. Even academic courses are unable to address all standards with adequate depth,[22] suggesting an even greater challenge for CT courses. In the future, the quality of CT programs will hinge on their alignment to *essential* college- and career-readiness standards that are crucial for success in postsecondary studies and careers.

The Perkins Act requires CT programs to embed academic content into student assignments, projects and activities. CT courses that blend academic and technical content effectively will enable students to see the relevance of their studies and to achieve at higher levels. **The challenge is to select anchor assignments[23] in CT courses that require the use of essential academic and technical content for students to complete.**



States need to change the high school experience and accountability system from a one-size-fits-all model to one with multiple pathways and assessments that serve the full range of students.

[22] Kendall, John S. and R. J. Marzano. *Content Knowledge: A Compendium of Standards and Benchmarks for K-12 Education.* Mid-continent Research for Education and Learning (McREL), 2004.

[23] An anchor assignment is a major activity, problem or project that is authentic, will take several days to complete, and engages students as they apply literacy and numeracy skills. The anchor assignment assesses for an understanding of these skills.

States must overcome several challenges in order to align CT courses to essential state academic standards:

- Career/technical teachers must be trained to identify and teach the literacy, mathematics, science and technical skills embedded in CT instruction, assignments and assessments.
- Academic and CT teachers need to work together to effectively align existing CT courses with academic standards.
- States need to develop and redesign courses that blend academic and technical content.
- States need assessment systems that measure and validate CT programs' contributions to graduation requirements and student achievement.

Best State Policies and Practices

Some states have made progress on integrating academic and technical content. **Delaware** requires all school districts to demonstrate that their curricula for CT courses are aligned with state academic content standards in grades nine through 12.[24] Delaware's goal is to align all CT courses to academic standards in the four core areas by spring 2008. The intent is to provide all public high school students the skills and knowledge needed for success in the workplace and postsecondary studies without the need for remedial courses.

ACTIONS STATES CAN TAKE:

Align new and existing CT courses with essential college- and career-readiness standards.

1. **Align the career/technical curriculum with essential college- and career-readiness standards in reading, writing and mathematics.** This will require high school, postsecondary education and business leaders to identify a set of essential college- and career-readiness standards for reading, writing and mathematics.
2. **Build technical capacity in the state department of education, districts and schools to align CT courses with essential college- and career-readiness standards and to develop examples of anchor assignments for teaching embedded academic content.**
3. **Establish panels in high-demand, high-skill, high-wage fields of two- and four-year college faculty members, employers, high school teachers, and school and district leaders.** Charge each panel with developing a curriculum framework and course syllabi for a series of high school courses that blend academic and technical content and encourage students to pursue more specialized education and career preparation after high school.
4. **Adopt nationally recognized, high-quality CT curricula that integrate academic and technical content, provide training for teachers and conduct end-of-course assessments to ensure that students have mastered the materials.** Examples include the National Academy Foundation's

[24] Delaware General Assembly. Delaware's Administrative Code, Title 14: Education: 502: Alignment of Local School District Curricula to the State Content Standards. Delaware Regulations. Approved April 1, 2007.

Academy of Finance and Academy of Information Technology, and the Pathway to Engineering™ and Biomedical Sciences programs from Project Lead The Way.® These programs require students to complete a solid academic core, for schools to use set course syllabi and common end-of-course assessments, and for teachers to be trained to teach each course.

CHALLENGE 2: Create a flexible system of optional career pathways in high schools to help better-prepare all students for college and careers. To find purpose in rigorous academic studies, some students need CT programs that stress broad career themes with challenging, authentic projects that engage students in the application of mathematics, science, reading and writing. Other students need early immersion in occupation-specific courses that link directly to a job and use project-based teaching to motivate them to learn technical and academic knowledge and skills to prepare for further studies and careers.

Schools face a challenge to create a variety of career-focused programs of study that will prepare a diverse set of students for college and career success — students who enter high school performing below grade level; students who become disengaged with school in seventh or eighth grade and are likely to drop out in the early years of high school; students who intend to enter employment directly from high school without pursuing further study and want to earn an employer certificate to obtain a better job; and students who intend to pursue an associate's degree and/or a bachelor's degree.

State leaders agree that, too often, traditional classroom instruction in large comprehensive high schools does not meet many students' needs. CTE can improve the transition from the middle grades to high school by helping more ninth-graders meet state academic standards, plan a program of study and set goals for themselves beyond high school. States need CT courses developed collaboratively by academic and CT teachers to provide students opportunities to apply academic learning to authentic problems and projects.

Best State Policies and Practices

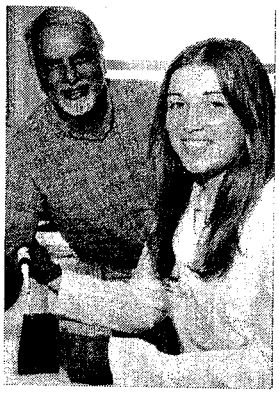
Massachusetts Commissioner of Education David Driscoll reported at the forum that his state's choice technical high schools meet the needs of both college- and career-bound students by integrating academic rigor into CT studies. **Delaware** has converted its shared-time career/technical centers into full-time technical high schools. These choice technical high schools incorporate a strong academic foundation into high-quality career/technical programs and have achieved graduation rates of 95 percent and higher, with more students prepared for work and further study.

The **Ohio** Department of Education has appointed work force and academic reform teams to work with struggling high schools. These teams assist schools in reorganizing around broad career themes with a rigorous academic core. Career/technical and academic teachers are given opportunities to plan together and align curriculum to essential college- and career-readiness standards. The main objective is to help students make successful transitions from middle grades to high school and from high school to postsecondary education and employment.

ACTIONS STATES CAN TAKE:

Provide a flexible system of optional career pathways that prepare a full range of high school students for college and careers.

1. **Establish policies that encourage school districts to provide programs of study that will lead more students to earn employer certification, an associate's degree and/or a bachelor's degree.** These programs of study, or pathways, should share key features to include:
   - a solid core of academic courses that help students meet college entrance requirements.
   - sequences of technical courses focused on essential college- and career-readiness standards.
   - project-based learning requiring application of academic and technical content.
   - mentors and access to extra-help tutoring and instructional assistance for students.
2. **Provide incentives to school districts and high schools to form partnerships with community and technical colleges, shared-time technology centers, employers and other entities.** The purpose of these partnerships will be to create pathways that give students access to:
   - specialized, occupation-specific courses that begin early in high school and lead to recognized employer credentials and enrollment in postsecondary studies.
   - high-quality CT programs in high-demand fields — including architecture and construction; business and finance; education and training; biomedical and health sciences; arts, media and entertainment; information technology; and science, technology, engineering and mathematics — leading to a certificate, an associate's degree and/or a bachelor's degree.



States will need to provide the necessary resources to implement a wide array of programs of study or career pathways.

States will need to provide the necessary resources to implement a wide array of programs of study or career pathways. They also will need to develop policies and procedures that enable secondary and postsecondary institutions to share facilities and adjust their operations to meet students' needs.

3. **Develop or redesign career/technical courses to help ninth-grade students apply essential mathematics, literacy and science concepts within work-related activities, projects and problems.** These courses would be an extension of students' language arts and mathematics studies and would give students another way to learn academic skills and the reasons they need those skills.
4. **Award a high school diploma to overage students who have passed the GED test, completed a planned sequence of career/technical courses in a high-demand field and passed a state-approved employer certification exam.** Support school districts collaborating with community and technical colleges to develop recovery plans for students ages 16 to 19 who have left school without completing the requirements for graduation and help them earn a GED credential and employer certification.
5. **Establish within state education agencies teams of academic and career/technical experts to help the most challenged high schools incorporate redesigned CT programs into comprehensive reform and create personalized learning communities of academic and CT teachers around career-oriented areas of study that are aligned with college-preparatory academics.**

Best State Policies and Practices

Kentucky Board of Education policy requires schools to assist students, beginning in grade eight, to develop individual learning plans. The plans engage parents in helping students set goals and develop a customized program of study that ties middle grades to high school, and high school to college and the work force.

Florida law requires that career and educational planning begin as early as grade seven. Instruction helps students think about future educational and career options, and parents and students work together to envision a high school program of study.

CHALLENGE 3: Create a policy framework that keeps students' future options open by developing career/technical and academic programs that: 1) link high school to postsecondary studies and work, 2) blend academic and technical studies, and 3) connect students to a goal. The Perkins Act mandates that high school programs of study link rigorous academics with high-demand career fields. Such programs of study require a strong working relationship between the state department of education, secondary and postsecondary institutions and employers. States need policies and procedures that encourage all stakeholders to help students develop and pursue programs of study that connect them to college and careers. A few states have begun to fashion such policies.

States face several challenges in developing seamless programs of academic and career studies that connect high school with postsecondary studies. The biggest challenge is helping high schools and colleges collaboratively implement flexible programs of study that serve a full range of students, including more academically advanced students and those who are behind. In most states, secondary schools, technical colleges, and two- and four-year colleges operate separately. Furthermore, student data systems often are not linked, which makes it difficult for many states to monitor student transitions and outcomes.

Best State Policies and Practices

Oklahoma is addressing the challenge of collaboration through its Cooperative Alliances initiative between the Oklahoma State Regents for Higher Education and the Oklahoma Department of Career and Technology Education. The alliances expand postsecondary access for career/technical students through an established credit-transfer process that makes it easier for more students to enter college. Career/technical students in the alliances begin college courses in 11th grade, connecting their high school studies to postsecondary goals. Students who may not have considered college as an option are learning they can succeed in postsecondary studies.

Georgia is implementing optional programs of study around career pathways. These programs support the Governor's Strategic Industries initiative, and they connect high school studies to postsecondary education and work force demand.

Best State Policies and Practices

As part of a state initiative to improve its public high schools and prepare all students for life beyond graduation, the **Arkansas** State Board of Education adopted the Smart Core curriculum that requires all high school students to complete 16 units in core academics and six career focus units, beginning with the 2010 graduating class. Smart Core specifies Algebra II as one of the four required mathematics units, and it dictates that all units in the career focus requirement shall be established through guidance and counseling at the local school district, based on the student's career interests.

All programs of study or career pathways must have a solid sequence of college-preparatory academic courses at their core. State policies should result in annual increases in the percentage of students who complete a basic college-preparatory academic core, in addition to an advanced academic focus and/or a sequence of planned courses in a high-demand career/technical field. Students who complete a sequence of career/technical courses should be expected to pass graduation exams in reading, writing and mathematics and to demonstrate readiness for postsecondary education or be ready to earn an employer certification. States should give students access not only to a solid academic core, but also to a sequence of highly developed career/technical courses and/or to advanced-level academic studies.

Students also need the support of a strong guidance and student advisement system to complete a coherent program of academic and career/technical courses and to make successful transitions. An effective guidance and advisement system should help schools build relationships with students and their parents, require all students by ninth grade to set career and educational goals and develop a plan to reach those goals, and connect students with an adult mentor who helps students and their parents understand the relationship between their studies and goals.

While the Perkins Act does not require high school programs of study to include dual enrollment opportunities, dual credit courses can help students reach their educational goals more quickly. Few states have overarching policies in place to realize the potential of dual enrollment in helping more students earn postsecondary credits. Some states fail to require students enrolled in dual credit courses to meet college-readiness standards in mathematics, reading and writing. Many high school students who take CT courses receive college credit but have major academic deficiencies and spend much of their first year of college in remedial courses. Furthermore, many states lack the policies they need for dual credit and college transfers of this credit. Funding for dual enrollment differs among states.

ACTIONS STATES CAN TAKE:

Create a policy framework for developing career/technical and academic programs that connect high school to postsecondary study and work.

1. **Designate resources to help secondary and postsecondary education state leaders develop statewide multiple programs of study or career pathways.**
2. **Develop protocols and procedures for creating programs of study or career pathways with sequences of recommended academic and career/technical courses that encompass essential college- and career-readiness standards and lead more students to employer certification, an associate's degree or a bachelor's degree.**

3. **Provide guidelines and resources for schools to create guidance and advisement systems in which:**
   - all entering ninth-graders set six-year career and postsecondary goals and develop an outline of academic and CT courses to help them achieve those goals.
   - all students are paired with an adult mentor who advises them for all four years of high school and involves parents in reviewing students' progress toward their goals.
   - all school counselors are trained in the programs of study or career pathways to provide guidance to students for setting and achieving their goals, and to help students develop skills and habits required for college and careers.
4. **Enable community and technical colleges to assign itinerant advisers to high school campuses to explain to students, teachers and counselors the level of academic preparedness in reading, writing and mathematics required for immediate access to courses counting toward a career certificate, associate's degree and/or bachelor's degree.**
5. **Align state policies to realize the potential of dual enrollment courses in career/technical studies.**
   - Establish statewide college- and career-readiness standards in reading, writing and mathematics that students must meet to enroll in dual credit courses.
   - Set minimum eligibility requirements for earning college credit toward a degree while in high school, and have all state postsecondary institutions apply them to career/technical dual credit courses.
   - Establish the same academic content standards, faculty requirements, course syllabi and end-of-course exams for dual credit career/technical courses, whether for high school or college students.

Align state policies to realize the potential of dual enrollment courses in career/technical studies.

   - Develop a statewide system for the transfer of college credits earned through dual credit courses toward a degree at the postsecondary level.
   - Decide how dual credit courses will be funded so that students' choices will not be limited by the unwillingness of the high school and postsecondary systems to work together.
   - Determine how dual enrollment will be monitored to ensure the programs meet state standards for college-level work.
6. **Develop policies to help schools determine students' level of college and career readiness prior to their senior year, and develop transitional courses in English/reading and mathematics — with common standards, syllabi and instructional materials — for 12th-graders who do not meet readiness standards.** Train teachers to lead the transitional courses and require unprepared students who plan to pursue postsecondary studies to take the courses during their senior year.
7. **Link secondary and postsecondary data systems to measure whether students who graduate from high school, including those in the new programs of study or career pathways, successfully transition to postsecondary studies and work.**

CHALLENGE 4: Assess the contributions career/technical education can make to improving students' academic and technical achievement. The number of academic courses required for graduation has increased over the years, yet gains in achievement have not paralleled these rising requirements. Through new CT courses that blend academic and technical content, students can learn academic content and may be more motivated to achieve at higher levels in their academic studies. However, assessing the redesigned CT courses' impact on academic achievement is one of the biggest challenges in realizing the potential of the Perkins Act. Under *No Child Left Behind*, state assessments for academic achievement are usually given in grades nine and 10. But, for many students, the bulk of CT courses are not available until grades 11 and 12. Furthermore, end-of-course assessments ignore the fact that academics embedded in CT courses often draw from a variety of academic courses and are driven by workplace requirements and industry standards. For example, a four-course sequence of high school CT courses that include mathematics may not be aligned to a specific mathematics course, but collectively may encompass academic standards equivalent to those required to earn one-half of a mathematics credit or more. States need to assess and give credit for the impact these experiences have on academic achievement.

Best State Policies and Practices

Some states offer credit for academic content in blended career/technical courses. For example, **Kentucky** has adopted a policy, effective for the graduating class of 2012, allowing approved career courses to substitute for specific academic courses required for graduation.[25] This policy encourages the redesign of CT courses to include essential academic content through the application of authentic activities, projects and problems. These courses are aligned to all of the state academic content standards required for the traditional academic courses. Construction Geometry, a course in the CT carpentry program, embeds the 23 required state core content standards for geometry. Students completing this course earn one credit in geometry and one credit in carpentry. Another CT course integrates agriculture and biology so that students may take the agriculture course in grade nine and receive biology credit through embedded instruction. Redesigned CT courses in Kentucky are double-block classes that provide one career/technical credit and one academic credit.

The Perkins Act requires states to measure career/technical students' achievement based on both academic and industry standards to determine career/technical education's contribution to improving student outcomes. Measuring technical achievement poses another challenge for states: Many states do not have the resources to develop technical assessments with the same reliability and validity as academic assessments. States can overcome this challenge, in part, by adopting existing, nationally recognized exams to determine whether students are meeting technical or career-specific standards.

Still, even those states adopting existing nationally recognized employer exams face challenges in measuring students' skills. Some of the national exams are occupation-specific and designed for adults. Some industry certification exams require students to complete an apprenticeship prior to taking the exam, and some have age requirements. States need to determine who will pay the testing fees, how and where tests will be administered, and to whom test results will be reported.

[25] Kentucky Board of Education. 704 KAR 3:305. Minimum requirements for high school graduation. Kentucky Administrative Regulations. Approved October 6, 2006.

Best State Policies and Practices

The **Virginia** State Board of Education allows students who meet technical standards on a state-approved certification or licensure exam to earn up to two student-selected verified credits[26] toward graduation. The board established criteria requiring state-approved certification exams to:

- prepare students for an occupation or occupational area.
- be knowledge-based rather than performance-based.
- measure achievement in a CT field that confers a credential from a recognized industry, trade or professional association.
- be administered on a multi-state or international basis.
- be standardized and graded externally.[27]

Oklahoma enacted a law in 2006 that requires every student, beginning with those entering the ninth grade in 2008, to take end-of-instruction examinations in seven academic subjects. Students must pass four of those exams to graduate.[28] The law specifies that students must pass exams in Algebra I, English II and at least two of five remaining areas (Algebra II, Biology I, English III, geometry and United States history). The new law also created a steering committee to advise the state Board of Education on several matters, including the recognition of "alternate tests or assessments that equal or exceed the rigor of the end-of-instruction assessments." The steering committee identifies state and national CT assessments that might serve as alternatives to passing the additional academic exams, provided the assessments are business- and industry-recognized and result in a credential.

Massachusetts is investing heavily in the development of career/technical education exams. Beginning with the graduating class of 2010, high school students will be required to pass these exams to earn a Certificate of Occupational Proficiency that signifies mastery of a core set of academic skills, technical competencies and knowledge. The state has redesigned 43 CTE curriculum frameworks to address six elements needed in the work force — health and safety, technical knowledge, embedded academics, management and entrepreneurship, technology, and employability — and to guide students' learning and assessment leading to the certificate. To qualify for the certificate, students must demonstrate mastery of the knowledge and skills needed for employment and further education by passing both written and performance exams. Students also will be required to complete a portfolio to demonstrate what they have learned, earn a safety credential, and develop a career plan and resumé. While earning the Certificate of Occupational Proficiency will not be required for graduation, students will be required to meet high school graduation requirements as a prerequisite for receiving the certificate.

[26] Students in Virginia earn two types of credit during high school. Standard credit is based on a minimum of 140 hours of instruction and successful completion of the course. Verified credit is based on standard credit *plus* a passing score on the end-of-course assessments or other board-approved substitute assessments, including industry certification exams.

[27] For more on the industry credentials that Virginia's high school students can earn, visit: http://www.pen.k12.va.us/VDOE/Instruction/CTE/certification/.

[28] Oklahoma State Department of Education. *Achieving Classroom Excellence Act (ACE) of 2006: Summary* — http://www.ofc.org/lef/ff06-garrett-acesumm.rtf.

ACTIONS STATES CAN TAKE:

Assess the contribution career/technical education can make to advancing academic and technical achievement.

1. **Create policies allowing students to earn academic credit through challenging career/technical courses that: feature curriculum and instruction aligned with college- and career-readiness standards, are taught by well-trained and qualified teachers, and incorporate external assessments to verify students' mastery of academic content.**
2. **Set progressive annual targets for increasing the percentages of CT students who meet the proficiency levels used to measure Adequate Yearly Progress (AYP) under *No Child Left Behind* (*NCLB*).** Extend CT targets to match *NCLB*'s requirement that 100 percent of students meet state academic standards in at least English/reading and mathematics by 2014.
3. **Allow CT students the option to meet graduation requirements (in subjects other than reading, writing and mathematics, which are required of all students) by passing equally rigorous state-approved employer certification exams.** Support districts in giving these state-approved alternative exams to CT students in 12th grade and provide funding for exam fees.
4. **Change the state accountability system to require that high schools improve annually the percentage of CT students who pass state-approved industry certification exams adopted by the state's secondary and post-secondary education systems and who meet standards on college-placement exams that allow students to enter college without remediation.**
5. **Consider virtual learning options for students who have limited access to high-quality CT programs.**

Prepare and enable career/technical teachers to teach essential academic skills through application in authentic activities, projects and problems.

CHALLENGE 5: Prepare and enable career/technical teachers to teach essential academic skills through application in authentic activities, projects and problems. Career/technical education teachers need substantial professional development to understand how to teach academics in technical courses using contextual instruction. A majority of CT teachers enter the profession through alternative certification, and some do not have strong backgrounds in academic content knowledge and in embedding academic content into classroom assignments. They also may not have strong classroom management skills, and about one in four CT teachers does not have a bachelor's degree.[29]

Some CT teachers have the necessary academic backgrounds in English, mathematics or science to be considered "highly qualified" under *NCLB* and to teach blended CT courses yielding academic credit. However, most CT teachers need further professional development to teach courses that blend academic and technical content. Kentucky is using virtual instruction to provide "highly qualified" teachers in more classrooms. Web-based instruction offers a promising strategy for CTE, but requires schools to embrace and integrate such technology and lessons into their classrooms.

[29] Special analysis by SREB of CTE teachers completing the 2006 *High Schools That Work* Secondary Teacher Survey.

The Perkins Act requires comprehensive professional development that prepares teachers to embed essential academic content standards into CT courses and to work in teams of academic and CT teachers to advance students' academic and technical achievement. Professional development should be intensive and sustained rather than short-term, one-time workshops. The aim of such training should be to increase CT teachers' knowledge of academic and industry standards, to help them assess students' performance on the standards, and to develop data-analysis skills that will enable them to identify students who need special assistance. The Perkins Act allows states to provide funds for school districts and other entities to design and implement this type of training.

ACTIONS STATES CAN TAKE:

Enable career/technical teachers to teach essential academic skills through application in authentic activities, projects and problems.

1. **Adopt policies that strengthen the preparation and certification requirements for all career/technical teachers, and require CT teachers to:**
   - have a bachelor's degree or be on schedule to complete one within five years of employment.
   - meet the same academic performance requirements required of academic teachers.
   - demonstrate teaching competence by passing an appropriate pedagogy exam or by meeting standards on a classroom performance assessment conducted by an external evaluator.
   - demonstrate technical content competence by passing a state-approved external assessment.
2. **Invest in a strong CT teacher induction system with sustained professional development and mentors that prepares teachers to:**
   - use data to set higher expectations in CT classrooms.
   - align CT curricula with essential college- and career-readiness standards, and use the standards to guide classroom assignments and assessments.
   - use research-based literacy and numeracy instructional strategies to help students meet readiness standards.
   - engage students in the application of academic and technical knowledge and higher-order thinking skills through hands-on projects and problems.
   - manage classrooms of students with diverse learning styles and achievement levels.
3. **Invest in the training of current CT teachers to help them embed and teach essential academic content through project- and problem-based learning and through structured workplace learning opportunities.**
4. **Provide high school principals with professional development on: aligning curricula, classroom assignments and assessments with college- and career-readiness standards; managing institutional change; securing resources; establishing flexible schedules; implementing project- and problem-based learning strategies; and designing effective professional development for teachers.**

5. **Publish and post Web-based guides that outline the most essential college- and career-readiness standards and describe the type of work through which students can demonstrate progress toward meeting the standards. Provide examples of anchor assignments that embed college- and career-readiness standards and written and performance-based classroom assessments.**
6. **Create and maintain a digital repository of tested course syllabi, anchor assignments and assessments for career/technical courses that are aligned with state academic standards.**

A Sense of Urgency: How State Leaders Can Take Action to Help More Students Succeed

Too many students are unprepared for employment and postsecondary studies. Too many leave high school before they acquire the knowledge and skills they will need to advance in a job, career training or higher learning. High school and even some college graduates lack the skills employers demand of workers: strong academic skills, appropriate technical skills, and the abilities to think critically, solve problems, collaborate in teams and articulate solutions.

Many of today's high schools fail to keep students engaged. Schools urgently need to make learning more relevant and help students see how education links to their future. Schools need to recognize students' varied learning styles and deliver instruction in more innovative ways to meet students' diverse learning needs. Educators, parents, students and policy-makers need to better understand the value that quality career/technical education brings to improving student achievement.

States have long overlooked the contributions high-quality career/technical education can make to preparing more students for success in careers and postsecondary studies. Career/technical education should become a key strategy to help states to improve academic and technical achievement and reform high schools. State leaders, educators, policy-makers and the business community share responsibility for taking action.

Career/technical education will positively affect student achievement and graduation rates if states are willing to invest in improving their programs. Programs of study focused on careers that are vital to the state's economy may require new learning facilities and equipment. School leaders need training in aligning these pathways with college- and career-readiness standards. CT teachers need professional development in blending academic and technical content and in employing research-based instructional strategies. States need to develop greater technical expertise and resources to make these changes in schools and classrooms.

States risk weakening their work force and economies without these kinds of actions to improve CTE and to help more students learn higher-level academic skills by applying them.

Tools to Help States Realize Career/Technical Education's Potential in High School Reform

SREB's *HSTW* has developed an assessment tool to help states determine progress made toward realizing the contributions career/technical education can make to high school reform. The tool, a checklist, includes all of the actions recommended in this report and provides a scale for levels of implementation of each action as a way for states and local school districts to gauge progress made. States and districts can identify the challenges to implementing these actions and develop strategies to overcome them. The Web-based checklist tool is accessible on the SREB Web site — www.sreb.org.

Several other career/technical education reports useful to states as they work to realize CTE's potential also are available on SREB's Web site. Some are highly relevant to helping states implement the recommended actions. For example:

Getting Students Ready for College and Careers: Transitional Senior English. This report describes and defines the reading and writing readiness standards that are needed to prepare students for postsecondary studies and careers. It provides samples of related school assessments to help teachers provide the support and class structure needed to get students to the readiness level expected by colleges. Also included are samples of learning activities to provide a structure for students to improve their literacy preparation. (08V04); 64 pages; 2007.

Designing Challenging Vocational Courses — A Guide to Preparing a Syllabus. This book is designed to help career/technical teachers develop a syllabus of the content they want students to master in a course, the projects students will be expected to complete, the instructional methods to be used in the course and the assessment strategies that will measure student achievement. The emphasis is on project learning as students strengthen their academic and career/technical skills in challenging courses. (97V46); 111 pages; 1997.

Research Brief — Project Lead The Way® Works: A New Type of Career and Technical Program. This research brief shows how the Project Lead The Way® (PLTW) STEM-based curricula raise student achievement in science, technology, engineering and mathematics courses and help get students ready for college and careers. Analyzing data from the 2006 *HSTW* Assessment, it looks at how PLTW students are more likely to exceed the *HSTW* course recommendations and are more prepared to pursue postsecondary studies and advances in the workplace. (07V29); 20 pages; 2007.

Using Real-World Projects to Help Students Meet High Standards in Education and the Workplace. Site Development Guide #11. Project-based learning invigorates students and teachers by showing how academic and technical content and skills are applied to the "real world." This guide provides a framework for academic and career/technical teachers who want to raise students' achievement by getting them to complete challenging, real-life projects. (00V03); 24 pages; 2000.

Actions States Can Take to Place a Highly Qualified Career/Technical Teacher in Every Classroom. Besides presenting actions for states to take to strengthen the preparation of their career/technical teachers, this report also addresses five key questions with respect to recruitment, preparation, induction and support of career/technical teachers: 1) What is the route for becoming a high school career/technical teacher? 2) What would an improved system to prepare these teachers look like? 3) What does the current system look like in selected states? 4) What can states do to close the gap between current and improved systems? 5) How can states work to support reciprocity? (05V73); 26 pages; 2005.

Lost in Transition: Building a Better Path from School to College and Careers. This report is based on 15 state education forums held in 2005 and 2006. Sponsored by the League for Innovation in the Community College and the Southern Regional Education Board, and supported by the U.S. Department of Education, the forums focused on the goals of the College and Career Transitions Initiative. This report summarizes the findings from the education forums, identifies key policy issues, and details actions states can take to improve students' transitions from high school to postsecondary studies and careers. (08V01); 28 pages; 2008.

Association for Career and Technical Education
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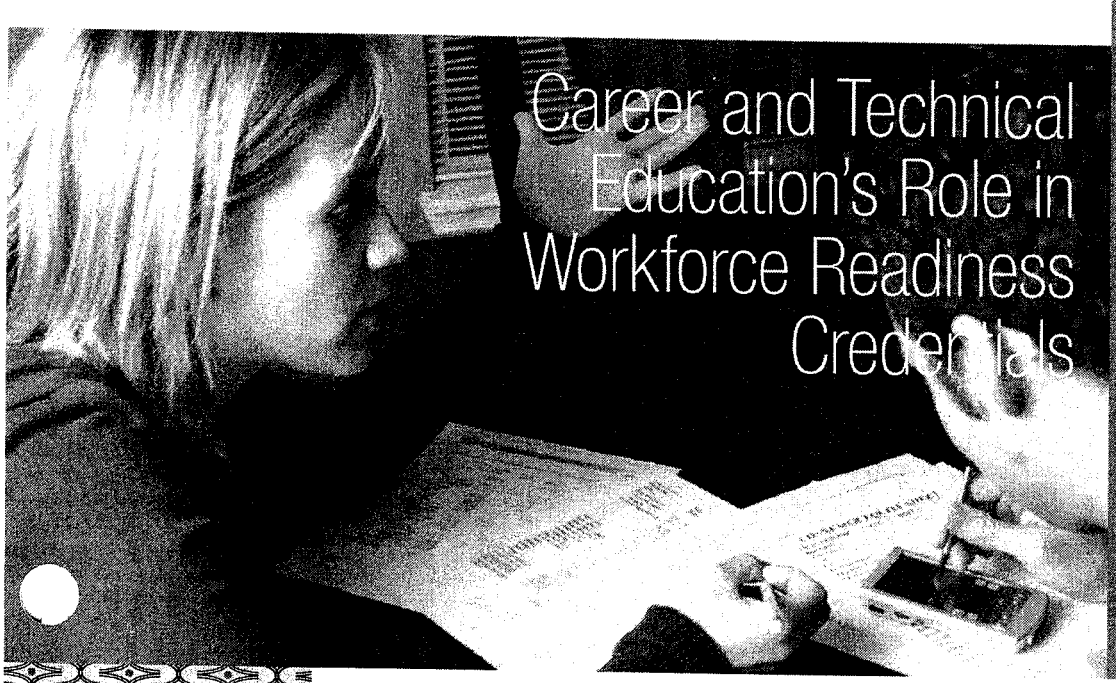
ISSUE BRIEF



Career and Technical Education's Role in Workforce Readiness Credentials

IN THIS BRIEF:

This issue brief will explore the important role that career and technical education plays in the continued expansion and value of workforce readiness credentials. CTE programs contribute to the growth of these credentials by helping students apply academic and employability skills, providing opportunities for preparation and assessment, and connecting with business and industry to increase employer support.

What standards of work and career readiness apply to the educational system and how can employers be sure that individuals are ready for work? Since the 1982 release of the U.S. Department of Education report *A Nation At Risk*, the first prominent report on the mediocre attainment of skills in the American educational system, this issue has been at the center of education and workforce development policy discussions.

As the global economy has gained strength and businesses and industries increasingly seek employees with higher levels of expertise, a national movement to ensure a steady supply of skilled workers has grown. Many employers, states and localities are turning to workforce readiness credentials to validate common workplace skills in job applicants and employees, and in turn, education and workforce agencies are responding by issuing or preparing students for these credentials.

The Concerns

THE GROWING SKILLS GAP

In a very short time, America has evolved from an industrial economy to a knowledge economy. Since the early 1990s, the pace of change in the global economy has accelerated even further, given the "flattening forces" spoken of in recent economic analyses. The globalization of business and industry requires workers to acquire core knowledge and skills that can be applied—and quickly upgraded and adapted—in a wide and rapidly changing variety of work settings.

"The shortage of qualified workers is truly widespread, impacting companies regardless of size, industry, or geographic location."

—NATIONAL ASSOCIATION OF MANUFACTURERS

Unfortunately, the skills of Americans have not kept pace. More than 80 percent of respondents in the 2005 National Association of Manufacturers *Skills Gap* report indicated that they are experiencing a shortage of qualified workers overall – with 13 percent reporting severe shortages.[1] The U.S. Chamber of Commerce also reports a growing skills gap. In the 2002 *Keeping Competitive* report, 73 percent of employers reported "very" or "somewhat" severe conditions when trying to hire qualified workers.[2]

In fall 2006, an American Society for Training and Development Public Policy Report, "Bridging the Skills Gap" defines a skills gap as "a significant gap between an organization's skill needs and the current capabilities of its workforce. It is the point at which an organization can no longer grow and/or remain competitive in its industry because its employees do not support the organization's strategies and goals."[3]

The changing nature of jobs, education that lags behind skill needs, a slow rate of growth in the workforce and ineffective training investments by employers all cause skills gaps. As a result, employers experience limited innovation and growth and lower productivity and profits. The gap in employee skills impacts the local, state and national economy.

THE NEED FOR SKILL STANDARDS

Employers have reported that the most important skills employees need more of include technical skills, strong basic employability skills, and reading, writing and communication skills.[4] While traditional education programs and assessments may address some of these skills, few provide comprehensive training across the skill spectrum. There is a growing discussion, influenced by legislation, a cadre of reports, and the interest of business-education and governmental partnerships, around the need for skills standards in all of these areas of American education and training.

Legislation including the Goals 2000: Educate America Act of 1994, School-to-Work Opportunities Act of 1994, Workforce Investment Act of 1998, No Child Left Behind Act of 2002, and Carl D. Perkins Career and Technical Education Act of 2006 have all focused on increasing and measuring skills needed in education, work and life.

Efforts emerging from these laws have included a National Skill Standards Board, created to develop occupational standards for broad occupational clusters, supported by a system of standards and certification; higher standards of achievement and accountability for every child through rigorous educational standards and assessments in reading and math; a stronger emphasis on strategies that help students graduate from high school with skills for success in both college and work; and increased requirements to measure skills gains of youth and adults in workforce development programs.

Other national efforts have also shaped this movement. In 1996, the nation's governors, working with prominent business leaders, started Achieve, Inc. to raise academic standards, improve assessments and strengthen accountability in states across the nation. National Education Summits, the American Diploma Project and reports such as *Closing the Expectations Gap 2007* have all resulted from this unique partnership.

Education, business and government banded together in 2002 to form the Partnership for 21st Century Skills to vision, articulate and advocate the educational skills that students need to be learners, workers and leaders in this century. The Partnership includes an impressive array of the nation's top businesses, along with the Council of

Chief State School Officers and the International Society for Technology in Education.

MEASURING WORKFORCE READINESS SKILLS

Out of these numerous efforts, the concept of a "workforce readiness credential" has emerged to attempt to validate work-ready skills. Jobs for the Future suggests that these skills be defined as a baseline of hard and soft skills that are transferable from one position to another across industries.[5] ACT similarly points out that the skills are valuable for "any occupation—skilled or professional—and at any level of education."[6]

Numerous assessment approaches have been developed in states and localities around the country, and are offered by various entities, including high schools, community colleges, employers, Workforce Investment Boards, and other state and local organizations.

National assessments include the ACT National Career Readiness Certificate™ (based on ACT WorkKeys®), National Work Readiness Credential, CASAS Workforce Skills Certificate and SkillsUSA Workplace Readiness Certificate. While still in the early stages of development in many areas, these credentials are working to gain acceptance around the country. Currently, the National Career Readiness Certificate™ has been the credential most widely adopted. It has been adopted on a statewide basis in 15 states, with local acceptance in at least 19 additional states. Over 150,000 National Career Readiness Certificates™ have been issued nationwide.[7]

While each of these assessments reflects and builds upon skills cited in the literature since the 1980 and is based on industry input, they differ in their assessment objectives and skills measured. The national assessments, and others developed in different regions of the country, reflect different combinations of required skills, and must be evaluated by potential users for their value in the specific education setting and employment environment. Once selected, a credential can drive the curriculum and instructional practices in education and training settings, helping to ensure that youth and adults have the skills really necessary to succeed in the 21st century economy.

National Workforce Readiness Credentials

ACT National Career Readiness Certificate™ www.nationalcareerreadiness.org
National Work Readiness Credential www.workreadiness.com
CASAS Workforce Skills Certificate www.casas.org
SkillsUSA Workplace Readiness Certificate www.skillsusa.org/educators/nocti.shtml

CTE'S ROLE

Career and technical education (CTE) is critical in an individual's journey toward total education and career success. Whether it is secondary students who need job skills to transition into the workplace, employees who need to upgrade skills, adults who need to achieve new skills for ongoing success or college graduates who want enhanced technical skills, all are served by CTE programs. It is through CTE programs that students, employees and other adults all gain the full range of skills necessary to be considered "workforce ready."

CTE programs have also been on the frontlines of offering new workforce readiness credentials, and should be considered leaders in the growth of this endeavor. Nobel laureate Dr. James Heckman reports that the skills measured by workforce readiness credentials are just as important to a student's future workplace success as more publicized academic indicators.[8] However, students often lack opportunities to gain these skills through traditional academic courses. CTE programs provide the relevance necessary to engage students, and the real-world situations that lead to workforce readiness skills attainment.

"Finally we have an assessment tool that allows the potential employee, the educator/trainer and employer, to all be on the same page."

—Tim Burg, Ponca City Development Authority, Oklahoma

Career and technical educators find value in using the workforce readiness credentials systems to improve student achievement and link learning to future study and careers. The formal credentials fill gaps in many state assessment systems that originated from state standards created under federal legislation, and provide clear links to business and industry needs for high school students and adults. CTE programs play critical roles in the growth of workforce readiness credentials by helping students apply skills, providing opportunities for preparation and assessment, and connecting with business and industry.

HELPING STUDENTS APPLY SKILLS

Numerous research studies have shown that context is critical in the learning process. Context has been described as "the integral aspect of cognitive events,"[9] and the National Research Council and the National Academies of Science "encourage the design of engaging curricula that apply to real-world situations."[10]

This is critical not only for traditional academic skills, but for workforce readiness skills as well. The national and state level credentials, while validating different skills, all attempt to verify that a student will be prepared to excel in the workplace, rather than an isolated classroom or testing center. Assessments that are utilized for these work readiness credentials assess workplace-related skills in as authentic an environment as possible, and include topics not typically addressed in academic environments, like locating information, listening, teamwork and observation. Assessments include workplace situational questions, case studies and work-based scenarios. A new assessment being developed by SkillsUSA will even use animation and other similar visual affects to measure student knowledge.

In order for students to be successful on workforce readiness assessments, and in turn, in the workplace, skills must be gained in an environment that is relevant to the real world of work. CTE provides such an environment where students can apply fundamental academic skills and employability skills to complex job-related problems.

According to a report from the National Research Center for Career and Technical Education, "CTE courses inherently provide contexts for applied or experiential learning ...delivery of content area curricula within a relevant, authentic, and presumably more motivating context... the creation of explicit connections between situations is critical if students are to transfer their knowledge and skills outside the classroom, whether it is to another context or to an abstract testing situation."[11]

While each workforce readiness credential or assessment validates a different set of defined skills, almost all include some focus on applying literacy and numeracy skills to typical work-related tasks. These skills are classified by many career and technical educators as "technical literacy." The Southern Regional Education Board defines technical literacy as is the ability to 1) apply academic knowledge and skills to a broad field of technical studies; 2) read, understand and communicate in the language of the technical field; 3) understand technical concepts and principles; and 4) use technology to complete projects in a specific career/technical field.[12]

Skills related to technical literacy are taught and reinforced daily in CTE classrooms across the country, preparing students for workforce readiness assessment components such as the WorkKeys® "Reading for Information" and "Applied Math", and the National Work

Readiness Credential's assessments "Read with Understanding" and "Use Math to Solve Problems."

As part of a West Virginia statewide effort to increase the rigor of CTE courses, the state has mandated that CTE students leave high school with certain types of credentials including program certification validating technical skills and a workforce readiness credential validating broader workplace readiness skills.

All CTE students who are program completers are offered the opportunity to earn "Ready-to-Work" workforce readiness credentials linked to the National Career Readiness Certificate™. Charles Pack, Assistant Principal at the Academy of Career and Technology in Beckley, West Virginia, believes this effort "came from the desire to make CTE more accountable for focusing on academic skills – not teaching the academics, but teaching students to use academics in a career."[13]

Certificates were awarded by the state workforce board for the first time in 2007, and around the state, CTE educators are working to prepare students for success on the assessment. A number of activities are being utilized in CTE classrooms to help students learn to apply academic skills to employment situations.

At Ralph R. Willis Career Center students maintain item banks of vocabulary words utilized in course lessons and write each week on a technical subject. At Roane Jackson Technical Center, journal writing and "technical words of the day" are utilized, and students at United Technical Center use targeted reading and math intervention software programs to enhance academic skills. Programs such as Automotive Technology and Collision Repair utilize related math textbook sections and work with math coaches to ensure student success.[14]

PROVIDING OPPORTUNITIES FOR PREPARATION AND ASSESSMENT

According to the U.S. Census Bureau, in 2006, 28 percent of adults had received a bachelor's degree or higher[15]; the other 72 percent of Americans need other pathways to gain technical skills and additional education to be successful in the workforce. CTE provides the comprehensive preparation necessary for students to show that they do have the skills desired by business and industry, and the venues for offering assessments and credentials. CTE programs in high schools, community colleges and technical centers have all been involved in offering students the opportunity to gain workforce readiness credentials.

In Florida, which has adopted a statewide Ready to Work Credential based on the National Career Readiness Certificate™, CTE programs are leading the way in implementation. Pasco County, Florida, has piloted the certificate program in two of its adult career centers, Marchman Technical Education Center and Moore-Mickens Education Center.[16] Training is provided to improve student skills, and students can receive a gold, silver or bronze certificate for their efforts. Lee County, Florida, is implementing Ready to Work through the district's career preparation academies in areas such as criminal justice, veterinary health, medical technology, engineering and automotive technology. Superintendent James Browder said the program would be an "added bonus" to the skills students are already receiving through the career academies.[17]

In Arkansas, a state that has also adopted a statewide Career Readiness Certificate program, Pulaski Technical College has been instrumental in offering a 20-hour pre-employment class to potential certificate candidates. The pre-employment course and certificate assessment are part of the screening process for local employer LM Glasfiber.[18]

Twelve Clarke County Schools in Athens, Georgia, implemented certificate efforts through a Pathways for Success program led by the CTE director for the district. The program was designed to strengthen academic performance and reduce the risk of dropping out by showing students that good jobs and careers are the end result of education. The program included academic curriculum, career exploration, and business and industry experience including tours, speakers and job shadowing. Pathways provided students with opportunities to see connections between theory and practice, and how their studies in middle and high school relate to the real world and their postsecondary educational and career plans.[19] CTE programs also play a unique role in the

expansion possibilities of workforce readiness credentials. Across the country, CTE programs are offered in about 11,000 high schools, including about 1,000 career and technical high schools and about 800 area career tech centers. About 9,400 postsecondary institutions offer technical programs, including community colleges, technical institutes and skill centers.[20]

There are over 15 million secondary and postsecondary CTE students nationwide.[21] These students have already shown a commitment to career preparation, and are in the process of gaining the skills necessary for future success. By utilizing CTE programs, more students at both the secondary and postsecondary levels can be given the opportunity to gain workforce readiness credentials.

Five Sacramento, California, high school career academies and an adult education program utilized the CASAS Workforce Skills Certification assessments primarily in health care, high tech manufacturing and banking. The project was a partnership with the Sacramento Linking Education and Economic Development (LEED) program to bring education and workforce development together.

LEED brings business and employers into the classroom setting and arranges internships, job shadowing and work-based learning experiences in addition to the LEED certification based on WSCS. LEED employer consortia work with the education community to drive activities surrounding construction, health care and telecommunications and technology in the fast expanding Sacramento area.

Brenda Gray, former executive director of LEED, explained the importance of the credential, "Students are excited because they finally see a reason for taking a test. They understand the difference—this assessment will give them a leg up in employment and when they apply for a college program. The audience for the test score is outside the school system—it's not just a standardized test." Over 40 large businesses in the Sacramento area agreed to accept the certificates of achievement from those who passed the CASAS Workforce Skills Certification assessments. These employers recognized that students with the credential had the skills necessary for success in entry-level jobs.[22]

CONNECTING WITH BUSINESS AND INDUSTRY

The awarding of workforce readiness credentials in education and training programs has little value to students without the support of business and industry. While the skills learned are still vitally important to future career success, the payoff in the actual certificate or credential can only be realized with employer support leading to preferential status in hiring decisions.

Employers and employer groups continuously discuss the need for high-skill workers, and the rising costs of securing a talented workforce[23]; and the use of workforce readiness credentials can help to address both of these issues. However, even though many states are undergoing education campaigns, employers often do not understand the different credentials and what they mean, or may not even be aware that workforce readiness credentials exist at all.

CTE, due to its unique relationship with employers, is in a prime position to promote the use and value of workforce readiness credentials with the business and industry community. As the last National Assessment of Vocational Education (NAVE) found, "Not surprisingly, vocational teachers have significantly greater contact with representatives of business, industry, and labor than do academic teachers."[24]

CTE educators engage in such diverse activities as working on advisory committees, referring students for job placements, having employers make presentations to students in class, having students visit employer work sites, and discussing workplace skill requirements with representatives from business and industry. Employers assist CTE programs with developing standards reflecting the needs of industry, especially at the state level, and 14 percent of all employers reported being a member of a CTE advisory committee in a Census Bureau Survey.[25]

All of these activities put CTE leaders in the perfect position to share information about workforce readiness credentials and to serve as conduits to the employer community. The connections with local business leaders allow the use of workforce readiness credentials to spread from the ground up in a way that is mutually beneficial to students and employers.

At the VF Jeanswear production and distribution center in central Oklahoma, the high cost of employee turnover was having a negative impact on profitability. H.R. Manager David Forgety began hearing about education programs in the area offering students the opportunity to obtain the Oklahoma Career Readiness Certificate. An initiative of the Governor's Council for Workforce and Economic Development, the certificate was being offered by career tech centers and high schools throughout the state. This provided VF Jeanswear a unique opportunity to measure skills that could not be identified by an interview alone and that could help to ensure potential employees' success in the company.

VF Jeanswear went through a process of having jobs in its center profiled to determine necessary minimum skill levels, and then began working with nearby Gordon Cooper Technology Center to create a process by which the Career Readiness Certificate could be used as an initial screening tool prior to a job candidate's interview. Gordon Cooper served as a conduit to other community organizations and leaders to ensure that the necessary administration and testing was possible.

VF Jeanswear now has agreements with Gordon Cooper and Wes Watkins Technology Centers, as well as the local workforce One-Stop center, to offer the assessments necessary for an individual seeking employment at VF Jeanswear to obtain a Career Readiness Certificate. Different scores on the assessment are required for different job openings, and individuals who do not meet the standards on the assessments the first time are offered education and training through the KeyTrain system at the Technology Centers.

The pre-screening process has been in place since April 2007, and the biggest success has been in identifying employees that are able to meet learning standards, and reducing training costs. Forgety emphasized the need for business and education to work together to drive the spread of workforce readiness credentials. He explains, "This initiative needs to be talked about more. Business is looking for something to assess employee skills, and needs to know where to find this tool. It must be repeated multiple times to those making hiring decisions – people are busy and this is too important to get lost in the shuffle."[26]

CONCLUSION

It is clear that 21st century employees need advanced skills to meet the needs of the U.S. economy. While academic and technical skills are critical, the importance of workforce readiness skills is also emerging to the forefront of skills gap discussions. Skills such as critical thinking, problem solving, applying academic knowledge and situational judgment are more important than ever to an individual's labor market success.

As employers seek ways to measure these skills efficiently and evaluate potential hires, the use of workforce readiness credentials is likely to increase. Workforce readiness credentials provide value added to the high school diploma and help adults to gain the skills necessary for workplace success. CTE is at the forefront of this increase, preparing students at all levels for the testing that leads to a workforce readiness credential, and perhaps more importantly, with the skills necessary for 21st century success.

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