A Statewide Assessment of California's Career Technical Education System

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Prepared for the California Department of Education and the California Community College Chancellor's Office

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INTRODUCTION

> *So if the flattening of the world is largely (but not entirely) unstoppable and holds out the potential to be as beneficial to American society as a whole as past market evolutions have been, how does an individual get the best out of it? What do we tell our kids?*
>
> *There is only one message: you have to constantly upgrade your skills. There will be plenty of good jobs out there in the flat world for people with knowledge and ideas, so seize them.*
>
> Thomas Friedman, *The World is Flat* (p. 237)

The "flattening" of the world — a metaphor used by Thomas Friedman in his 2005 book, *The World is Flat*, to describe economic globalization — is not a new phenomenon, but has become increasingly visible since the 1980s. The emerging global knowledge-based economy and the resulting changes in the workplace are requiring commensurate adjustments in our educational systems, if the U.S. is to remain competitive. Professors Murnane and Levy, authors of *The New Basic Skills*, writing in 1996, asserted that "the skills required to succeed in the economy have changed radically, but the skills taught in most schools have changed very little." A decade later, the U.S. Chamber of Commerce, in its paper "Global Engagement: How Americans Can Win and Prosper in the Worldwide Economy" (2006), describes our increasing dependence on foreign-born workers at all skills levels. The Chamber cites improvements in K-12 schools and career technical education as key to ensuring that American workers are competitive and economically secure in this new world.

In California, career technical education (CTE) is stepping up to the challenge of meeting both student and workplace needs. As an integral component of public secondary and postsecondary education, CTE is designed to educate students about, through, and for careers. California, as the sixth largest economy in the world, is a major player in the global marketplace. As such, it is striving to provide its students — whether children first exploring options or adults retraining for new careers — a world-class career technical education system, one that both informs and is informed by best practice in education, as well as by input from employers and the community.

The purpose of this study is to examine the status of CTE in California and explore opportunities for strengthening the CTE system as a whole. The expected reauthorization of the Carl D. Perkins Vocational and Technical Education Act of 1998, which provides over $140 million annually in funding to improve California's career technical education programs, catalyzed this study. Congress reauthorized the act in August 2006, renaming it the Carl D. Perkins Career and Technical Education Act of 2006. The 2006 Act will require a new State Plan for the use of future funds. One purpose of the needs assessment, therefore, is to identify and document potential system improvements to provide direction for California's 2006 State Plan. Equally, if not more, important is the surfacing of issues, solutions, and effective practices that can inform improvements in CTE that may be implemented through any number of initiatives, all working toward the creation of a fully articulated and comprehensive CTE system.

Specifically, this study seeks to answer two major questions:

1) *What is the status of CTE in California and what are the major trends?*

2) *What resources and system improvements are essential at the state and local levels to ensure that CTE meets the current and evolving needs of students, communities, and the economy?*

To answer these questions, WestEd conducted a literature review to:

1) Determine the importance of CTE in state and national education reform and in the preparation of the skilled workforce required for healthy state and national economies

2) Identify the critical organizational characteristics or elements of effective state and local CTE programs

3) Develop a list of effective state and local CTE program improvement practices that should be considered in the implementation of the reauthorized Perkins Act

A survey of stakeholders was also conducted, as well as focus groups and interviews to elicit input directly from the field.

WestEd worked closely with staff at both the California Department of Education and the California Community College Chancellor's Office, and benefited from the participation of a "working resource group" of CTE experts representing both K-12 and community college perspectives.

The report begins with a description of the structure of the CTE delivery system in California. To provide context for the current needs assessment and the specific issues that were addressed in the surveys and focus groups, the report then describes the policy context for this work, including some major CTE funding sources and current initiatives. A literature review is then presented followed by the results of the surveys and focus groups. Finally, the concluding chapter highlights key themes and recommendations for improvements to CTE as suggested by both the literature review and the data analysis.

CAREER TECHNICAL EDUCATION IN CALIFORNIA

THE CTE DELIVERY SYSTEM IN CALIFORNIA

California's CTE programs are implemented through a myriad of different venues or types of organizations that, taken together, represent a system that can offer life-long learning opportunities for all residents. Some are linked vertically while others provide support to or enhance the vertically integrated components.

Elementary and middle school programs, when available, introduce children to options beyond school, thus stimulating their imaginations and helping them see the importance of learning. High school-level CTE is offered by high schools, in some cases by county offices of education, and through Regional Occupational Centers and Programs (ROCPs). Some high schools have integrated CTE/academic programs, such as career academies, that operate in parallel to, and often embed or coordinate with high school CTE and ROCP programs. Apprenticeships offer valuable postsecondary options for many students. Adult education plays an important role in serving adults through an open entry/open exit system with programs that prepare students for both entry level and higher levels of employment. Tech Prep programs have provided vital connections between secondary and postsecondary levels. Middle College High Schools link high school and community college for some students, implementing collaborative, project-centered, interdisciplinary curricula and requiring career education or community service for graduation. Community college CTE programs are central to preparing students for the workplace through a number of means: short-term non-credit programs, certificate or associate degree programs, or by means of transfer to four-year institutions; increasingly, the community college system is also being used by business and industry for training or retraining incumbent workers. In addition, the community college system provides funding for economic and workforce development programs, which are designed to link CTE subject matter to emerging industries and statewide strategic initiatives.

The 12 vehicles for CTE include:

1) Elementary school awareness and middle school introductory CTE courses
2) High school CTE courses, delivered individually or in a sequence
3) Regional Occupational Centers and Programs (ROCPs)
4) Integrated academic and CTE programs, such as magnet schools, thematic schools, and academies
5) Adult Education
6) Apprenticeship
7) Middle College High Schools
8) Community College Occupational Programs
9) Community College-Based Adult Education
10) Community College-Based Apprenticeship
11) Tech Prep/2+2 Programs
12) Economic and Workforce Development Program (EWDP)

In addition to classroom-based programs, other formal structures exist to provide work-based learning opportunities outside the classroom. Work-based learning opportunities are provided both through ROCPs and through Work Experience Education (WEE) at the secondary level, and Cooperative Work Experience Education at the community college level. While not central to the *vertical* integration of system components, these programs can provide important learning and career exploration opportunities for students, in some cases in ways that are closely connected to classroom curricula and occupational coursework. Given that work-based learning is a key component of CTE, descriptions of these programs are also presented below.

All of the instructional programs are further strengthened by the involvement and integration of counseling and guidance functions. At the high school level, counselors provide both academic counseling and exposure to career options. Counselors play a crucial role in the overall system, assisting students in crafting course schedules that will enable them to achieve their goals. Many high schools also have "Career Technicians," who are often funded by Carl D. Perkins funds through their local ROCP to provide targeted support to students in exploring their interests and career options. Career Technicians may also be responsible for bringing industry representatives onto campuses to speak in classrooms, coordinating job shadowing or other workplace experiences for students, and working directly with classroom instructors to assist with the infusion of career information into academic curricula. ROCPs may also have their own counseling and/or guidance staff.

At the community college level, most campuses have separate career centers, as well as employment offices, which help students clarify their career goals, facilitate students' selection of occupational coursework, and assist in their transitions to employment.

Three additional educational subsystems parallel the overall CTE system: alternative education programs, including continuation high schools and court and community schools, as well as independent study programs; the Division of Juvenile Justice (California Department of Corrections and Rehabilitation) that serves incarcerated youth; and charter schools. These are not CTE system components, but, rather, alternative delivery systems. However, like magnet and academy programs *inside* of high schools, they offer structures, such as flexible scheduling, that are conducive to student participation in CTE programs, and in some cases offer innovative programs that prepare students for college and careers.

Finally, workforce development programs funded through the U.S. Department of Labor's Workforce Investment Act (WIA) offer career services through California's One Stop system and through community-based agencies that are contracted to provide these services to youth, coordinated through local Workforce Investment Board (WIB) Youth Councils. Large numbers of other community-based organizations (e.g., YMCAs, Boys and Girls Clubs, YouthBuild, and Girls, Inc.), as well as many federal and state-funded projects (e.g., Jobs Corps and California Conservation Corps), and business- and/or city-sponsored programs (e.g., summer job programs, Interact Clubs) also provide important career preparation services and could be considered part of the larger CTE "system", to the extent that they are linked with school-based programs.

The report does not include a discussion of alternative education, Division of Juvenile Justice programs, charter schools, workforce development programs or youth serving community-based

programs. These entities are mentioned, however, in recognition of the important roles that they play.

In summary, as the economy has changed, education has become even more critical to California's competitiveness and future prosperity. CTE represents the core of a larger workforce development system in California, comprising K-12 and postsecondary education, public and private sector training programs, and economic development and employment expansion programs. The table below depicts the array of institutions and programs that make up this larger system — ensuring that individuals are educated, trained, and increasingly, *retrained*, for employment and participation in the workforce.

Table 1. California's workforce development system

Public and Private Postsecondary Education	**Public and Private Sector Employment and Training Programs**
▪ Community Colleges ▪ California State University ▪ University of California ▪ Private Colleges and Universities ▪ Specialized Career Training Institutions ▪ Adult Education ▪ Apprenticeships ▪ Middle Colleges	▪ Public Workforce Programs ▪ Workforce Investment Act ▪ Employment Training Panel ▪ Private Sector Training ▪ Emerging Partnerships ▪ Colleges ▪ Extension Programs
K-12 Education	
▪ Elementary and Secondary Education ▪ Partnership Academies, Career Academies ▪ ROCPs ▪ Adult Education – Basic, Vocational, Citizenship ▪ Apprenticeships	

Source: Adapted from *A Contextual Examination of Education and Workforce Development in California*, Working Paper WP/05-04, Dec. 2005, California Postsecondary Education Commission, page 4.

Below, a more detailed description of the 12 primary CTE system components is presented, beginning with those administered through the California Department of Education and followed by those administered by the California Community Colleges.

California Department of Education-administered system components

The vision of the California Department of Education is "to create a dynamic, world-class education system that equips all students with the knowledge and skills to excel in college and careers, and excel as parents and citizens" (CDE, 2005a). Career technical education plays a central role in helping CDE realize this vision.

1. Elementary and Middle School Programs

Elementary schools can offer the beginnings of career exposure through field trips, speakers and other activities. Middle schools can, in addition, offer a variety of CTE courses, ranging from "sampler" 8-12-week classes to full first-year courses in a given career area. By beginning CTE exploration as early adolescents, students can experience the hands-on educational opportunities CTE provides while investigating various industry sectors in which they may pursue further training during high school (CDE, 2006a).[1]

2. High School CTE Courses

Most comprehensive high schools offer a range of both stand-alone and sequenced CTE courses, including traditional classes such as construction or automotive repair and more recently added "high-tech" classes such as computer-assisted drafting. The numbers, types, titles, and curriculum for these courses vary dramatically from district to district. Schools support CTE courses through general funds, some additional state and federal appropriations, and/or discretionary funds (CDE, 2006a). To better respond to the needs of the changing economy and to promote statewide system coherence,[2] CTE programs have been clustered in recent years into 15 industry sectors, each of which encompasses three to seven "pathways"[3] as codified in the recently approved "California CTE Model Curriculum Standards." Those sectors are:

1) Agriculture and Natural Resources
2) Arts, Media, and Entertainment
3) Building Trades and Construction
4) Education, Child Development, and Family Services
5) Energy and Utilities
6) Engineering and Design
7) Fashion and Interior Design
8) Finance and Business
9) Health Science and Medical Technology
10) Hospitality, Tourism, and Recreation
11) Information Technology
12) Manufacturing and Product Development
13) Marketing, Sales, and Service
14) Public Services
15) Transportation

The 15 industry sectors are clustered into six broad career areas, which were identified during the 1940s and 1970s and are used to facilitate various CDE functions, including professional development and technical assistance. They are also, in most cases, aligned with national CTE

[1] At present, CDE does not have information about the precise number of elementary and middle schools that provide career exposure and exploration opportunities.
[2] For example, to facilitate curriculum development and alignment with standards, course sequencing, articulation, and coordination with workforce and economic development efforts.
[3] As described below, the community colleges do not employ the same 15 industry clusters, but rather organize their programs into six subject areas.

student organizations. Support from CDE in these areas has enabled faculty to develop standards-based integrated curricula, including A-G approved courses, and to implement effective practices that have served as models for other CTE programs. As noted later, course sequences in Agriculture, for example, have enabled students to go on to higher education as far as the doctoral level. Further, the foundations laid with this technical assistance have facilitated the creation of related career academies and other integrated programs in many high schools.

The table below reflects the six broad areas of CTE in relation to the 15 industry sectors.

Table 2. CDE career areas

Agriculture Education	**Business & Marketing Education**	**Health & Human Services**
Agriculture & Natural Resources	Business & Finance	Health Services
	Information Technology	Public & Private Education Services
	Retail & Wholesale Trade	Public Services
Home Economics & Careers In Technology	**Industrial &Technology Education**	**Arts, Media & Entertainment Technology**
Fashion & Interior Design	Building Trades & Construction	Arts, Media & Entertainment Technology
Hospitality, Tourism, & Recreation	Energy & Utilities	
Public and Private Education Services[4]	Engineering & Design	
	Manufacturing & Product Development	
	Transportation	

Source: 2000-2004 California State Plan for Vocational and Technical Education.

Agriculture Education

Technical assistance in this area supports agriculture education programs, including classroom instruction, leadership, and supervised agricultural experience programs that prepare students for college or entrance into agricultural careers. Work in this area has resulted in an integrated curriculum in agricultural education based on three components: classroom instruction, Future Farmers of America (FFA) leadership activities, and Supervised Occupational Experience Projects. Agriculture education receives additional funding through the Agriculture Incentive Grant program.

Business and Marketing Education

In this area, technical assistance provides program information that prepares students for postsecondary education and careers in the areas of marketing, finance, accounting, information technology, entrepreneurship, and economics. This work also includes sponsorship and coordination of the career technical student organizations: Distributive Education Clubs of America (DECA) and Future Business Leaders of America (FBLA).

[4] Public and Private Education Services is listed under both Home Economics and Health & Human Services.

Health and Human Services

The goal of this program is to establish high-quality integrated health careers pathways, "kindergarten through employment," throughout California, thus enabling students to fulfill their career goals while helping the health care industry meet its human resource demands. The student organization for this career area, Health Occupations Students of America (HOSA), is endorsed by both CDE and the U.S. Department of Education.

Home Economics

Programs in Home Economics Careers and Technology (HECT) fall primarily into two categories: Consumer and Family Studies (CFS) and Home Economics Related Occupations (HERO). The student organization for HECT is FHA-HERO[5]. Career areas associated with these programs include child development, family services, fashion design, merchandising, nutrition, hospitality, tourism, and interior design.

Industrial and Technology Education

Technical assistance in this area supports the career pathways of building trades and construction technology, engineering and design technology, manufacturing and product development technology, transportation technology, and energy and utilities technology. The CTE student organization for these students is SkillsUSA.

Arts, Media, and Entertainment Technology

The addition of this sixth subject matter (Arts, Media, and Entertainment Technology) incorporates career preparation for one of the state's highest growth industries. Technical assistance in this area supports the development of cross-disciplinary knowledge and skills, whereby aesthetic understanding and creative imagination are integrated with technological expertise. Career areas in this sector include performing arts, media and design, and production.

3. Regional Occupational Centers and Programs (ROCPs)

Organization

ROCPs have been a major component of California's workforce preparation system for almost 40 years. Initiated in 1967 to extend and expand high school and adult CTE programs, ROCPs were established as regional programs or centers to allow students from multiple schools or districts to attend career technical training programs regardless of the geographic location of their residence in a county or region. Regionalization provides for efficient use of limited resources, while allowing student access to a broad array of training opportunities, often requiring expensive technical equipment and specially trained and experienced instructors.

[5] FHA-HERO was formerly known as Future Homemakers of America-Home Economics Related Occupations, but changed its name to decrease the emphasis upon the word "homemaker" and increase the emphasis on leadership and career development.

ROCPs fall under one of three distinct organizational structures: school districts participating in a county office of education-operated ROCP; school districts participating under a joint powers agreement; or a single school district.

ROCPs in California collaborate with high schools, businesses, community colleges, public agencies, and associations in creating and implementing their instructional classes, programs and services. Examples of these programs and services include: Certified Nurse Assistant/Home Health Care Aide (CNA/HCA), Automotive Youth Education Systems (AYES) and ROCP CalWORKs. In addition, ROCPs partner with local business and industry organizations to design and deliver industry-based, portable certification programs, based on labor market needs. Many ROCPs also partner with a variety of California labor organizations to provide apprenticeship-related and supplemental instruction to apprentices in California's trade careers.

Purpose and enrollment

The purpose of ROCP is to prepare students to:

- Enter the workforce with skills and competencies necessary to succeed
- Pursue advanced training in higher educational institutions
- Upgrade existing skills and knowledge

The programs are limited to those occupational areas with employment opportunities, postsecondary articulation, and sufficient student interest. ROCP courses are open to all secondary and adult students with priority enrollment given to those ages 16-18 or in grades 11-12[6].

Statewide, there are now 74 ROCPs offering approximately 100 career pathways and programs, as well as career exploration, career counseling and guidance, and placement assistance. ROCPs work with industry or pathway-specific advisory groups to update curricula annually to address labor market needs. Funded through apportionment funds (ADA), the programs received $421 million in 2005 and served about half a million students, with the highest enrollment in business/information technology and industrial/technology (CDE, 2006a).

Role in the continuum of CTE services

ROCPs are an important component in the continuum of sequenced CTE courses offered within public secondary schools. Students are first exposed to exploratory courses to build their awareness and career-related knowledge. These experiences often contribute to a student's decision to take additional CTE courses or concentrate in a sequenced pathway of interest. High school CTE courses often lead to ROCP courses, which are designed to provide more focused occupational training. ROCP courses are therefore typically the more advanced "capstone courses" that students take during grades 11 and 12 to prepare for entry-level jobs or to transition to postsecondary education, technical training, or apprenticeships.

[6] AB 2448, as described in the section below, has modified the enrollment criteria.

ROCP course curricula are state-certified and students completing training receive certificates of completion, typically indicating the competencies each student has mastered. Depending on the course, students may also receive industry certification that is recognized regionally, statewide, or nationally (CDE, 2006a). For those seeking further education, articulation of ROCP courses with local community college courses facilitates students' transitions to postsecondary education.

Work-based learning

ROCP programs offer both non-paid on-the-job workplace experiences (Community Classroom) and paid workplace experiences (Cooperative Vocational Education). ROCP instructors facilitate student placements in these workplace experiences and monitor the experiences through site visits in the field. Coordination and supervision of the Community Classroom and Cooperative Vocational Education components are an integral part of an ROCP instructor's responsibilities, with paid time allotted for this task.

4. Integrated Academic and CTE Programs

Many high school CTE and ROCP programs have integrated core academic content into their programs. Similarly, many academic courses provide career-related context for academic content in their curricula. Two programs administered by the CDE foster this type of integration: California Partnership Academies, which require that programs have career themes, and Specialized Secondary Programs, which often have career themes but are not required to do so. In recent years, school reform efforts such as the creation of federally funded "smaller learning communities" have further facilitated the development of integrated programs. Many high schools also have academy and other integrated programs funded through internal or other resources.

California Partnership Academies

The Partnership Academy Model is a three-year program spanning grades 10-12, structured as a school-within-a-school. Funding is available for 290 programs and currently 281 programs are funded throughout California. Informed by high school reform efforts throughout the country, academies not only integrate academic and career technical education, but strive to create close family-like environments and establish partnerships with business and the community. Emphasis is placed on student achievement and positive postsecondary outcomes.

The career technical focus for an academy is determined by an analysis of the local labor market, with an eye toward fields that are growing and healthy, offer jobs with "career ladders," and have companies willing to support the program. Career technical education is kept broad, focusing on industries rather than specific jobs in areas such as business technology, health, engineering, media, communication, agribusiness, building trades, natural resources, finance, and public and protective services.

Employer representatives play a number of roles. They:

- Serve on an academy steering committee that oversees the program

- Help develop the career technical curriculum
- Provide speakers for academy classes
- Host field trips to give students a perspective on the workplace
- Provide mentors who serve as career-related role models and personal points of contact in the career area
- Provide summer jobs and part-time school-year jobs

All academy students participate in a mentoring experience during their junior year that encompasses career development, job or college shadowing, and goal setting.

Specialized Secondary Programs

Specialized Secondary Programs (SSPs), funded since 1984 through competitive grants, offer another vehicle for comprehensive high schools to create career pathways and academies. The acquisition of technology skills and the use of technology as a tool for instruction and learning are also emphasized in these programs.

Funding is provided for four years: one year of planning and three years of implementation. Since its inception, SSP has funded over 130 programs. Currently there are 47 funded programs, of which 26 have a career focus. Programs selected for funding are structured so that participating students can explore areas of study in a deeper way while developing their talents and skills as they prepare for the world of work and higher education. Frequently, SSPs are established as "smaller learning communities" or as schools-within-schools. They are expected to implement high-quality, innovative approaches to curriculum and instruction, staffing, and scheduling.

5. Adult Education

The purpose of adult education is to "equip adults with the knowledge and skills necessary to participate effectively as citizens, workers, parents, and as family and community members." Adult education schools are administered by school districts and funded through "apportionment funds" (Average Daily Attendance) supplemented by federal Workforce Investment Act funds. Adult education serves diverse student populations, including:

- Adult immigrants
- Adults with disabilities
- Disadvantaged and homeless adults
- Incarcerated adults
- Single parents and "displaced homemakers" (unemployed or underemployed individuals who have been providing unpaid services to family members)

Short-term vocational courses, which offer a variety of career training programs linked to the needs of businesses, are included among a range of other courses, including Adult Basic Education (ABE) (e.g., reading, writing, computation, problem solving, and interpersonal skills, enabling adults to read, write, and speak in English, acquire a high school diploma, and obtain employment); English as a Second Language (ESL); ESL-Citizenship; Adult Secondary

Education leading to a high school diploma; General Educational Development (GED) qualifying students for a California High School Equivalency Certificate; classes for adults with disabilities; Health and Safety; Home Economics; Parent Education; and classes for older adults.

Adult education is also implemented through the California Community Colleges. This is discussed on page 16.

6. Apprenticeship

Apprenticeship is an on-the-job training and education delivery system that prepares individuals for employment opportunities in a wide variety of craft and trade professions. There are over 800 "apprenticeable" occupations in California. CDE supports apprenticeship by providing "related and supplementary instruction" (RSI) in 34 local adult education and ROCP agencies for over 200 apprenticeship programs, involving over 30,989 registered apprentices.

Programs in California are developed and conducted by program sponsors including individual employers, employer associations, or jointly sponsored labor/management associations. Local ROCP and adult schools individually contract with the program sponsors.

The Division of Apprenticeship Standards within the California Department of Industrial Relations administers California apprenticeship law and enforces apprenticeship standards for wages, hours, working conditions, and the specific skills required for state "journeyperson" certification.

Apprenticeship is also implemented through the California Community Colleges. This is discussed on page 16.

Work Experience Education

In addition to work-based learning that is offered through ROCPs, work-based learning is also offered through Work Experience Education (WEE), administered by school districts or other local educational agencies (LEAs)[7]. WEE programs combine an on-the-job component with related classroom instruction designed to maximize the value of on-the-job experiences. WEE is intended to help students choose a career path wisely; prepare students for full-time employment suited to their abilities and interests; and provide students the opportunity to learn to work with others in ways that are successful and rewarding. Approximately 29,000 students participated in WEE in 2005-06.

The WEE program provides both unpaid (Community Classroom) and paid (Cooperative Vocational Education) workplace experiences, developed through training agreements with employers.

There are three types of WEE programs: vocational, general, and exploratory.

[7] LEAs include school districts, county offices, consolidated programs, cooperatives, migrant education regions, and charter schools.

1) **Vocational Work Experience Education** is intended to reinforce and extend vocational learning opportunities for students through a combination of related classroom instruction and supervised paid employment.

2) **General Work Experience Education** provides students with opportunities for applying the basic skills of reading, writing, and computation through a combination of supervised paid employment in any occupational field and related classroom instruction.

3) **Exploratory Work Experience** is intended to provide career guidance to students and help them ascertain their interests and aptitudes for specific careers through opportunities to observe and sample a variety of work conditions. Exploratory Work Experience includes a combination of unpaid job observations and related classroom instruction.

Counseling and Guidance Programs

College and career counseling services support students in their selection of course and program options, including pathways and academies, in preparation for postsecondary education and future careers. College planning helps students and their families understand the different educational opportunities available to them. Career counseling assists students in career planning and provides the foundation for acquiring the knowledge, skills, and attitudes that enable them to successfully transition from school or college to the workplace.

Secondary counseling programs are informed by the National Model for School Counseling Programs, guidelines developed by the American School Counselor Association (ASCA). These guidelines connect school counseling programs to current educational reform movements and reflect a comprehensive approach to program foundation, delivery, management, and accountability. The Model covers academic development, career development, and personal/social development. It provides a framework for the program components, the school counselor's role in implementation, and the underlying philosophies of leadership, advocacy, and systemic change. It also includes "national standards" that "define the vision and goals for 21st century school counseling programs". These standards have not been formally adopted, yet are seen by many in the counseling profession as crucial to future program development and improvement.

The Model further reflects the growing importance of the counselor's role within a school, as stated by Trish Hatch and Judy Bowers in their article, "The Block to Build On" (2005):

> *As we head further into the 21st century, school counselors continue to define new directions for the profession…Today, in a world enriched by diversity and technology, school counselors' chief mission is still supporting the academic achievement of all students so they are prepared for life beyond school. However, school counselors no longer work in isolation; instead, they are professionals, integral to the total educational program.* (p. 13)

In addition to the daily functions performed by counselors, components of the guidance system also include the following:

- The 10th Grade Counseling Program: in operation since 1983, the 10th Grade Counseling Program requires a systematic review of each student's academic progress and educational options available during the final two years of high school.
- Career centers: Career services are also provided in "career centers" on some high school campuses, funded by ROCP and/or district resources. Offerings can include information on careers and specific occupations, career assessment, support with resume writing, training on job readiness, and access to job shadowing and internship opportunities. Career center staff often also provide work permits and job postings, as available. In addition "career technicians" who staff these centers may work with both CTE and academic faculty to provide career-related material and speakers for their courses.
- ROCP-sponsored career services: In addition to supporting high school career centers and delivering CTE curricula, ROCPs may also offer career guidance services.
- County Office of Education-sponsored activities: County offices of education also produce career planning and guidance materials that are distributed to high school students through their schools and used by either counselors or teachers to promote student reflection and goal setting.

Other career exposure and exploration opportunities are generally offered through career-focused curricula, in CTE courses directly, in separate career exploration courses, or in career-pathway and academy programs.

California Community College-administered system components

A primary mission of the community colleges is to offer academic and career technical education at the lower division level for both recent high school graduates and those returning to school. Another primary mission is to advance California's economic growth and global competitiveness through education, training, and services that contribute to continuous workforce improvement. Constituting the largest system of higher education in the world, the California Community College system is currently comprised of 72 districts, 109 campuses, 64 approved educational centers, and 20 separately reported district offices (CCCCO, 2006a).

7. Middle College High Schools

In 1998, the California Community Colleges created an initiative called Middle College High Schools, enabling high-potential "at-risk" students to complete high school while concurrently receiving direct access to college courses and services. Located on and integrated into the community college environment, MCHSs merge the high school and community college curriculum and experience in order to enhance academic and personal success. High school students attend classes at a community college and earn credit toward a high school diploma while having the opportunity to concurrently take college courses and receive more intensive counseling and administrative attention. Currently, there are 13 Middle College High Schools operating in California serving nearly 2,000 students.

8. Community College Occupational Programs

The community colleges offer courses in over 130 occupational areas, ranging from accounting to World Wide Web administration, many of which lead to certificates based on industry standards. Programs on most campuses are overseen by Vocational Deans or Deans of Vocational Education and Economic Development.

Beyond providing ongoing classes on their campuses, community colleges also offer "contract education" courses, which are developed specifically to serve the needs of a particular business or industry. These programs are often managed by Deans of Contract Education or Deans of Contract Education and Economic Development, depending on the campus. Overall, the community colleges have served over 26,000 businesses through contract education services.

For the purpose of organizing advisory committees and other projects, the Community College Chancellor's Office organizes CTE course offerings into six subject areas:

1) Agriculture and Natural Resources
2) Business Education
3) Family and Consumer Science
4) Health Careers
5) Industrial and Technical Education
6) Public Safety Education

Besides the six subject-area advisory committees, the Chancellor's Office has four additional advisory committees:

1) Career Development
2) Research and Accountability
3) Special Populations
4) Work-based Learning and Employment Services

In addition, to facilitate collaboration and coordination of services within regions, the community colleges are organized into seven "regional consortia" representing 10 regions throughout the state, with three consortia made up of two regions each. The Regional Consortia provide important vehicles for coordinating economic development activities, facilitating professional development and peer learning, disseminating information to the field, and soliciting input on policy initiatives.

To "strengthen the Colleges' capacities to respond to current and emerging labor market needs and to prepare students to compete in a global economy," the CCC has developed a strategic plan that includes a six-point strategy in the area of "Partnerships for Economic and Workforce Development." Among these are the creation of career pathways that will articulate with the K-12 system; ensuring high standards while delivering offerings that meet the needs of business and industry; defining and developing emerging career clusters; and tracking and responding to long-term economic and workforce trends (California Community Colleges System Strategic Plan Steering Committee, 2006).

9. Community College-Based Adult Education

Adult education at the community college level falls under the rubric of "noncredit instruction." As described by the Board of Governors of California Community Colleges (Boatright, 2005), noncredit instruction provides "remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, adult noncredit instruction, and support services which help students succeed at the postsecondary level (p. 2)." Noncredit courses fall into three broad instructional areas: Literacy, Workforce Preparation, and Family and Community Education. Non-credit workforce preparation/short-term vocational programs are offered on 58 campuses and served 297,674 students in 2003-04 (latest data available).

10. Community College-Based Apprenticeship

To provide apprenticeship training for their employees, many employers partner with the California Community Colleges (CCC) as well as the CDE. The community colleges have approximately 16,200 students enrolled in over 160 apprenticeship programs comprising a total of 66 trades/crafts titles located on 39 campuses. Apprentices receive on-the-job training via their employer, and in the evening or on weekends receive employer-selected "related and supplemental instruction" (RSI). All RSI apprenticeship programs offered by the community colleges must be approved by the CCC Chancellor's office as well as by the Division of Apprenticeship Standards, a division within the California Department of Industrial Relations.

Many of the RSI apprenticeship programs, which are typically three to five years in length, allow apprentices to earn a certificate or degree, such as an Associate of Arts or Associate of Science.

11. Tech Prep/2+2 Programs

Tech Prep programs are designed to link high school and two-year college programs in specific technical fields and occupational areas. They are "planned sequences of study in technical fields or pathways beginning as early as grade nine and linked to two or more years of postsecondary education or through an apprenticeship program of at least two years following secondary instruction. The sequence culminates in an associate degree, a certificate, and/or a bachelor's degree" (Carl D. Perkins Vocational and Technical Education Act of 1998, PL 105-332).

Tech Prep programs also integrate academic and career technical education. Combining at least two years of high school CTE and academics with two years of postsecondary education, Tech Prep is designed to provide maximum preparation for higher-wage employment or continued education (CDE, 2006a).

As funded by the Carl D. Perkins Act, Tech Prep programs are required to have seven elements (U.S. Department of Education, 2006):

1) An articulation agreement between secondary and postsecondary participants
2) A 2+2, 3+2, or a 4+2 design with a common core of proficiency in math, science, communication, and technology

3) A specifically developed Tech Prep curriculum
4) Joint in-service training of secondary and postsecondary teachers to implement the Tech Prep curriculum effectively
5) Training of counselors to recruit students and to ensure program completion and appropriate employment
6) Equal access of special populations to the full range of Tech Prep programs
7) Preparatory services such as recruitment, career and personal counseling, and occupational assessments

In addition, states are required to give priority consideration to Tech Prep programs that do the following (U.S. Department of Education, 2006):

- Offer effective employment placement
- Transfer to four-year baccalaureate programs
- Are developed in consultation with business, industry, labor unions, and institutions of higher education that award baccalaureate degrees
- Address dropout prevention and re-entry and the needs of special populations

Funding is awarded through "consortia," led by a community college district office and including the local community colleges working in collaboration with K-12 districts, schools, ROCPs, and local business partners. For 2006-07, there are 80 Tech Prep consortia, comprising 110 colleges, operating across California (CCCCO, 2006b). In addition to implementing the "seven key elements" listed above, consortia also offer technical assistance, professional development, curriculum support and other resources to schools and colleges in their areas on the core strategies of secondary-postsecondary articulation, curriculum integration, work-based learning, inclusion of special populations, and outcomes-based assessments (Bragg, 1994).

From 1991-98, California's State Center Consortium in Fresno was one of only eight Tech Prep consortia nationwide to receive the U.S. Department of Education's "Excellence in Tech Prep Award."

12. Economic and Workforce Development Programs

CCC economic and workforce development programs complement and enhance its CTE programs. Both strive to improve career technical education and respond to industry needs. The CCC Economic and Workforce Development Program (EWDP) couples the goals of its state and local program funds (which are focused on economic strategies, community development, creating quality, high-end career pathways, incumbent worker education and training, enhancing career technical education, and college capacity building) with the goals of its federal funds (which are used to build the academic, vocational, and technical skills of CTE students).

Objectives of the EWDP are to:

- Advance California's economic growth and global competitiveness through quality education and services focusing on continuous workforce improvement, technology deployment, and business development

- Coordinate a community college response to meet statewide workforce needs that attracts, retains, and expands businesses
- Develop innovative solutions in identified strategic priority areas for workforce development
- Identify, acquire, and leverage resources to support local, regional, and statewide economic development
- Create logistical, technical, and marketing infrastructure support for economic development activities within the CCC
- Optimize employer and student access to community colleges' economic development services
- Develop strategic public and private sector partnerships

In implementing its workforce development goals, the EWDP links career technical subject areas to emerging and connected industry clusters and to statewide strategic initiative areas. The strategic initiative areas include advanced transportation and energy, environmental health safety and homeland security, biotechnologies, multimedia/entertainment, workplace learning resources, business and workforce performance improvement, international trade, small business development, and health and applied competitive technologies/ manufacturing. The EWDP also supports a network of 115 "regional delivery centers," which work with local career technical programs, and provide representation on statewide subject area committees and leadership projects. In addition, competitive funding in various categories supports the piloting of future CTE courses and programs. Other activities include:

- Statewide Network Leadership and Support Services
- Industry-Driven Regional Training Collaboratives
- A flexible training fund for incumbent workers
- A job development incentive training fund

The majority of the EWDP programs concentrate on employer-focused workforce development projects, entrepreneurship, and scanning the latest trends and industry workforce needs. However, balancing the needs of students with those of employers is seen as critical. Workforce development activities serve many different types of workers, including new entrants, new hires, and incumbent workers, as well as workers with barriers to being hired, retaining their jobs, or moving up a career ladder.

The EWDP seeks to continue leveraging and linking its workforce development activities with the community colleges' CTE programs to advance California's workforce preparation and improve responsiveness to business needs.

Cooperative Work Experience Education Programs

All of California's community colleges offer Cooperative Work Experience Education ("Co-op"), a form of work-based learning that integrates classroom knowledge with productive work experience in a business or industry setting, guided by a learning plan. Co-op programs are intended to help students clarify career goals; reinforce academic skills, workplace competencies or occupation-specific technical skills; and assist in transitions to employment. Co-op courses are

not restricted to students in occupational programs, however, and may be offered in association with non-occupational academic programs or to students at large, as a means to integrate classroom study with planned and supervised experiences in the workplace.

Counseling and Guidance Services

Counseling and guidance services are offered in the community colleges by means of counseling centers and through the occupational programs themselves. Campuses also offer employment services through their employment placement offices.

According to the Mission Statement of the Career Development Advisory Committee (2003):

> *In addition to readying the colleges' educational offerings to be responsive to evolving workforce preparation and economic development circumstances, the California Community Colleges must improve students' ability to understand and best utilize these educational opportunities. Broadly, that student development agenda can be thought of as "Career Development." It is a life skill focusing on an individual's ability to move into productive roles in their community.*

Key principles of career development implemented by the community colleges include:

- The need for individuals to understand their interests, values, aptitudes and skills.
- The need for individuals to understand the world of work, economic trends, and career opportunities.
- The need for individuals to understand how to prepare for a chosen career and how to manage one's career path utilizing "career ladders." That is, individuals must understand the lifelong pathway between "learning and earning", balancing life roles and further skill enhancement.

The Mission Statement further states that:

> *…a failure to provide enhanced career development services to students will markedly diminish any initiative aimed at connecting education, workforce development and economic development. This is especially true when working with high risk students. Conversely, career development expenditures will have a positive impact on the effectiveness and productivity of existing and proposed efforts.*

CTE enrollment in California

The following is an overview of enrollment statistics for Career Technical Education at the secondary and community college level.

Enrollment in secondary programs

CTE is a key component of secondary education. Below is a summary of secondary enrollment characteristics across California.

Enrollment in CTE courses at the secondary level

Career Technical Education secondary school course enrollments constitute a large and significant segment of overall public secondary school enrollments in California, accounting for 633,972 enrollments, or 32.5% of the state's 1,953,368 enrollments in 9th to 12th grades in 2005-06.[8] Adding in secondary ROCP, the number of CTE enrollments rises to just over 1 million (1,009,443).[9]

At the same time, there has been a continual decline in secondary school CTE enrollment over the last 12 years.

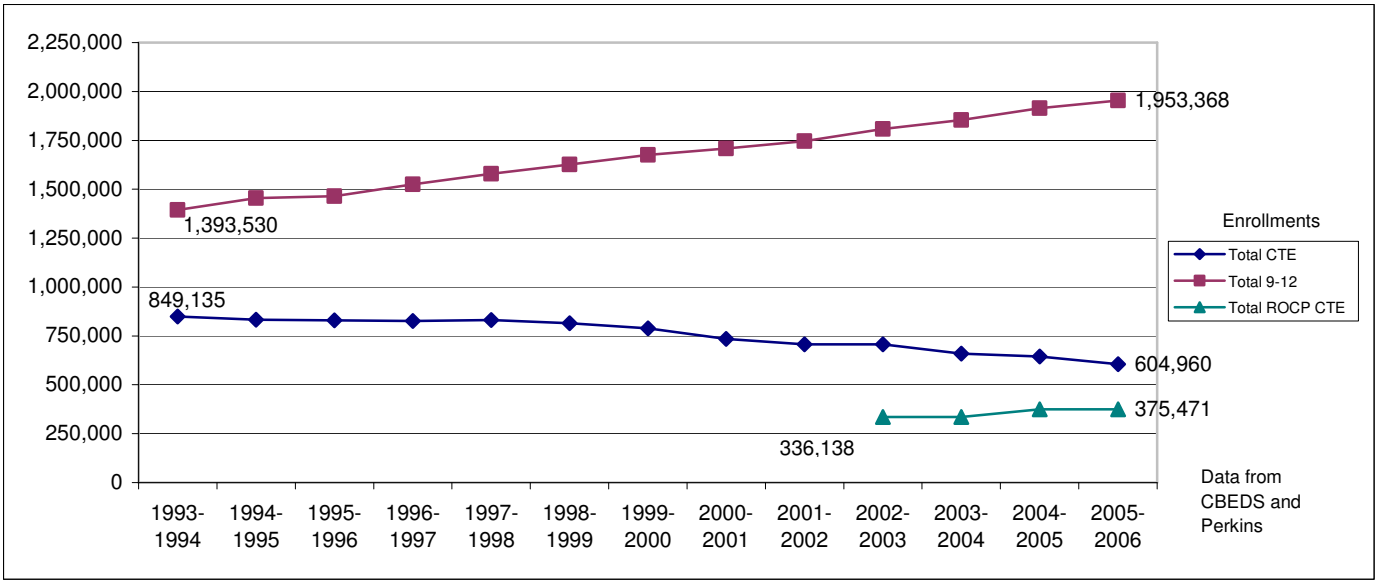
Table 3. Career technical education course enrollment in California high schools, 1993–2006[10]

Statewide Totals for Career Technical Education Courses									
	1993 -1994	**1995 -1996**	**1997 -1998**	**1999 -2000**	**2001 -2002**	**2003 -2004**	**2005 -2006**	**Increase/ Decrease**	**Percent Change 1993-2006**
Total CTE Enrollment	849,135	830,273	831,594	788,442	706,173	659,706	604,960*	-244,175	-40.36%
Total 9-12 Enrollment	1,393,530	1,464,841	1,578,929	1,675,393	1,745,295	1,854,482	1,953,368	559,838	+28.66%
Total ROCP CTE						335,612	375,471		
	1993 -1994	**1995 -1996**	**1997 -1998**	**1999 -2000**	**2001 -2002**	**2003 -2004**	**2005 -2006**		
Percent of CTE Enrollment	60.93%	56.68%	52.67%	47.06%	40.46%	35.57%	30.97%		

Source: CBEDS and ROCP data

** Does not include Work Experience Education*

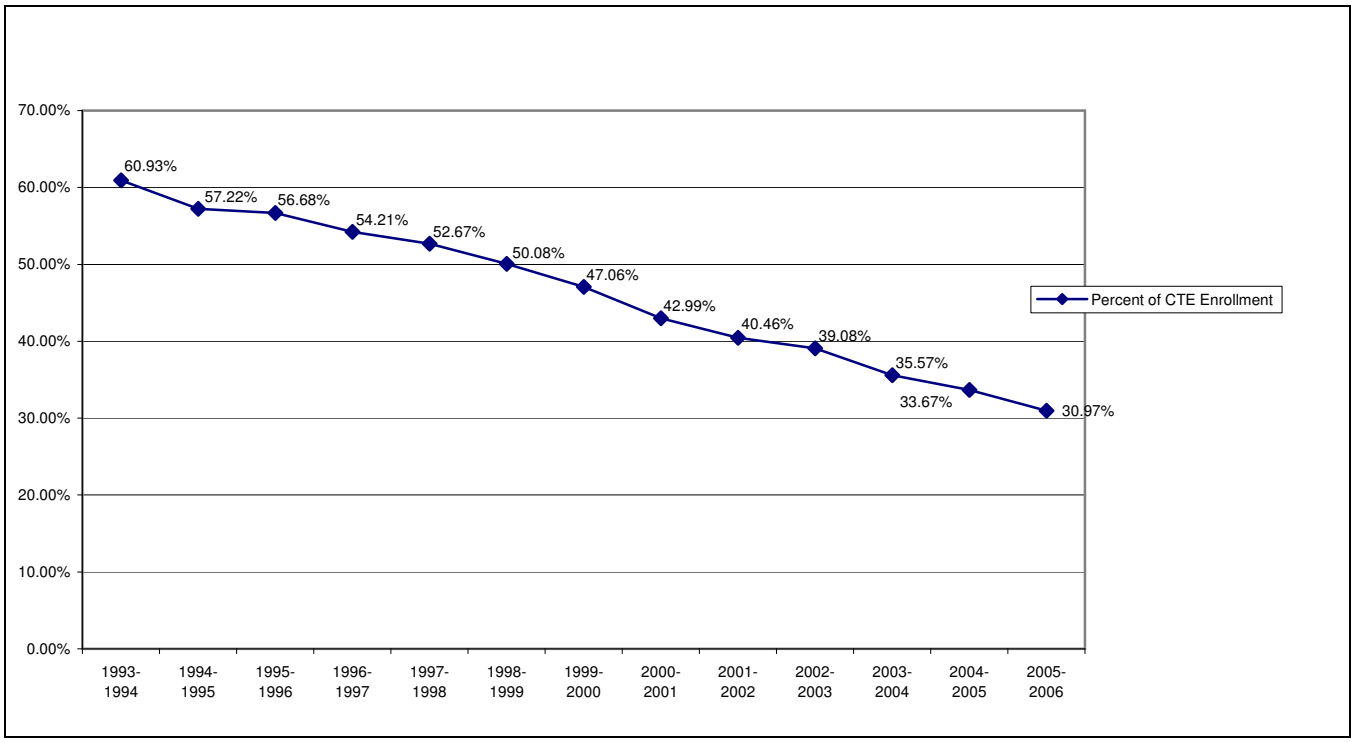
Figure 1. CTE course enrollment compared to total high school enrollment, 1993–2006



[8] CBEDS 2005-06.
[9] Source: Carl D. Perkins Data System, data retrieved Dec. 2006.
[10] Source: CBEDS; excludes Work Experience Education (29,012 in 2005-06); 2003 earliest ROCP data available.

When CTE enrollment is compared to the increased overall enrollment at the secondary (9-12th grade) level, the trend of declining CTE enrollment is clearly evident. In 1993, CTE enrollments comprised 61% of all secondary enrollments, whereas in 2006, they comprised only 31%, a decrease of 49% over the last 12 years[11].

Figure 2. CTE enrollment as a percent of overall enrollment at the secondary level, 1993–2006



This has been paralleled by a decrease in the number of CTE classes available to students. In 1997-98[12], students in grades 9-12 enrolled in 32,238 CTE classes, while in 2005-06 they enrolled in only 24,370 CTE classes, a decrease of 24% in the last eight years.

Enrollment patterns by career area

Five of the 16 programs accounted for almost two-thirds (64.7%) of all CTE enrollments at the secondary level in 2005-06, with the top two, Business Education – Office and Consumer Home Economics Education, accounting for 39% of secondary CTE enrollments in 2005-06.

[11] Data do not include ROCP; ROCP enrollments have increased by approximately 10% since 2002-03.
[12] 1997-98 is the earliest date for which these data are available.

Table 4. CTE enrollment by course — secondary, 2005-06[13]

1	Business Education - Office	20.3%	128,579
2	Consumer Home Economics Education	18.7%	118,415
3	Agriculture Education	8.9%	56,685
4	Industrial & Technology Education	8.5%	54,166
5	Explorations in Industrial Technology	8.1%	51,585
6	Visual Communications, Graphics	5.3%	33,734
7	Home Economics Related Occupations	5.3%	33,357
8	Power, Energy & Transportation Technology	5.1%	32,447
9	Visual Communications, Drafting	4.6%	29,131
10	Work Experience Education	4.6%	29,012
11	Manufacturing Technology	2.5%	16,092
12	Applied Technology	2.3%	14,288
13	Health Careers	1.9%	11,980
14	Electronics Technology	1.6%	10,254
15	Business Education - Marketing	1.5%	9,247
16	Diversified Occupations	0.8%	5,000
Total		100.0%	633,972

Source: CBEDS 2005-06.

In secondary ROCP programs, the top five programs accounted for almost two-thirds (66.3%) of all enrollments, with the top two, Scientific Research and Technical Services, and Business and Administrative Services, making up nearly 40% of the secondary ROCP course enrollments.

Table 5. CTE enrollment by course — secondary ROCP, 2005-2006

1	Scientific Research & Technical Services	21.0%	78,745
2	Business & Administrative Services	18.8%	70,545
3	Logistics, Transportation & Distribution	9.5%	35,671
4	Wholesale/Retail Sales & Services	9.4%	35,318
5	Health Services	7.6%	28,500
6	Hospitality & Tourism	5.6%	20,977
7	Construction	4.8%	18,171
8	Legal & Protective Services	4.6%	17,229
9	Education & Training Services	4.4%	16,532
10	Agriculture & Natural Resources	4.3%	16,227
11	Human Services	3.3%	12,214
12	Arts & Communication Services	2.5%	9,390
13	Manufacturing	1.9%	6,997
14	Information Technology	1.3%	4,939
15	Financial Services	1.0%	4,016
Total		100.0%	375,471

Source: Carl D. Perkins Data System, retrieved Dec. 2006.

[13] These numbers include all district and county office of education-sponsored secondary CTE programs, not ROCPs.

Gender and Ethnicity

Comparison of CTE students to all high school students shows a higher proportion of female students in CTE (56.5%) compared to all high school students (48.7%). Hispanic students are slightly underrepresented, whereas White/Caucasian, and Asian students are slightly overrepresented.

Table 6. Gender and ethnicity of CTE students — secondary,[14] 2005-2006

	All High School	CTE Students
Gender		
▪ Female	48.7%	56.5%
▪ Male	51.2%	43.4%
Ethnicity		
▪ White/Caucasian	30.3%	38.0%
▪ Hispanic	47.5%	39.3%
▪ Asian	8.1%	11.5%
▪ African American	7.8%	7.3%

Source: CBEDS 2005-06.

CTE enrollments at the postsecondary level

Total enrollment

The California Community College System provided educational, CTE, and transfer programs to more than 2.5 million students during academic year 2004-2005. Of these, approximately 1.4 million,[15] or about 56%, are considered to be CTE students.

Enrollment patterns by career area

Table 7. CTE enrollment by course — community colleges, 2005-2006 [16]

1	Business Education	34%
2	Agriculture and Natural Resources	17%
3	Industrial and Technical Education	13%
4	Family and Consumer Science	13%
5	Public Safety Education	12%
6	Health Careers	10%
		100%

Source: TOPS Pro.

[14] Does not include ROCP.
[15] 2004-05 data, the latest available.
[16] Includes Tech-Prep and Adult Education.

Age, Enrollment Status, Gender and Ethnicity

The California Community Colleges serve students across a large age range, from below 19 to over 50, with half of the students being 24 years old or less and half 25 years or older; 23% of the students enrolled are aged 40 years or older.

Table 8. Enrollment by age — all community college, spring 2006

19 or Less	345,441	21.5%
20 to 24	455,225	28.3%
25 to 29	196,980	12.3%
30 to 34	127,722	8.0%
35 to 39	106,823	6.7%
40 to 49	170,544	10.7%
50 +	198,293	12.3%
Unknown	4,897	0.3%
Total	1,605,925	100.0%

Source: CCCCO MIS data, retrieved Oct. 2006.

Based on spring, 2006 data, the majority of community college students are "continuing students" — students continuing with their educational courses of study (57%). The next largest group is made up of those who had stopped their studies and are re-enrolling (14% "returning students"), with 10% being "first time students" and another 10% "first time transfer students."

A comparison between CTE and non-CTE/academic students shows similarity in distribution by gender and ethnicity. Unlike secondary students, however, female students are slightly underrepresented. Ethnicity follows the same pattern as secondary enrollments, though less markedly, with Hispanic students very slightly underrepresented, and White/Caucasian and Asian students slightly overrepresented.

Table 9. Gender and ethnicity of CTE students — postsecondary, spring 2006

	All Community Colleges	CTE Students
Gender		
▪ Female	55.0%	51.9%
▪ Male	43.7%	46.6%
Ethnicity		
▪ White/Caucasian	36.7%	39.6%
▪ Hispanic	28.8%	26.1%
▪ Asian	11.8%	14.7%
▪ African American	7.2%	7.6%

Source: CCCCO MIS data, retrieved Oct. 2006.

Community college CTE course enrollment by county

The largest enrollment numbers for CTE are in the south of the state.

Table 10. CTE enrollment by county — community colleges

	Top 20 Counties (CTE Enrollment at Postsecondary Level)	Number of CTE/Voc Ed Students
1	Los Angeles	271,096
2	Orange	162,161
3	San Diego	127,054
4	Alameda	84,440
5	Sacramento	62,956
6	Riverside	50,315
7	Santa Barbara	42,942
8	San Bernardino	39,805
9	San Francisco	38,735
10	Kern	37,176
11	Santa Clara	31,994
12	Fresno	31,756
13	Contra Costa	30,118
14	Ventura	27,659
15	Monterey	25,794
16	Sonoma	23,301
17	Stanislaus	21,106
18	San Mateo	19,548
19	Santa Monica	17,999
20	San Joaquin	16,541

Source: CCCCO MIS data from 2004-2005.[17]

Adult CTE enrollments in adult schools and ROCPs

Total enrollment

The total numbers of adults enrolled in CDE-administered adult education and ROCP CTE was 332,072 for the 2005-06 school year. This is a combination of Perkins Basic Grant Adult enrollments and Adult ROCP enrollments. Five programs accounted for almost 80% of all CTE enrollments in adult education and ROCP, with Business and Administrative Services alone accounting for 42% of enrollments.

Table 11. Adult CTE enrollment by course — adult education and adult ROCP, 2005-2006

1	Business & Administrative Services	41.9%	139,156
2	Health Services	16.9%	56,280
3	Human Services	8.0%	26,721
4	Construction	6.7%	22,259
5	Scientific Research & Technical Services	5.1%	16,847

[17] 2004/2005 Year - Summer 04, Fall 04, and Spring 05.

6	Logistics, Transportation & Distribution Services	4.8%	15,809
7	Information Technology	3.3%	10908
8	Hospitality & Tourism	2.5%	8,233
9	Legal & Protective Services	2.4%	7,903
10	Wholesale/Retail Sales & Services	2.0%	6,614
11	Manufacturing	1.9%	6,249
12	Education & Training Services	1.9%	6,205
13	Arts & Communication Services	1.1%	3,745
14	Agriculture & Natural Resources	1.0%	3,514
15	Financial Services	0.5%	1,629
Total		100.0%	332,072

Source: Carl D. Perkins Data System, data retrieved Dec. 2006.

Special Populations

Below are presented enrollment data for students who identify themselves as being within a "special population" group, as defined by the Perkins Act. According to the Carl D. Perkins Accountability Report 2004-05 covering secondary, postsecondary and adult programs, 32% of students enrolled in Perkins-funded CTE programs identify themselves as "Economically Disadvantaged" and 37% identify themselves as "Nontraditional Enrollees", (that is, enrolled in an occupation that is "not traditional" for their gender).[18] Some students identify with more than one Special Population category, so that numbers are not additive.

Table 12. Secondary, postsecondary, adult special populations (combined)[19]

Total CTE enrollment 3,099,267		
Individuals With Disabilities	250,316	8.1%
Economically Disadvantaged	993,127	32.0%
Nontraditional Enrollees	1,139,243	36.8%
Single Parents	96,764	3.1%
Displaced Homemakers	29,060	0.9%
Limited English Proficient	328,323	10.6%
Other Educational Barriers	101,685	3.3%

Table 13. Secondary special populations

Total CTE enrollment 1,345,615		
Individuals With Disabilities	95,997	7.1%
Economically Disadvantaged	373,274	27.7%
Nontraditional Enrollees	582,719	43.3%
Single Parents	5,544	0.4%
Displaced Homemakers	1,393	0.1%
Limited English Proficient	204,171	15.2%
Other Educational Barriers	70,832	5.2%

[18] Perkins III defines "nontraditional training and employment" as occupations or fields of work in which individuals from one gender make up less than 25 percent of the individuals employed in each such occupation or field of work (Section 3(17)) p. 246, National Assessment of Vocational Education Final Report to Congress, June 2004, US Department of Education.

[19] Enrollment counts for Carl D. Perkins accountability reports are calculated differently than CBEDS: Perkins, by course and CBEDS at one point in time in the fall of a given year.

Table 14. Postsecondary special populations

Total CTE enrollment 1,408,036		
Individuals With Disabilities	134,352	9.5%
Economically Disadvantaged	481,323	34.2%
Nontraditional Enrollees	348,845	24.8%
Single Parents	63,372	4.5%
Displaced Homemakers	20,558	1.5%
Limited English Proficient	97,656	6.9%
Other Educational Barriers	0	0%

Table 15. Adult special populations

Total CTE enrollment 345,616		
Individuals With Disabilities	19,967	5.8%
Economically Disadvantaged	138,530	40.1%
Nontraditional Enrollees	207,679	60.0%
Single Parents	27,848	8.0%
Displaced Homemakers	7,109	2.0%
Limited English Proficient	26,496	7.7%
Other Educational Barriers	30,853	8.9%

Source: Carl D. Perkins Vocational-Technical Educational Basic Grant Student Enrollment Report, 2004-05.

POLICY CONTEXT: CURRENT CTE FUNDING AND INITIATIVES

Career Technical Education in California is informed and supported by multiple state and federal funding streams. Further, the current effort to identify needs for system improvements is occurring against the background of a number of initiatives to expand and strengthen CTE programs in California. To provide context for the current needs assessment and the specific issues that were addressed in the surveys and focus groups, some of the major CTE funding sources and current initiatives are described below.

California budgetary and legislative initiatives

California is undertaking numerous initiatives to expand and strengthen its CTE programs.

The Governor of California has recently reaffirmed the state's commitment to career technical education as part of its "overall strategy to help more students graduate prepared for college and the 21st century economy," according to Scott Himelstein, Deputy Secretary of Education and Chief of Staff for the Office of the Secretary of Education (The James Irvine Foundation, 2006). "We all know the consequences of failing to inspire and prepare young people for the 21st century economy," said State Superintendent of Public Instruction Jack O'Connell. "No less than California's standing as a global economic leader and the California dream are at stake" (Ibid).

The 2006-07 California budget calls for expanded vocational and career technical educational opportunities for middle and high school students, and improved linkages between public schools and community college CTE programs. Toward this end, the Budget provides $100 million consisting of $20 million in ongoing funds for community colleges, $40 million in one-time funds for new career technical education equipment for community colleges, and $40 million for new equipment for public high schools as reflected in the K-12 education section. The funds "seek to systematically reinvigorate high school vocational programs through

curriculum enhancements, course sequencing, and articulation between K-12 tech-prep programs and community college economic development programs." Funding may be targeted in areas such as faculty and counselor in-service projects, career advancement academies for young adults without high school diplomas, teacher pipeline pilot projects, and "other investments focused on ensuring that students have access to programs that provide the necessary technical training and skills for emerging industries." The funds will complement the ongoing resources by ensuring students in both segments will have state-of-the-art equipment necessary for developing skills needed in the workplace (California's Enacted Budget, 2006).

Senate Bill 70: The Economic Development and Career Technical Education Reform Initiative

As stated on the Community College Chancellor's Office (CCCCO) website (2006a), the Governor's 2005-06 budget called for expanded career technical education opportunities and improved linkages between public schools and community colleges. The overall goal of these funds is to strengthen California's workforce development efforts by linking the state's investment in economic development with its investment in public education and other services. Funding will therefore be used for:

- "Quick Start" Partnerships, which will enhance linkages and pathways between secondary schools and selected economic and workforce development initiatives in community colleges
- Projects that will grow program capacity and infrastructure
- Projects that will strengthen Career Technical Education sectors at secondary schools

Portions of the funds will be used for community and regional consortium-based projects that bring together economic development initiatives and consortia composed of community colleges, high schools, and Regional Occupational Centers/Programs. Twenty percent of the funds ($4 million) will be used to develop regional articulation councils with the charge of aligning seamless, non-redundant education and training in California. Another 12.5% of the funds ($2.5 million) are targeted for strengthening existing CTE sectors. Middle school career exploration projects are allocated 7.5% of the funding ($1.5 million). The remaining 6% of the funds ($1.2 million) are targeted at critical professional development needs and capacity-building needs.[20]

This allocation of funding reflects the Community College Chancellor's Office's commitment to building a coherent Career Technical Education system. According to the Economic Development and Career Technical Education Reform Implementation Strategy for Senate Bill 70 (Scott), in implementing SB 70, the Community College System Office proposes a policy direction that is grounded in the consensus that California is building a Career Technical Education *system* and proposes a funding approach that features three concurrent actions to support this approach: building exemplars as "beacons," strengthening the foundation, and growing needed program capacity and infrastructure (CCCCO, 2005).

[20] Chancellor's Office California Community Colleges, Economic Development and Workforce Preparation Division, Request for Applications of New Grant Awards Instructions, Specification, Terms and Conditions Technical Assistance Center for Career Pathways and Work-Based Learning FY 2005-06.

- Building exemplars in every region of California is intended to energize communities and to signal what robust, high-end career technical education can be. "Quick Start" exemplars will be built around components of the high-skill, high-wage, high-demand emerging industries reflected in the California Community College economic development initiatives.

- Efforts to strengthen the foundation of CTE will focus on current occupations with good, well-paying futures — reinvigorating and enhancing existing CTE programs. Funding will support such activities as updating course content to ensure rigor, adding new technologies or new aspects to the courses, such as global trade or entrepreneurship skills, building learning communities, establishing work-based learning opportunities, and "linking career ladders of life-long learning and career upward mobility."

- Growing needed program capacity and infrastructure is the third component of the implementation strategy. Currently, according to the SB 70 Implementation Plan, "California's CTE system has several weak — or missing — links." Examples of work to be funded through competitive RFAs include alignment and articulation to address the current situation, which has been characterized as "spotty and provincial." Solutions are needed that balance transportable articulation with locally controlled education and individual faculty expertise. Another example of needed capacity and infrastructure would be the development of strong career exploration opportunities in the middle grades to help students understand the connection between learning and skills to future careers and thus the relevance of education (CCCCO, 2006c).

Two other pieces of legislation that affect career technical education include the following.

Assembly Bill 2448 (Hancock): Regional Occupational Centers and Programs

AB 2448, signed by the Governor of California on September 28, 2006, redefines the role of Regional Occupational Centers and Programs (ROCPs) in the CTE delivery system. The bill will phase out the number of adults that can be served through ROCPs, implements several recommendations by the Legislative Analyst's Office to refocus ROCP services to high school students and ensure the courses are part of occupational course sequences, and makes various modifications to ROCPs. Some of the modifications include (Legislative Council, State of California, 2006):

- Permitting a school to schedule classes so that each pupil attends 2,400 minutes during any 10-school day period, and permitting a pupil to attend school fewer days per week to accommodate career technical education, regional occupational center, and program courses and block or other alternative school class schedules as long as the pupil attends the required minutes per 10-school day period.

- Requiring a regional occupational center or program to expand the provision of skill training to include a sequence of academic and skill instruction leading to an employer-

endorsed skill certificate and vocational degree or certificate programs at a community college.

- Placing the primary focus of service on students in grades 9-12, setting limits on the number of adult students, while maintaining service to some of the most needy adults.

- Allowing students younger than 16 to participate if they are referred to the center or program as part of a comprehensive high school plan. Also required is that they be in individualized education programs that prescribe occupational training and for which their enrollment in a regional occupational center or program is deemed appropriate.

- Requiring annual reporting to the State Department of Education on the academic progress of its secondary pupils, as specified, in order to receive specified, additional average daily attendance.

- Requiring a community college, upon receiving federal funds provided under the federal Carl D. Perkins Act, to develop a plan for building course sequences that link grades 7-12 to the community colleges. Included in the plan, among other requirements, will be an institution-wide process and criteria for awarding community college credit for vocational courses taken by pupils in high school or through the ROCP.

Assembly Bill 1802: The Middle and High School Supplemental Counseling Program

Among its provisions, this education finance bill would establish the Supplemental School Counseling Program ($200M) and require the governing board of a school district that maintains any of grades 7 through 12 to adopt a counseling program that includes a provision for a counselor to meet with each student to explain the academic and deportment records of the student, his or her educational options, the coursework and academic progress needed for satisfactory completion of middle or high school, and the availability of career guidance activities. The educational options explained at the meeting may include vocational programs, including regional occupational centers and programs. Students who have failed the high school exit examination, are at risk of failing the examination, or are not earning credits at a rate that will enable them to graduate from high school with their class will be assigned first priority for counseling services (AB 1802, 2006).

Accreditation standards related to CTE

Both CDE, through the Western Association of Schools and Colleges (WASC) CDE Criteria, and the Community Colleges, through the Accrediting Commission for Community and Junior Colleges (ACCJC) of the WASC, support career technical education through their accreditation processes.

CDE accreditation standards

The WASC Accreditation Standards for CDE highlight the importance of fostering students' transitions to careers, the importance of goal-setting, and the importance of using multiple instructional strategies to engage students and promote higher-order thinking skills, as follows:

- Under "Standards-Based Student Learning — Curriculum," the WASC criteria require that
  "All students have access to the school's entire program and assistance with a personal learning plan to prepare them for the pursuit of their academic, personal, and school-to-career goals."
- Under "Standards-Based Student Learning — Instruction," the criteria require that "All teachers use a variety of strategies and resources, including technology and experiences beyond the textbook and the classroom, that actively engage students, emphasize higher order thinking skills, and help them succeed at high levels."
- Finally, under "School Culture and Support for Student Personal and Academic Growth," the criteria require that "All students receive appropriate support along with an individualized learning plan to help ensure academic success."

Community College accreditation standards

The ACCJC provides four sets of standards in the areas of mission-driven planning, student learning outcomes, resources, and leadership. The first standard requires that the institution's mission drive institutional planning and decision making. In 1996, the recognition of the importance of the community colleges in the preparation of the workforce in an increasingly competitive global economy, the California Community Colleges added a second clause to its mission statement: "To advance California's economic growth and global competitiveness through education, training, and services that contribute to continuous workforce improvement." Consistent with this expanded mission, the California Community Colleges' Strategic Plan is subtitled "Education and the Economy: Shaping California's Future Today"; it sets ambitious goals related to workforce preparation and economic development (Community Colleges System Strategic Plan Steering Committee, 2006).

Career technical education is also prominently featured in the area of student outcomes. The accreditation standards require the faculty, "with the assistance of advisory committees when appropriate, to identify competency levels and measurable student learning outcomes for courses, certificates, programs including general and vocational education, and degrees." They require planning "to assure currency and measure achievement of its stated student learning outcomes for courses, certificates, programs including general and vocational education, and degrees." They require that career technical courses include "a component of general education," as appropriate, and, finally, they require that "[s]tudents completing vocational and occupational certificates and degrees demonstrate technical and professional competencies that meet employment and other applicable standards and are prepared for external licensure and certification."

Accountability systems used for CTE

In California, data on CTE programs and student outcomes are reported through the Consolidated Annual Performance, Accountability, and Financial Status Report for State-Administered Vocational Education Programs, required by the Carl D. Perkins Vocational and Technical Education Act of 1998 (Perkins III). For CDE (secondary, adult education, and tech prep) programs, this is the primary accountability system used; it tracks the indicators required by the Perkins Act, as described below.

In the new Perkins Act, CTE programs will be required to demonstrate "[s]tudent attainment of challenging academic content standards and student academic achievement standards, as adopted by a State under NCLB, and measured by the State academic assessments used for NCLB."

The California Community Colleges use the California Community College Management System (CCCMS), an electronic, student-level information system which tracks student participation, completion, and transition into the California State University system, the University of California, the military, or the workforce. It allows community colleges to collect and report data by vocational program area. Data are aggregated across vocational program areas for federal reporting purposes. In addition, the CCC has a new accountability system known as AB 1417/ARCC (Accountability Reporting for Community Colleges). ARCC is comprised of a set of measures for the system and for individual colleges. There are a total of 13 measures grouped into the following categories: degrees and certificates in both transfer education and workforce development, basic skills, and participation (CCCCO, 2006d).

California is also developing other systems for K-12 accountability, such as the California Longitudinal Pupil Achievement Data System (CALPADS), which will collect data on both graduation and drop-out rates, and is due to be implemented in 2008.

California Department of Education initiatives

<u>Superintendents' P-16 council</u>

The Superintendent's P-16 Council was created in 2005 to examine ways to improve student achievement at all levels and link preschool, elementary, middle, high school, and higher education to create a comprehensive, integrated system of student learning. Subcommittees focus on "rigor," "relevance," and "relationships," respectively, and deliberate on various "essential questions." Some of these include how to increase the relevance of school, how to provide all students the opportunity of rigorous work- and college-ready curricula, and how to ensure that all students develop a sense of community while in high school. Recommendations from the Council are forthcoming.

<u>The CTE standards and frameworks</u>

The 2002 Assembly Bill 1412 and Senate Bill 1934 mandated that a Career and Technical Education (CTE) Advisory Group oversee development of the CTE curriculum standards and

frameworks, as had previously been developed for the core academic subject areas and the arts. The resulting California Career Technical Education Model Curriculum Standards, adopted by the State Board of Education in May 2005, integrate California's academic content standards with industry-specific knowledge and skills in order to prepare students both for direct entry into the workplace and for postsecondary education. The standards emphasize 21st century labor market realities, flexibility, and adaptability to local CTE conditions, and increased rigor in the CTE system.

The CTE standards are organized into 15 industry sectors, or groupings, of interrelated occupations and broad industries. Each sector has two or more career pathways, which are a coherent sequence of rigorous academic and technical courses that allow students to apply academics and develop technical skills in a curricular area. Career pathways are intended to prepare students for successful completion of state academic and technical standards and more advanced postsecondary course-work related to the career in which they are interested. Identified with industry input, the 15 industry sectors include:

1) Agriculture and Natural Resources
2) Arts, Media, and Entertainment
3) Building Trades and Construction
4) Education, Child Development, and Family Services
5) Energy and Utilities
6) Engineering and Design
7) Fashion and Interior Design
8) Finance and Business
9) Health Science and Medical Technology
10) Hospitality, Tourism, and Recreation
11) Information Technology
12) Manufacturing and Product Development
13) Marketing, Sales, and Service
14) Public Services
15) Transportation

The California Career Technical Education Curriculum Framework provides guidance for implementing the career technical education model curriculum content standards. It provides context for the content laid out in the standards, and discussion of best practices and important issues in implementation. The Framework is currently in review.

A to G requirements

The University of California (UC) and the California State University (CSU) require students to complete accredited courses in order to be eligible to enter their postsecondary institutions. These are commonly called the "A-G" requirements. The aim is to ensure that students can participate fully in the first-year program at the university in a wide variety of fields of study.

UC/CSU have approved hundreds of CTE courses that meet the A-G requirements. The California Department of Education has released a report called *CDE-UC Approved CTE*

Courses 2006-07 (2006b) in which it reports that 4,705 CTE courses have been approved to satisfy the A-G requirements. (UCOP, 2006)

Examples range from business economics and veterinary science to graphic design and robotics. In determining the acceptability of a CTE course, UC/CSU apply the same faculty guidelines that are applied to academic courses. Specifically, courses must fall within one of the A-G subject areas, must be academically challenging, must prepare students for success in lower division courses at UC, and must meet the specific subject area guidelines articulated by the faculty (Ibid.).

UC/CSU eligibility and career-technical education are not mutually exclusive paths for students. It is feasible for a student to simultaneously follow both paths. Commonly, those integrating academic and CTE course content tend to take one of two approaches: infusing additional academic content into an existing CTE course, or starting with an academic course and inserting topical career technical applications in appropriate places (Ibid.).

California Community Colleges initiatives

The incorporation in 1996 of economic development into the mission of California Community Colleges has increased the system's active support of regional economic development. To carry out the CCC's economic development mission, the Economic and Workforce Development program promotes the development and implementation of training, curricula, and career pathways in key strategic industry sectors in which there is anticipated job growth that will create future jobs and career pathways for students. With the passage of SB 70, this work will include the creation of career pathways for high school as well as community college students.

The program currently fosters 10 key strategic priority areas and provides other short-term grant components that address emerging areas and local project needs. The 10 areas include:

1) Advanced Transportation and Energy
2) Applied Competitive Technologies/Manufacturing
3) Biotechnologies
4) Environmental Safety, Health, and Homeland Security
5) Health Care Careers
6) International Trade Development
7) Multimedia and Entertainment
8) Small Business Development
9) The Workplace Learning Resources
10) Business and Workforce Performance Improvement[21]

The industry-specific initiatives are responsible for working with industry to promote workforce development in those sectors. The Workplace Learning Resources Initiative is responsible for serving the needs of the public and private sector employers with a variety of customized

[21] Attention is also being given to fostering information technologies, nanotechnology, intelligent transportation systems, logistics, and the hydrogen economy.

workplace learning services, including occupation-specific skill needs assessment, task analyses of specific jobs, vocational English as a second language, and customer service training. The Business and Workforce Improvement Initiative facilitates the strengthening of contract education programs, offers professional development, and is responsible for nine regional "Centers of Excellence" that conduct environmental scans related to high-growth, emerging, and economically critical industries and their related workforce needs.

In addition to these initiatives, the Community Colleges' Economic Development Program administers "Industry-Driven Regional Collaboratives" (IDRC) grants. These grants fund community colleges to create flexible local projects to meet regional business needs, particularly in high-growth, emerging technology industries.

Carl D. Perkins Career and Technical Education Improvement Act of 2006

California receives approximately $140 million annually from the Carl D. Perkins Act, serving 3,099,267 total students in 600 local and state education agencies, and 109 community colleges.[22] While representing only approximately 7% of funding for CTE programs in the state of California, the Perkins Act serves as a lever for system improvement and, as such, exerts a large influence on the shape of CTE programs in California. At the secondary level, Perkins funding has served as a primary vehicle for increasing the academic content and technical rigor of career technical education courses and has supported statewide efforts to restructure high schools to improve student achievement. At the postsecondary level, Perkins has facilitated instructional innovation and development of programs in high-demand and emerging technologies.

In August 2006, President Bush signed the Carl D. Perkins Career and Technical Education Improvement Act of 2006. Replacing the Carl D. Perkins Vocational and Technical Education Act of 1998, the 2006 Perkins Act provides almost $1.3 billion in federal support for career technical education programs in all 50 states. The law will extend through June 30, 2013.

<u>Perkins III</u>

The Carl D. Perkins Vocational and Technical Education Act of 1998, also known as Perkins III, was signed into law on October 31, 1998. Perkins III was intended to "restructure programs previously authorized by the Carl D. Perkins Vocational and Applied Technology Education Act and promote reform and innovation in vocational and technical education to help ensure that all students acquire the skills and knowledge they need to meet challenging State academic standards and industry-recognized skill standards, and to prepare for postsecondary education, further learning, and a wide range of career opportunities." Implementation of Perkins III promised "to make vocational and technical education an integral part of State and local efforts to reform secondary schools and improve postsecondary education." The law stressed high-

[22] From testimony of Dr. Patrick Ainsworth, Assistant Superintendent and Director of the Secondary, Postsecondary, and Adult Leadership Division, California Department of Education to the Subcommittee on Education Reform, Committee on Education and the Workforce, United States House of Representatives regarding *H.R. 366 – the Vocational and Technical Education for the Future Act.*

quality programs that integrate academic and vocational education; promote student attainment of challenging academic and vocational and technical standards; provide students with strong experience in, and understanding of, all aspects of an industry; address the needs of individuals who are members of special populations; involve parents and employers; and provide strong linkages between secondary and postsecondary education. Programs were required to develop, improve, or expand the use of technology in vocational and technical education, by providing training in the use of technology to educational personnel, preparing students for careers in the high technology and telecommunications fields, by working with businesses in high technology industries to offer internships and mentoring programs for students, and other means. To enhance the quality of instruction in vocational and technical education, Perkins III also required local programs to provide comprehensive professional development opportunities for teachers, counselors, and administrators (Federal Register, 1999).

This translates into eight required uses of Perkins funds:

1) Strengthening academic, professional-technical skills of students through integration of academic, professional-technical programs
2) Providing programs that address all aspects of an industry
3) Developing, improving, and expanding the use of technology, which may include professional development, providing students with the ability to enter high technology and telecommunications careers and encouraging schools to work with high technology industries
4) Providing professional development for teachers, administrators, and counselors, including in-service and pre-service training and practices to include parents and the community
5) Evaluating programs and assessing how special populations are being served
6) Developing and upgrading programs
7) Providing services of sufficient size, scope, and quality
8) Linking secondary and postsecondary education

States were further permitted to use their funds to:

- Involve parents, businesses, and labor organizations in planning, implementing, and evaluating professional-technical education programs
- Provide career guidance and academic counseling for professional-technical education students
- Provide work-related experiences
- Provide programs for special populations
- Support local business and education partnerships
- Assist vocational student organizations
- Provide mentoring and support services
- Lease, purchase, and upgrade equipment
- Provide initial teacher preparation, including that for teacher candidates from business and industry
- Develop and improve curriculum
- Support family and consumer sciences education

- Provide programs for adults and school dropouts to complete secondary education
- Provide services for placement in employment and further education
- Support nontraditional training and employment

Performance measures have been established in accordance with Section 113 of the Perkins III legislation and include four core performance indicators to measure:

- Student attainment of challenging state-established academic and vocational technical skill proficiencies
- Student attainment of a secondary school diploma or its recognized equivalent or postsecondary degree or credential
- Placement in, retention in, and completion of postsecondary education or advanced training, placement in military service, or placement or retention in employment
- Student participation in and completion of vocational-technical programs that lead to nontraditional training and employment.

Performance levels of core indicators 2002 to 2005

Over the last few years, changes have been observed in the performance levels achieved for these four core indicators. Achievement is measured against "adjusted" — or targeted — performance levels. Please note that the "adjusted" performance levels for 2004-05 were established from an *average* of California's performance for the three prior years.

In the secondary arena, Core Indicators 1S2 (Skill Attainment), 4S1 (Non-Traditional Participation), and 4S2 (Non-Traditional Completion) have continued to exceed the "adjusted" (targeted) performance level each year, 2002 to 2005. Over the same time period, the state's secondary school programs were slightly below the "adjusted" performance levels for Core Indicators 1S1 (Academic Attainment) and 2S1 (High School Completion), both measured by attainment of a high school diploma, although both have held fairly steady over the three years measured and the disparity between achievement and targets has continued to diminish. Achieved levels for Secondary Placement (3S1) have increased notably since 2003-04, both in absolute terms and with respect to targets.

For the state's adult school programs, in the areas of Core Indicators 1A1 (Academic Attainment), 1A2 (Skill Attainment), and 2A1 (Completion), all measured by the same indicator (Vocational Program Completion), the disparity between performance and targets diminished and performance increased over time. Achievement exceeded expectations for 4A1 (Non-Traditional Participation) and 4A2 (Non-Traditional Completion). Core Indicator 3A1 (Placement) over the same years, increased markedly both in comparison to targets and in absolute numbers.

For postsecondary programs, Core Indicators 1P1 (Postsecondary Academic Attainment), 1P2 (Postsecondary Vocational & Technical Skills Attainment), both measured by grade achievement in Vocational Programs; 2P2 measured by course completion, transfer or enlistment; 2P2 2P1(Postsecondary Completion); 3P2 (Postsecondary Retention); and 4P1 (Participation in Postsecondary Nontraditional Programs) have exceeded the targeted performance level each year

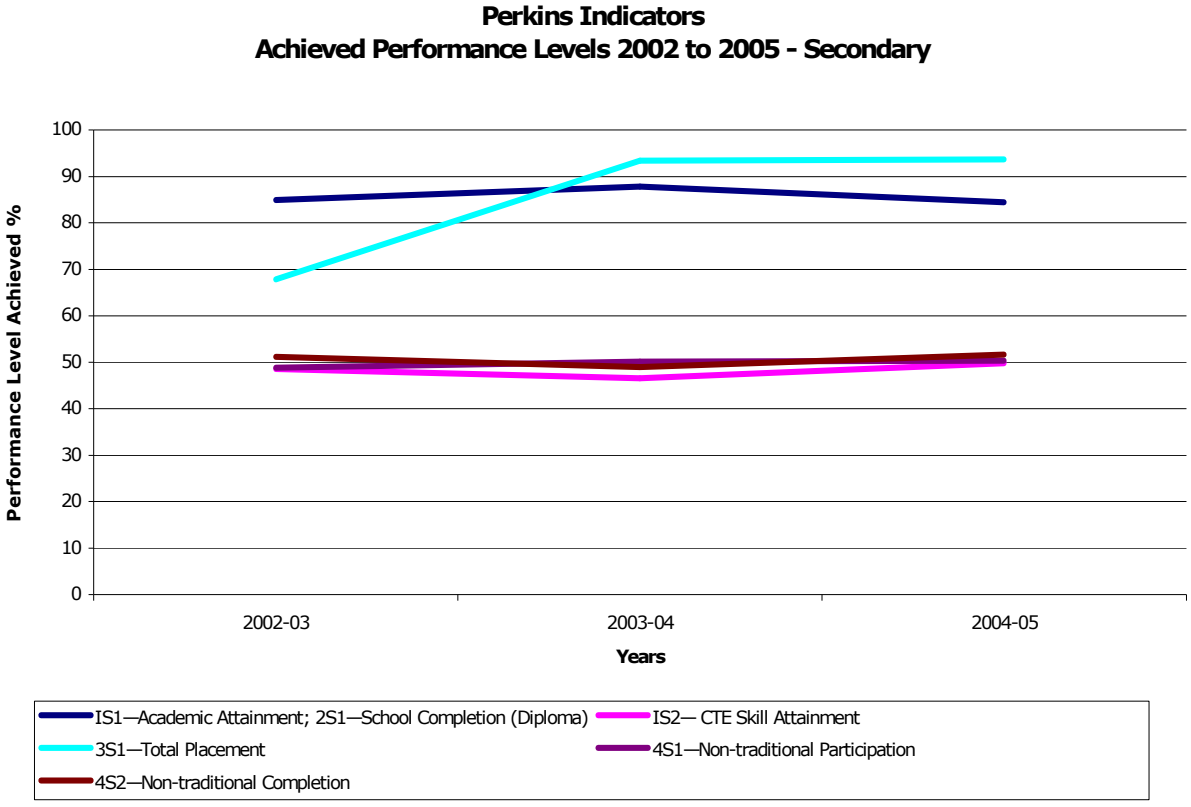
(2002-2005). Core Indicator 4P2 (Completion of Postsecondary Nontraditional Programs) fell very slightly below the targeted level, for the same period, while 3P1 (Postsecondary Placement) exceeded targets in 2002-03 and then declined slightly.

Table 16. Secondary programs — secondary schools (including secondary ROCP)[23]

	Secondary Performance Levels 2002 to 2005					
Indicator	**Adjusted 2002-03**	**Achieved 2002-03**	**Adjusted 2003-04**	**Achieved 2003-04**	**Adjusted 2004-05**	**Achieved 2004-05**
Academic Attainment	92.35 %	84.94 %	93.35 %	87.82 %	85.00 %	84.49 %
CTE Skill Attainment	17.03 %	48.60 %	18.03 %	46.59 %	49.00 %	49.84 %
School Completion (Diploma)	92.35 %	84.94 %	93.35 %	87.82 %	85.00 %	84.49 %
Total Placement	71.14 %	67.88 %	71.64 %	93.46 %	71.64 %	93.69 %
Non-traditional Participation	17.63 %	48.81 %	17.63 %	50.11 %	18.63 %	50.42 %
Non-traditional Completion	24.63 %	51.24 %	25.13 %	49.05 %	49.00 %	51.74 %

Source: Consolidated Annual Performance, Accountability, and Financial Status Report for State-Administered Vocational Education Programs (2002-03; 2003-04; 2004-05).

Figure 3. Achieved performance levels — secondary[24]

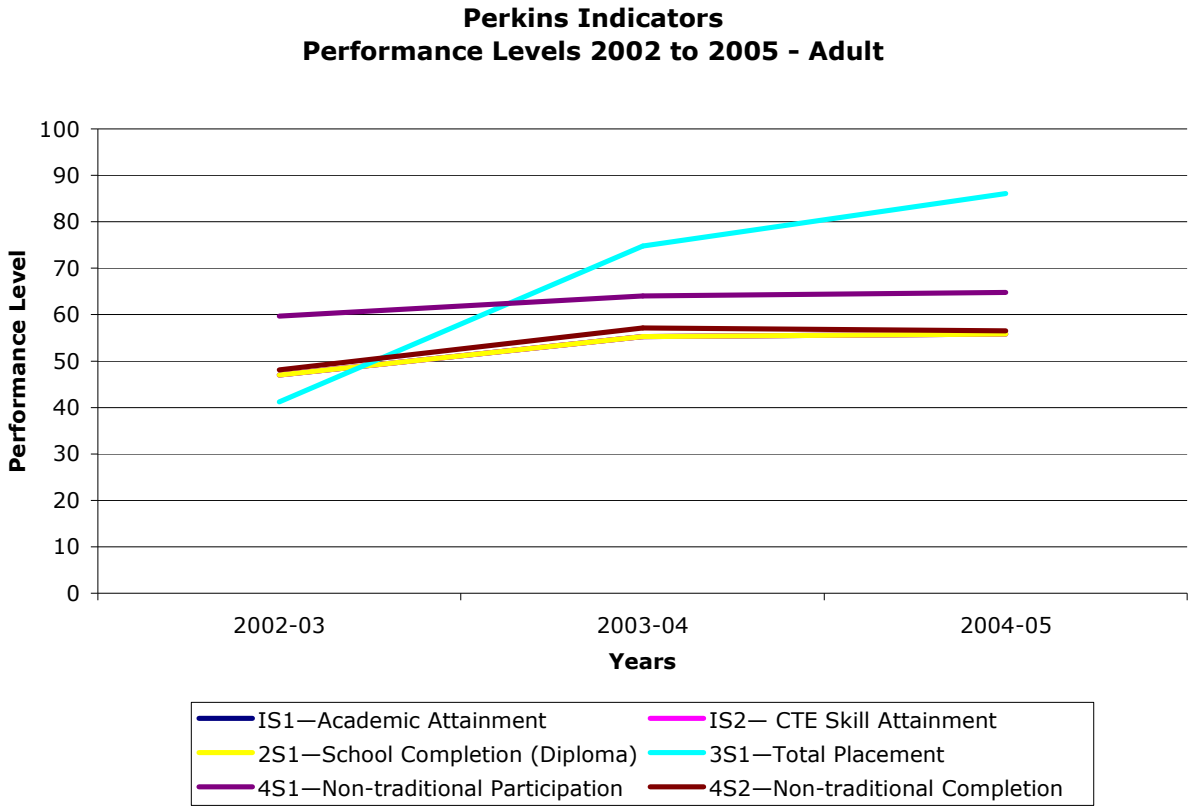


[23] Academic Attainment and School Completion are both measured by the same indicator: attainment of a high school diploma.
[24] See footnote 23.

Table 17. Adult programs — adult education and adult ROCP[25]

	Adult Performance Levels 2002 to 2005					
Indicator	**Adjusted 2002-03**	**Achieved 2002-03**	**Adjusted 2003-04**	**Achieved 2003-04**	**Adjusted 2004-05**	**Achieved 2004-05**
Academic Attainment	81.26 %	47.05 %	81.76 %	55.35 %	62.50 %	55.80 %
CTE Skill Attainment	81.26 %	47.05 %	81.76 %	55.35 %	62.50 %	55.80 %
Vocational Program Completion	81.26 %	47.05 %	81.76 %	55.35 %	62.50 %	55.80 %
Total Placement	60.18 %	41.28 %	61.18 %	74.81 %	60.00 %	86.13 %
Non-traditional Participation	17.63 %	59.73 %	18.13 %	64.08 %	18.63 %	64.88 %
Non-traditional Completion	24.63 %	48.14 %	25.13 %	57.15 %	51.00 %	56.51 %

Figure 4. Achieved performance levels — adult[26]

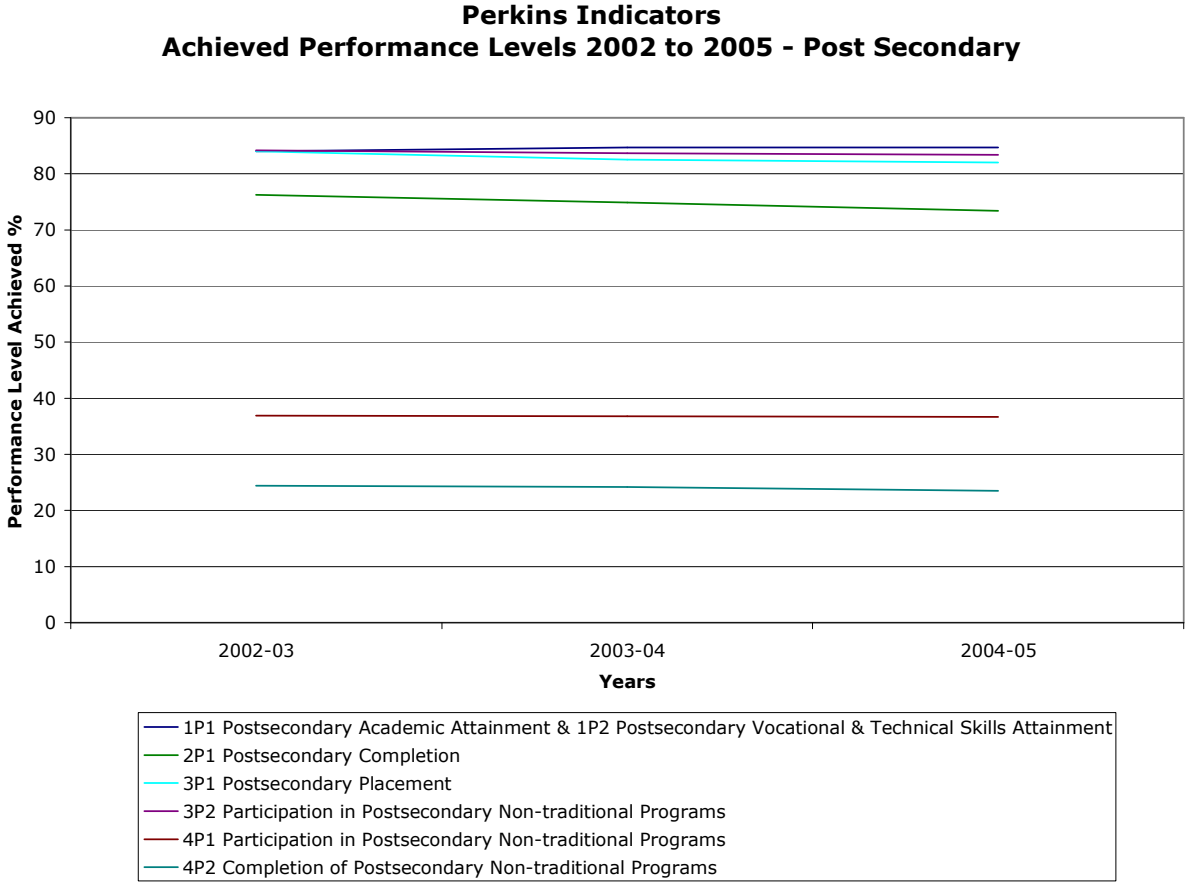


[25] For adult CTE, Skill Attainment and Vocational Program Completion are all measured by the same indicator: Vocational Program Completion.
[26] See footnote 25.

Table 18. Postsecondary programs — community colleges[27]

	Postsecondary Performance Levels 2002 to 2005					
Indicator	**Adjusted 2002-03**	**Achieved 2002-03**	**Adjusted 2003-04**	**Achieved 2003-04**	**Adjusted 2004-05**	**Achieved 2004-05**
Postsecondary Academic Attainment	77.76%	84.01%	78.76%	84.73%	79.76%	84.70%
Postsecondary Vocational & Technical Skills Attainment	77.76%	84.01%	78.76%	84.73%	79.76%	84.70%
Postsecondary Completion	59.82%	76.36%	59.82%	74.90%	60.82%	73.42%
Postsecondary Placement	83.19%	84.08%	83.19%	82.53%	83.19%	82.07%
Postsecondary Retention	82.70%	84.29%	82.75%	83.77%	82.85%	83.48%
Participation in Postsecondary Nontraditional Programs	27.98%	36.98%	28.98%	36.80%	29.98%	36.71%
Completion of Postsecondary Non-traditional Programs	26.95%	24.42%	26.95%	24.21%	25.05%	23.52%

Figure 5. Achieved performance levels — postsecondary[28]



[27] For postsecondary CTE, the measure for both Academic and Skill Attainment is the unduplicated count of students enrolled in SAM A-C courses who have earned a GPA of 2.0 or above in those SAM A-C courses only.
[28] See footnote 27.

To address the performance measures in California, LEAs serving students at the secondary level applying for Carl D. Perkins funding from the state are required to collect data on the following:

- Number of students enrolled in the program (including the enrollment of special population students)
- Number and percent of program completers[29]
- Number and percent of secondary program completers who receive diplomas
- Number of completers placed in the military, further education/training, or employment
- Number of nontraditional program concentrators[30] and completers (CDE, 2006c)

At the postsecondary level, applicants must also collect data regarding levels of certificate completion (CDE, 2000).

Perkins IV

Perkins IV emphasizes high-quality programs that prepare individuals for high-skill, high-wage, and high-demand occupations and careers; integration of academic and career technical education; and course sequences. The four purposes of the 1998 law are expanded, and three new purposes are added. The purposes now include:

1) Building on the efforts of states and localities to develop challenging academic and technical standards, and to assist students in meeting such standards, including preparation for high-skill, high-wage, or high-demand occupations in current or emerging professions.
2) Promoting the development of services and activities that integrate rigorous and challenging academic and career and technical instruction, and that link secondary education and postsecondary education for participating career and technical education students.
3) Increasing state and local flexibility in providing services and activities designed to develop, implement, and improve career and technical education, including tech prep education.
4) Conducting and disseminating national research and disseminating information on best practices that improve career and technical education programs, services, and activities.
5) Providing technical assistance that promotes leadership, initial preparation, and professional development at the state and local levels, and that improves the quality of career and technical education teachers, faculty, administrators, and counselors.
6) Supporting partnerships among secondary schools, postsecondary institutions, baccalaureate degree-granting institutions, area career and technical education schools, local workforce investment boards, business and industry, and intermediaries.

[29] A "completer" is a student who has completed the culminating, or "capstone," course in a course sequence consisting of either two or three courses, depending on the career area, or receives a certificate defined by industry or the LEA.

[30] A "concentrator" is a student who takes a series of at least two CTE courses in the same career area, or a minimum of 20 hours of coursework beyond the introductory course.

7) Providing individuals with opportunities throughout their lifetimes to develop, in conjunction with other education and training programs, the knowledge and skills needed to keep the United States competitive.

Most of the definitions used in Perkins IV are maintained as in Perkins III. Four new definitions have been added for the terms "articulation agreement" and "scientifically based research." The definition for an articulation agreement is similar to the definition that was included in Title II of the 1998 law, but specifies that the articulation agreement must be agreed to at the state level or approved annually by the lead administrators of a secondary institution and a postsecondary institution, or a sub-baccalaureate degree-granting postsecondary institution and a baccalaureate degree-granting postsecondary institution. The articulation agreement must link programs through credit transfer agreements and lead to technical skill proficiency, a credential, certificate, or a degree. The definition of scientifically based research references the scientifically based research standards that are included in the Education Sciences Reform Act of 2002.

Among terms already defined in current law, the most significant change is to the definition of "Vocational and Technical Education," which is now "Career and Technical Education." The clause in the first part of the definition restricting preparation for careers to those not requiring a baccalaureate, master's, or doctoral degree is eliminated. This would allow for CTE programs that prepare students for careers eventually requiring baccalaureate degrees, such as engineering. Two additional clauses are also added to the definition. One states that CTE "provides technical skill proficiency, an industry-recognized credential, a certificate, or an associate degree," and the other specifies that CTE may include prerequisite courses that meet the requirements of the definition, as long as they are not remedial in nature (ACTE, 2006a).

The accountability provisions of Perkins IV separate secondary and postsecondary indicators, create new local requirements, provide more specific improvement plan and sanction language, and stress the importance of valid and reliable measures (ACTE, 2006b). Notably, the indicators are now more closely aligned with the requirements of the No Child Left Behind (NCLB) Act, while stopping short of holding states to NCLB's AYP requirements for student achievement or Highly Qualified Teacher requirements for all CTE instructors. The new indicators are:

Secondary student indicators

- Student attainment of challenging academic content standards and student academic achievement standards, as adopted by a state under NCLB, and measured by the state academic assessments used for NCLB
- Student attainment of career and technical skill proficiencies, including student achievement on technical assessments that are aligned with industry-recognized standards, if available and appropriate
- Student rates of attainment of each of the following: 1) a secondary school diploma; 2) a General Education Development (GED) credential or other state-recognized equivalent, including recognized alternative standards for individuals with disabilities; and 3) a proficiency credential, certificate, or degree, in conjunction with a secondary school diploma (if such credential, certificate, or degree is offered by the state in conjunction with a secondary school diploma)
- Student graduation rates (as defined by NCLB)

- Student placement in postsecondary education or advanced training, in military service, or in employment
- Student participation in and completion of career and technical education programs that lead to non-traditional fields

Postsecondary student indicators

- Student attainment of challenging career and technical skill proficiencies, including student achievement on technical assessments that are aligned with industry-recognized standards, if available and appropriate
- Student attainment of an industry-recognized credential, a certificate, or a degree
- Student retention in postsecondary education or transfer to a baccalaureate degree program
- Student placement in military service or apprenticeship programs or placement or retention in employment, including placement in high-skill, high-wage, or high-demand occupations or professions
- Student participation in, and completion of, career and technical education programs that lead to employment in non-traditional fields (ACTE, 2006c)

One of the highlights of the new Perkins Act is the requirement for the development and implementation of "career and technical programs of study." These programs of study are defined and referenced throughout the Act. States must develop the programs of study in consultation with local programs, and each local recipient receiving funds under the bill will be required to offer at least one of the relevant courses. Programs of study are very similar to, and build on, positive initiatives already underway in CTE programs, such as Tech Prep, career pathways and career academies. (ACTE, 2006d).

SUMMARY

As shown, the structure of California's CTE system consists of various levels of services and programs, serving the educational and career development needs of students throughout their lives, from children in their early grades to adults seeking retraining for new careers.

In 2005-06, the CTE system served over 2.7 million students. Enrollment data are captured according to programs driven by different funding streams and using various data management systems. Career areas are currently clustered differently at the secondary and postsecondary level and in different programs, but, overall, courses are offered in 15 industry sectors at the secondary level, and six overarching career areas at the postsecondary level, spanning over 130 occupations.

In this section, a policy overview has also been included to provide context for this needs assessment and for the survey and focus group results presented later in the report. New initiatives, such as California's SB 70, the Economic Development and Career Technical Education Reform Initiative, are creating vehicles to promote greater coherence among secondary and postsecondary programs and across sectors, in service of a more seamless CTE system to better meet the pressing educational and economic development needs of the state.

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METHODOLOGY

The research team used a three-stage approach to address the research questions: a review of the current literature, online surveys, and focus groups and interviews.

Prior to beginning either the literature review or the data collection, a "Working Resource Group" was convened to provide expert consultation to WestEd in implementing the assessment, designing and administering data collection instruments, analyzing data, and writing the report. The Working Resource Group consisted of nine members, four representing K-12 education and five representing the California Community Colleges. The group provided input and reviewed materials in-depth throughout the assessment.

LITERATURE REVIEW

The initial phase of the needs assessment consisted of reviewing existing literature on national CTE research and education reform, implementation trends, and recognized "effective" or "best" practices. This included reports on CTE implementation, such as the National Assessment of Vocational Education, literature reporting on issues in workforce development and postsecondary education, and previous research summaries. It also included reports from other states such as the Arizona Career Technical Education Delivery System Project Report, policy briefs, position papers, and web-based materials on the California Department of Education (CDE) and the California Community Colleges (CCC), as well as information about the initiatives of foundations, business organizations and other non-profit organizations working in the field of education reform or CTE. WestEd used this information to identify key distinguishing features of effective CTE systems, to identify knowledge gaps, and to help shape the inquiry and instruments for the subsequent data collection efforts.

SURVEYS AND FOCUS GROUPS

Topics, terms, and audiences covered by data collection

The survey and focus group instruments included all the topics identified with the project team at the initiation of the project. These included:

- Local program evaluation, including an assessment of how the needs of special populations are being met
- Integration of academic and CTE curriculum
- Integration and application of rigorous academic curriculum and the California Career Technical Education Model Curriculum Standards
- Size, scope, and quality of CTE programs
- Articulation, coordination, and course alignment of instruction with feeder and advanced-level agencies
- Sequence of courses
- Sequenced curricular pathways
- Multiple entry and exit points
- Student preparedness in high-skill, high-wage, and high-demand established and emerging occupations
- Ability to meet local and community needs; ability to meet all student needs

- Industry involvement in program design, instruction, and assessment
- Basis of programs on occupational opportunities and job performance needs as determined by industry
- New and emerging occupations
- Supply of qualified CTE teachers and professional development of CTE teachers
- Career guidance K-14

Terms used in surveys and focus groups

This report utilizes terms and phrases that are sometimes have varying connotations. For clarity, below is presented a glossary of terms as they are used in this report.

- "Academic", an adjective used to describe teachers, skills, and curriculum, refers to reading, writing, math, and science, as taught separately from the occupational context in which they may be found. Where possible, the term "academic only (non-CTE)" is used in the report, as it was on the survey itself, to avoid suggestion that CTE programs are not "academic" and to acknowledge the academic and rigorous nature of high-quality CTE programs. When this phrase was too cumbersome, the text refers simply to "academic."

- "Soft skills" refer to what are also called "essential employability skills" or "workplace competencies," and include higher-order thinking and problem-solving skills, oral and written communication skills, and use of technology, among others (i.e.. all the SCANS Competencies plus Thinking Skills and Personal Qualities listed as SCANS Foundation Skills), in addition to other workplace skills. The term "soft" is used when quoting either survey and focus group respondents or other authors.

- "Integration" of curriculum refers to *both* infusion of basic academic skills and standards into CTE curricula *and* infusion of career themes and applied- and work-based learning into academic curricula. It also refers to coordination between CTE and academic instruction in such a way that the result for students is "synergistic" access to *both* academics and career technical context/content.

- "College" refers to both community college and four-year colleges and universities; where possible, the text refers to "postsecondary education or training" to avoid confusion.

- "Vocational" is used instead of CTE when citing other authors or materials that use this term.

- "Counseling" versus "advising": "Counseling" generally refers to the tasks performed by a credentialed counselor while "advising" is used generically for the functions performed by any other staff. The text avoids use of the term "counseling" alone, except in the cases where only counselors are being discussed.

- The term "Counselor/Advisor" is used throughout the report to refer to School and College-based Counselors and Career Advisors — staff located on or employed by

schools and colleges. "Community-based Counselors/Advisors" — staff working in the community, serving both in- and out-of-school youth – are referred to with this full term.

Categories and definitions of targeted respondent groups

Survey and focus group constituencies were defined as follows:

Administrators: Administrators working at the secondary or postsecondary level, including those working in districts, schools, colleges, county offices of education, ROCPs, and adult education programs.

CTE, Vocational, or Occupational Instructors: Instructors who teach CTE/occupational coursework at the secondary or postsecondary level, including those working in schools, colleges, county offices of education, ROCPs, and adult education programs.

Academic Only (Non-Occupational) Instructors: Individuals who teach reading, writing, math, science, and other non-CTE courses at the secondary or postsecondary level, including those working in schools, colleges, county offices of education, and adult education programs.

Counselors/Career Advisors – School/College: Those who play roles in a variety of areas related to course selection and student preparation for future education and careers. Examples include:

- Assisting students in making decisions about their class schedules
- Assisting students in setting goals
- Assisting students in exploring careers
- Brokering opportunities for career exploration or workplace experiences
- Providing career-related information to instructors

Intended respondents to the School/College Counselors/Career Advisors Survey included counselors, guidance staff, career technicians, and other non-instructional coordinators of career-related activities working at the secondary or postsecondary level in schools, colleges, county offices of education, ROCPs, and adult education programs.

Counselors/Career Advisors – Community-Based: Those who play roles in a variety of areas related to student/youth preparation for future education and careers. Examples include:

- Assisting students/youth in setting goals
- Assisting students/youth in exploring careers
- Brokering opportunities for career exploration or workplace experiences

Intended respondents to the Community-Based Counselors Survey included staff that work with students at the secondary or postsecondary level or out-of-school youth, but are *not* employed by the public school system.

Business/Industry Representatives: Employers and other representatives from business and industry, contacted through business and CTE advisory organizations.

In addition to the groups listed above, focus groups were conducted with three additional constituencies, defined as follows:

Special Populations Representatives: Administrators, staff and consultants who have expertise in working with special populations. Special populations include individuals with disabilities, individuals from economically disadvantaged families, individuals preparing for "non-traditional" training and employment (in career areas not traditional for their gender), single parents, displaced homemakers, and individuals with other barriers to educational achievement, including individuals with limited English proficiency.

Students: Secondary, postsecondary, and adult CTE students, and ROCP students.

Economic Development Representatives: Representatives from the California Community Colleges' Economic and Workforce Development Program strategic initiatives, and from various industry associations.

Surveys

Survey design

WestEd developed six online surveys (Appendix A) with the goal of capturing the perspectives of diverse stakeholder groups:

1) Administrators
2) CTE, Vocational, or Occupational Instructors
3) Academic Only (Non-Occupational) Instructors
4) Counselors/Career Advisors – School/College-Based
5) Counselors/Career Advisors – Community-Based
6) Business/Industry

WestEd worked closely with the CDE and CCCCO as well as the Working Resource Group in developing the survey and focus group questions. All surveys were reviewed in-depth and approved by both groups.

Surveys were designed to be detailed enough to meaningfully inform improvements in practice, yet short enough to be completed in approximately 25 minutes. Respondents entered through a web page whose address was provided on the invitation letter. Once on the front page, respondents selected the one survey that best fit their primary role. On their survey, educators were also asked to identify the type of organization for which they worked (e.g, School District, School, ROCP, Community College District, Community College Campus, County Office of Education, Adult Education, and "Other"). Business representatives were asked to select their primary industry from a provided list. Respondents were informed that their responses would remain anonymous and confidential.

Structure of questions

Questions to each of the groups were targeted to fit the audience, with some questions crossing surveys to obtain varying perspectives on the same issue. For example, the surveys asked almost identical questions of all the educators — administrators, CTE instructors, academic only (non-occupational) instructors, and counselors/advisors — on the challenges of integrating CTE and academic curricula.

To keep the surveys to a reasonable length and maximize the quality of responses, careful consideration was given in deciding which questions were included in the surveys and which were left for focus groups. Staff drew on the literature and the experience of the Working Resource Group to craft closed-ended, multiple-item questions in various formats on many topics for which there existed some previous knowledge on a given topic, leaving room for "other" responses. This allowed for aggregation of some responses while still generating unanticipated additional responses. For example, these types of questions were used in most of the cases when seeking information about the *challenges* in implementing various CTE strategies (e.g., integration of curricula, implementation of work-based learning, creation of pathways). However, when responses required more thoughtfulness — for example, when seeking *solutions* to challenges, examples from the field, and other "constructed" responses — staff asked the question in a focus group. This allowed for the generation of multiple ideas and rich discussion.

Focus of questions for each respondent group

The surveys varied in length, depending on the questions asked and relevance to different stakeholder groups. Targeting of questions kept each survey to a reasonable length. The distinct focus of the surveys for each group was as follows:

- **Administrators and instructors:** CTE-related strategies employed and challenges to implementation of such CTE practices as integrated curriculum and work-based learning.

- **Business/industry representatives:** Views regarding skills needed in the workplace and implementation issues related to their role as advisors to educators and in providing opportunities to students.

- **School/college counselors/career advisors:** Counseling and career guidance services provided on their campuses, their interactions with faculty on CTE-related issues, and their perceptions of CTE.

- **Community-based counselors:** On the request of the Working Resource Group, WestEd created a survey to be distributed through Youth Councils[31] for youth-serving staff located in community-based agencies, to ensure that the study had some input from individuals who work with youth outside of the schools.

[31] California's Youth Councils were formed under the Workforce Investment Act. Youth Councils "advise the local Workforce Investment Board on the use of WIA youth dollars…and assist in the identification, selection and monitoring of local service providers," (p. 8, New Ways to Work. (2003). *All Youth, One System: The YCi Guidebook*. Sebastopol, CA: The Youth Council Institute.)

Survey administration

Surveys were launched in May 2006. To make the survey available quickly to a broad cross-section of stakeholders, WestEd staff distributed surveys through a variety of professional organizations representing administrators, instructors, counselors, parents, industry groups, economic and workforce development agencies and others. CDE and CCCCO, together with WestEd, identified 96 such organizations. Educational organizations included both those directly involved with career technical education, such as the California Industrial and Technology Educators Association (CITEA), and organizations representing general educators and administrators, such as the California Teachers Association, the California Federation of Teachers, Association of California School Administrators (ACSA), and the California County Superintendent's Education Services Association (CCESSA). Also included were organizations outside of education, such as the California Workforce Investment Board, the California Chamber of Commerce, and the California Community College Chancellor's Office Workforce and Economic Development Health Care Initiative. See Appendix B for a complete list.

Surveys were distributed and administered via points of contact for each constituent group. Information about the surveys was sent to postsecondary organizations on May 22, 2006, and at CDE's request, the survey information to secondary organizations was sent on June 1, 2006. In order to allow the maximum number of survey responses and accommodate educators' busy schedules at the end of the school year, WestEd kept the surveys open for a month and a half. Staff closely monitored survey response rates and sent a reminder to all organizations on June 28 to encourage participation and additional responses. The survey was closed on July 15, 2006 in order to begin the data analysis phase.

In the survey invitation, organization leads were informed that paper surveys could be provided if online access was not available. Staff did not receive any requests for paper surveys but one recipient of the invitation made a request for assistance with postage so that he could send the invitation to his organization's 350 members by regular mail. Through the organizations' memberships and contacts, it is estimated that approximately 18,000 names were reached. However, given that many individuals belong to multiple organizations (some as many as four or five), it is believed that the unduplicated count of individuals receiving survey notifications was less than this.

A few of the survey participants encountered slight difficulties with the survey. Staff received emails or phone calls about login difficulties, which in most cases were due to a typing error or cookies (browser tracking). In the instance where participants contacted WestEd about which survey to complete, respondents were advised to complete the survey that best represented their primary role.

Survey responses

The timing of the surveys, determined by the state contract, was not optimal for the maximum response. Nevertheless, at the close of the surveys, 1,311 responses were received in the following categories:

Table 19. Survey responses by respondent group

Survey	Number of Responses
Administrators	409
CTE, Vocational, or Occupational Instructors	592
Academic Only (Non-Occupational) Instructors	165
Counselors/Career Advisors – School/College-Based	85
Counselors/Career Advisors – Community-Based	13
Business /Industry	47
Total	**1,311**

Four of these surveys (Administrator, CTE Instructor, Non-CTE Instructor, and Counselors/Career Advisors – School/College-Based) inquired about the survey taker's county and type of educational organization. This information is as follows:

Counties represented among educators

Respondents from 55 different counties completed surveys, with the highest survey response rate from Los Angeles (21.1%). (See Appendix C for a complete list of counties reported.)

Types of educational organizations represented

Educators (administrators, instructors, and counselors/advisors – school-based) were asked to select their organization affiliation. As shown in the tables below, there were a greater number of secondary respondents than postsecondary respondents, with 50.9% of the responses coming from secondary school/district employees and 28.1% from postsecondary colleges/districts, with the balance from ROCPs, county offices of education, adult education, and other programs.

Table 20. Type of organization by response group

Type of Educational Organization	Administrators		CTE Instructors		Academic Only (Non-Occupational) Instructors		Counselors/ Career Advisors – School/College-Based		Total	
	Number	%	Number	%	Number	%	Number	%	Number	%
Secondary - School	63	15.1%	301	50.3%	93	54.7%	7	8.2%	464	36.5%
Secondary - District	90	21.6%	37	6.2%	7	4.1%	39	45.9%	173	13.6%
Postsecondary - District	24	5.8%	0	0.0%	0	0.0%	0	0.0%	24	1.9%
Postsecondary - College	100	24.0%	163	27.2%	48	28.2%	17	20.0%	328	25.8%
County Office of Education	47	11.3%	3	0.5%	5	2.9%	2	2.4%	57	4.5%
Regional Occupational Center/Program	47	11.3%	56	9.4%	0	0.0%	8	9.4%	111	8.7%
Adult Education	26	6.2%	24	4.0%	4	2.4%	5	5.9%	59	4.6%
Other	19	4.6%	10	1.7%	8	4.7%	3	3.5%	40	3.1%
No Response/Missing	1	0.2%	5	0.8%	5	2.9%	4	4.7%	15	1.2%
Total types selected*	*417*	*100.0%*	*599*	*100.0%*	*170*	*100.0%*	*85*	*100.0%*	1,271	*100.0%*
Total respondents	**409**		**592**		**165**		**85**		**1,251^**	

**Respondents were allowed to select multiple types of organizations.*
^Community-based Counselors and Business/Industry Representatives were not asked this question.
All percentages were rounded to the nearest tenth.

Table 21. Secondary and postsecondary respondents

Type of Educational Organization	Administrators		CTE Instructors		Academic Only (Non-Occupational) Instructors		Counselors/Career Advisors – School/College-Based		Total	
	Number	%	Number	%	Number	%	Number	%	Number	%
Secondary School/District	153	55.2%	338	67.5%	100	67.6%	46	73.00%	637	64.4%
Postsecondary College/District	124	44.8%	163	32.5%	48	32.4%	17	27.0%	352	35.6%
Total	**277**	**100%**	**501**	**100%**	**148**	**100%**	**63**	**100%**	**989**	**100%**

**Respondents were allowed to select multiple types of organizations.*
All percentages were rounded to the nearest tenth.

Roles represented within educational organizations

Administrators categorized their roles within their organizations in various ways. The most frequently identified roles for administrators were Director (28.4%) and Coordinator (20.5%). For those working in a secondary school, nearly a quarter selected "other" to define their roles. These included Perkins administrators, trustees, and program directors.

Table 22. Secondary administrator respondents' roles

Role selected	Number	Percent Respondents
Superintendent	9	3.4%
Assistant Superintendent	12	4.5%
Principal	36	13.4%
Vice Principal	20	7.5%
Director	76	28.4%
Coordinator	55	20.5%
Other	60	22.4%
Total responses with role selected	**268**	**100%**

All percentages were rounded to the nearest tenth.

Similarly, almost 31% of postsecondary administrators selected "other" to define their roles. Many of these postsecondary respondents referred to themselves in leadership roles, but not in the categories provided of Chief Executive Officer, Chief Instructional Officer, Chief Student Services Officer, or Business Officer. The most frequently selected roles were Dean (37.6%) and Director (25.6%).

Table 23. Postsecondary administrator respondents' roles

Selection	Number	Percent Respondents
Chief Executive Officer (CEO)	1	.8%
Chief Instructional Officer (CIO)	1	.8%
Chief Student Services Officer (CSSO)	3	2.3%
Business Officer	3	2.3%
Dean	50	37.6%
Director	34	25.6%
Other	41	30.8%
Total responses with role selected	**133**	**100%**

All percentages were rounded to the nearest tenth.

Career areas and academic disciplines represented

The CTE instructors surveyed represented a variety of career areas. In recognition that some instructors work in multiple career areas, respondents were allowed to select all career areas in which they work. Among 592 respondents, 877 career areas were selected. The two most highly represented were Agriculture and Natural Resources (22.6%) and Information Technology

(21.1%). Career areas that were the least represented were Energy and Utilities (1.7%) and Public Services (2.4%).

Table 24. CTE instructor respondents by career area

	Career Areas	Number	Percent Respondents
1	Agriculture and Natural Resources	134	22.6%
2	Arts, Media, and Entertainment	67	11.3%
3	Building Trades and Construction	61	10.3%
4	Education, Child Development, and Family Services	62	10.5%
5	Energy and Utilities	10	1.7%
6	Engineering and Design	51	8.7%
7	Fashion and Interior Design	35	5.9%
8	Finance and Business	70	11.8%
9	Health Sciences and Medical Technology	53	9.0%
10	Hospitality, Tourism, and Recreation	40	6.8%
11	Information Technology	125	21.1%
12	Manufacturing and Product Development	41	6.9%
13	Marketing, Sales, and Service	55	9.3%
14	Public Services	14	2.4%
15	Transportation	59	10.0%
	Total areas selected	**877***	
	Total respondents	**592**	

**Respondents were allowed to select multiple career areas.*
All percentages were rounded to the nearest tenth.

Academic only (non-occupational) instructors were asked to report their discipline. Again, respondents were allowed to select multiple disciplines. All of the core disciplines were represented. Science was the most frequently selected discipline at 33.3%, followed by English Language Arts (31.5%).

Table 25. Academic only (non-occupational) instructor respondents by discipline area

Discipline Area	Number	Percent Respondents
Science	55	33.3%
English Language Arts	52	31.5%
History/Social Studies	38	23.0%
Mathematics	36	21.8%
Visual/Performing Arts	30	18.2%
Total disciplines selected	**211***	
Total responses	**165**	

**Respondents were allowed to select multiple disciplines.*
All percentages were rounded to the nearest tenth.

Focus Groups

Focus group purpose and protocols

WestEd developed interview and focus group protocols to further its investigation and clarify and amplify the survey results. In addition to seeking greater depth of understanding from those who were sent surveys, staff also sought input from stakeholder groups that did not receive surveys: parents, students, and representatives from the economic and workforce development sector. WestEd also developed questions specifically for practitioners working with special populations to obtain more targeted, in-depth information, beyond that sought through the surveys.

Given the limited time available for data collection, WestEd again worked with the CDE and CCCCO staff to identify organizations and associations from which to solicit representatives for 10 focus groups. This list was then approved by the project's Working Resource Group. Adequate representation across the state was sought with respect to geographic location, urbanicity, program type and career area, as appropriate.

All focus group questions and protocols were reviewed in-depth and approved by both the CDE and CCCCO staff and the Working Resource Group.

Focus group implementation

Participants were invited via email in a two-step process. First, an email was sent letting prospective participants know that they had been nominated to participate in a focus group for the CTE Needs Assessment and asking that they respond with their interest and availability. If there was no response, WestEd staff followed up with a phone call to answer questions and gauge interest. Once participants confirmed their availability and willingness to participate, they were sent a second email confirming the time, date and access information for the focus group. Two sample emails are located in Appendix D. With the invitation emails, participants were also provided with a copy of the questions to be asked (see Appendix E for full interview protocol questions). Staff also faxed these to them upon request.

In addition, WestEd gained expedited human subjects approval from its Institutional Review Board (IRB). The IRB approved all written invitations, questions, and consent forms for this project. All prospective participants received a "Consent for Focus Group" form (see Appendix F), informing them about how their confidentiality and privacy would be maintained. WestEd filed a waiver of documentation of consent with the IRB, and it was agreed that non-minor participants' participation would serve as their formal consent. In this case, written consent was not mandatory for participation. Minor students were provided a similar consent form (with more basic language), and WestEd also requested consent from their parents (in addition to themselves) by email, fax, or telephone.

Most of the focus groups were conducted by conference call. For three of these focus groups, attendees were provided the additional option of video conferencing, but not enough participants were able to travel to the video conference sites. Several participants traveled to WestEd or the California Community College Chancellor's Office (CCCCO) to participate in person,

specifically for the Special Populations' focus group (two people in Sacramento in addition to WestEd staff) and the Administrators' focus group (one person in WestEd's San Francisco office and one person in WestEd's Los Alamitos office), which allowed for some face-to-face discussions. Due to low participation in the initial student focus groups, WestEd held a second focus group in person with CTE students at a high school in Richmond, California to collect more data.

Due to the time of year, WestEd made a large effort in recruiting focus group participants to ensure maximum participation, and timed the groups when the most participants could be available. Most recruiting efforts proved fruitful, as the majority of the focus groups went smoothly and produced lively discussions. However, the parent and student focus group recruitment was very difficult. For this reason, WestEd conducted one-on-one interviews with a parent of two high school CTE students and with a leader in the California PTA. Staff, after discussion with CDE, also conducted additional focus groups with students. Counselors were also difficult to recruit, and because of this, staff held an additional focus group with two counselors from comprehensive high schools, as well as an interview with an education program consultant with CDE's Counseling, Student Support and Service-Learning Office.

Following the October Working Resource Group meeting in Sacramento, CDE asked WestEd to conduct several additional focus groups, with community college and ROCP students. WestEd held three additional student focus groups. These included two focus groups with community college students and one ROCP focus group (a class in Northern California).

The focus groups included the following:

<u>Administrators and staff representing Special Populations groups</u> (one group, face-to-face and via conference call for those not available to travel; 6 participants)

Special populations for the Perkins Act include Single Parents, Displaced Homemakers, Economically Disadvantaged, Limited English Proficient, Students with Disabilities, and Nontraditional Students.

- Community college (2)
- ROCP (1)
- High school (1)
- Joint Special Populations Advisory Committee (1)
- Consultant (1)

speaking about their experiences working with:

- Single parents
- Displaced homemakers
- Limited English proficient students
- Students with disabilities
- Special education students
- Economically disadvantaged students
- Re-entry students
- At-risk youth

Representatives from business and economic and workforce development organizations (one group, via conference call; 9 participants)

- California Community Colleges, Economic and Workforce Development Program Advanced Transportation Technology Initiative
- California Community Colleges, Economic and Workforce Development Program Applied Competitive Technologies Initiative
- California Community Colleges, Economic and Workforce Development Program, IT
- California Community Colleges, Economic and Workforce Development Program Business and Workforce Performance Improvement Initiative (BWPI)
- California Community Colleges, Economic and Workforce Development Program Environment, Health, Safety and Homeland Security – EHS (REBRAC)
- California Community Colleges Los Angeles/Orange Regional Consortia
- California Manufacturing and Technology Association
- Los Angeles Chamber of Commerce/United LA
- Small Manufacturers' Institute

Administrators of high schools, community colleges, Regional Occupational Centers/Programs, adult education programs (two groups, via conference call; 6 participants)

- County office of education (2)
- School district (1)
- ROCP (1)
- Community college (1)
- Magnet high school (1)

Career technical education instructors (two groups via conference call: 6 secondary CTE Instructors and 9 postsecondary CTE Instructors)

- Farming/Agriculture
- Automotive
- Culinary/Home Economics
- Drafting/Architecture/Urban Planning/Woodworking
- Horticulture
- Computer Services Technology
- Natural Resources
- Business/Technology

Counselors/advisors (two groups, via conference call; 6 participants)

- ROCP (1)
- Community college (1)
- Consultant, county office of education (1)
- Community-based counselor (1)
- Comprehensive high school counselors (2)

Career technical education students, nominated by advisors of their respective CTE student organizations (one group via conference call with two career academy graduates, and a supplemental group in person at an area high school; three additional focus groups including,

two with community college students and one with ROCP students; 27 student participants over five focus groups)

- Agriculture Studies (2)
- Automotive (2)
- Construction (7)
- Culinary/Home Economics (1)
- Education (8)
- Health (7)

Trained WestEd interviewers and facilitators conducted these sessions. Each focus group had a facilitator and recorder. In addition, focus groups were digitally recorded via our conference call service to support accurate note taking. These recordings and notes will not be available to anyone outside the project team. All participant names remain confidential.

DATA ANALYSIS AND INTERPRETATION

Staff analyzed both quantitative and qualitative survey results, first by survey and then across surveys on similar topics. Frequency distributions were calculated for all responses and open-ended responses were coded to identify themes. Data were also disaggregated by the respondents' organizational affiliations, and where meaningful, disaggregated by secondary versus postsecondary instructors. Note that the category of secondary instructors does *not* include ROCP instructors.

To produce a rich analysis, staff who participated in the focus groups were responsible for summarizing the data for their respective focus groups and then for integrating these results with survey data in specific areas, using common guidelines to ensure systematic analysis and overall coherence.

As the parameters of the study precluded scientific sampling, the resulting sample of survey respondents for the study may be biased in certain ways. For example, it is likely that the academic only/non-CTE instructors who completed the survey are not representative of academic teachers in California, but rather, include a disproportionate number of academic instructors who are actively engaged with CTE programs. The same can be said for administrators and counselors/advisors who responded. As such, the findings regarding support for and participation in CTE may be higher than might have been reported with a random statewide sample of non-CTE instructors, administrators, and counselors/advisors. In summary, the results of the needs assessment survey and focus groups should provide a useful picture of CTE needs, but should be interpreted with care.

LITERATURE REVIEW

The following literature review serves as the foundation for the needs assessment, suggesting areas for CTE improvement in California and helping in the identification of key issues for the data collection efforts. It is organized into four sections. It begins with a brief overview of the need for high-quality CTE in light of economic globalization and current educational outcomes. Second, CTE's role in education reform and in the preparation of the skilled workforce required for healthy state and national economies is examined. The third section discusses effective CTE models and practices being implemented in other states and in California that can inform future improvements in California's CTE programs. The final section summarizes distinguishing features of effective CTE practice distilled from the previous sections.

ECONOMIC GLOBALIZATION AND THE NEED TO BETTER PREPARE STUDENTS FOR WORK AND LIFE BEYOND THE CLASSROOM

California and the nation are facing a "perfect storm," as economic, demographic, and educational forces conspire to create a potential shortage of skills that threatens both the state's economy and individuals' economic security. Global markets and international competition are creating pressure to develop a highly skilled "knowledge" workforce. Soon, the baby boom generation will be retiring, with fewer workers in the 25- to 54-year-old age group behind it. At the same time, there is evidence that the replacement workers will have lower levels of education and skill. Industry and policymakers call for significant improvements in education and career technical education — including close alignment of education with workforce and economic development efforts — to maintain our nation's global competitiveness, ensure economic development for communities, and ensure economic stability for individuals (U.S. Chamber of Commerce, 2006).

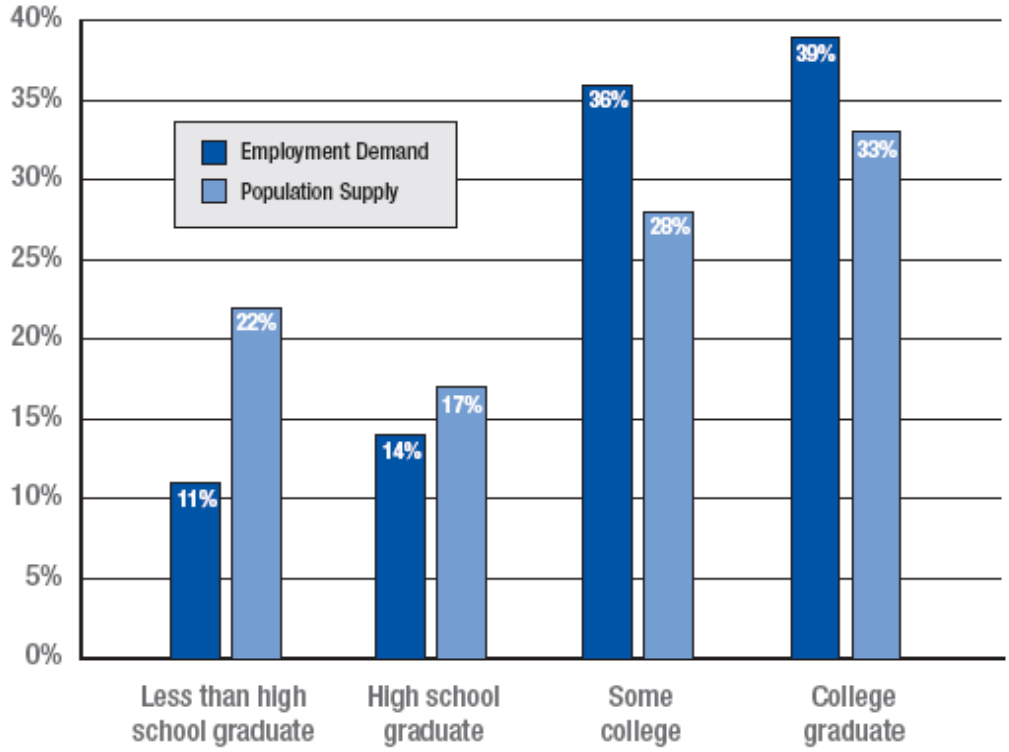
The need for workplace skills

Thomas Friedman in his 2005 book, *The World is Flat,* describes an increasingly interconnected global economy where the competitive playing field between industrial and emerging market countries is "flattening." Globalization is not a new phenomenon, but has become increasingly visible since the 1980s with the advent of technological innovations that have made it easier and faster to complete both trade and financial transactions internationally. With this increasing international competition comes the need for American workers to develop and maintain high-level "knowledge skills" (Friedman, 2005; IMF, 2002; U.S. Chamber of Commerce, 2006): "….American individuals have nothing to worry about from a flat world — provided we roll up our sleeves, be ready to compete, [and] get every individual to think about how he or she upgrades his or her educational skills…" (Friedman, 2005, p. 252).

In 1950, 80% of jobs were classified as "unskilled." By 2003, an estimated 85% of jobs were classified as "skilled," requiring education beyond high school. It is projected that 60% of future jobs will require training that only 20% of today's workers possess (Business–Higher Education Forum, 2003). The Public Policy Institute of California also projects that by the year 2020, 36% of jobs will require "some college," and an additional 39% of jobs will require a college degree, as seen in Figure 6. Unfortunately, if current trends persist, the population supply will not meet

the demand: only 28% of the population is expected to have "some college" and 33% will obtain a college degree.

Figure 6. Education projections for 2020: employment demand and population



Source: Public Policy Institute of California, 2005

In addition, the U.S. Department of Labor, Bureau of Labor Statistics (2005) projects that by the year 2014, 80% of the 30 fastest growing jobs will require education beyond high school: one will require a postsecondary CTE certificate, seven will require an associate's degree, while 16 will require a bachelor's degree or higher. In California, of the 10 fastest growing occupations, seven will require some postsecondary education (California Occupational Projections 2004-2014).

As the economy continues to shift from an industrial to a knowledge orientation, individuals with no postsecondary education or training will find it difficult to move beyond subsistence level jobs (Jenkins, 2006). Adults age 18 and older with only a high school diploma earned only $28,645 per year, according to tabulations released in October 2006 by the U.S. Census Bureau, and those without a high school diploma earned an average of only $19,169. By contrast, graduates with a bachelor's degree earned an average of $51,554 in 2004 (U.S. Census Bureau).

Beyond the need for high levels of education, the workplace is seeking new skills: facility with technology, entrepreneurship, the ability to continue learning, among many other basic "employability" skills (Carnevale, Gainer, & Meltzer, 1990; Jenkins, 2006; Murnane & Levy, 1996).

Policymakers and business leaders agree on the need to ensure that workers have the skills that they need to succeed and that businesses need to stay competitive. David Sampson, Deputy Secretary of the U.S. Department of Commerce, comments that "unless the skills gap within the United States is closed and employers can find the workers they need, and job seekers have the skills to pursue the opportunities that will exist, then America's economy will remain vulnerable" (National Council for Workforce Education [NCWE], 2006, p. 1).

The projected shortage of skills

The threat of a skill shortage posed by the global economy is exacerbated by the impending retirement of the highly skilled baby boom generation, which, according to Thomas Tierney, National Center for Public Policy and Higher Education, "produced so many new workers that it didn't matter that our education system had moved only a fraction of them through post-high-school training or schooling." While the U.S. workforce expanded by almost 50% between 1980 and 2000, current projected labor-force growth is only 16% over the next two decades (Tierney, n.d.).

At the same time, the education system is not adequately preparing students for the workforce, as evidenced by the high school dropout rates, generally low academic expectations, low secondary-to-postsecondary transition rates, and the need for college remediation. According to a 2005 national survey of high school graduates, college instructors, and employers commissioned by Achieve, Inc., as many as 40% of American public high school graduates are unprepared for both college and work (Peter D. Hart Research Associates & Public Opinion Strategies, 2005).

A November 2005 study conducted by the Congressional Research Bureau found that between one-quarter and one-third of all students fail to graduate from public high schools in California,[32] and African American and Latino students are less likely to graduate from high school compared to Asian or White students (de Cos, 2005; California Performance Review, 2004). This is an issue that affects all levels of society, as high school dropouts are twice as likely as their graduating classmates to slip into poverty and be unemployed (Bill and Melinda Gates Foundation, 2006a). In 2004, nearly three-quarters of all high school dropouts did not have jobs.

Even while in school, many students are not taking rigorous courses. A 2001 report of the National Commission On the High School Senior Year stated that among 1998 graduates, just 44% earned the minimum number of academic credits recommended by the National Commission on Excellence in Education in its report, *A Nation at Risk* (Hull, 2005).

In addition, the National Research Council Report (2004) found that between 40-60% of all high school students were chronically disengaged. WestEd's California school climate survey corroborates this finding. Recent data revealed that only 4% of high school staff felt "nearly all"

[32] The statistic varies depending on the way that dropout rates are calculated. The basic completion ratio graduation rate, which compares 9th grade enrollment to the number of students who graduated, found that only 70.7 % of California students from the class of 2004 graduated from high school. This basic completion method yields a high school dropout rate of nearly 30%.

students were motivated to learn; 46% of staff reported that "most" students were motivated, and 50% reported that "some/few/almost none" of the students were motivated to learn (WestEd, 2006). The National Research Council Report concluded that in most high schools, unless students "come with their own intrinsic motivation to learn (or at least to get good grades), they are likely to feel alienated from their teachers and coursework" (Hill, 2005, p. 23).

Of the students completing high school, close to 70% go on to either two-year or four-year colleges. But, of those who continue to college, only half earn a degree within six years (Tucker, 2004); only 15% of high school graduates earn a four-year college diploma within 10 years after high school (Hill, 2005).

Once in college, many students need remediation. A report sponsored by the U.S. Department of Education states that, as of 2000, 76% of Title IV degree-granting postsecondary institutions that enrolled freshmen offered remedial courses in reading, writing, or mathematics. Public two-year institutions had the overall highest incidence of remedial courses, with some 98% providing such courses, and with 42% of their first-year students enrolled in at least one pre-collegiate course (Parsad & Lewis, 2003). In California, according to the California Community Colleges' Strategic Plan, only 26% of the state's community college students are taking rigorous courses, compared with 66% in the top-performing states (Community Colleges System Strategic Plan Steering Committee, 2006).

However, even completing programs or taking "rigorous" courses may not be enough. Many have suggested that the current secondary, and to a lesser extent postsecondary, systems are still operating using the "industrial age model" of education and not yet preparing students for the new knowledge economy (Gray, 2004; Hoachlander, 2006; Kazis, 2005; Stone III, Alfeld, Pearson, Lewis, & Jensen, 2005). Writing in 1996, Murnane and Levy asserted that during the previous 20 years, the skills required to succeed in the economy had changed radically, but the skills taught in most schools had changed very little. In 2006, the situation appears to be no better. According to Partnerships for 21st Century Skills (2006), there are still "wide gaps between the skills that businesses value and the skills most graduates actually have" (p. 8).

Given the lack of skills available in the local economy, many employers are looking abroad for talent. In *Is High School Career Technical Education Obsolete?*, Gray (2004) argues that during the 1990s over a million foreign-born workers were admitted to the U.S. to fill mostly technical jobs because the U.S. had not adequately trained enough technicians for a new and growing industry. As Tierney (2006) comments:

> *We face…the emergence of a knowledge-based economy, whose demand for highly trained and educated workers is greater and faster growing than we have ever seen before. We also face fierce global competitors…. Thus, the new reality: If our nation and our states can't assure employers a large and growing labor pool of people with competencies beyond those taught in high school, other nations assuredly will. With the "outsourcing" of high-end jobs, we are already seeing this happen.* (p. 7)

The need for programmatic and systemic reform

Numerous studies confirm the need for educational reform, both to ensure that all students succeed by traditional measures (achievement tests, high school graduation, transition postsecondary training/education, certification, and transition to employment) and that they are prepared for the global economy they will enter (2001 CEO Forum School Technology and Readiness Report; ACTE, 2006a; Brand, 2003a; California Career Technical Education Curriculum Framework, 2006; DeLuca, Plank, & Estacion, 2006; Gray, 2004; Hill, 2005; Hoachlander, 2006; Kazis, 2005; Levesque, 2000; Silverberg, Warner, Fong, & Goodwin, 2004; Partnerships for 21st Century Skills, 2006; Stone III et al., 2005; Comprehensive School Reform Quality Center [CSRQ], 2005). The International Monetary Fund and the U.S. Chamber of Commerce specifically call for improved education and career technical education to ensure that students have the "right skills" to succeed in the changing economy (IMF, 2002; U.S. Chamber of Commerce, 2006). At the postsecondary level, community colleges make the case for *systemic* reform, to work with their K-12, business, and community partners in creating coherent "pathways" that will ensure economic stability for individuals and economic development for communities (Jenkins, 2006; National Council for Workforce Education, 2006).

A recent study conducted by WestEd, "High School Reform: National and State Trends" (Walcott, Owens-West, & Makkonen, 2005), highlights the need for more academic rigor in courses to prepare students for both higher education and the workplace.

> *When asked about which skills they find most basic and useful for their employees, officials from the manufacturing sector to financial services cite strong reading, writing, and research skills, as well as a solid understanding of algebra, geometry, and statistics. In short, the skills needed for success in college and in work are converging. Unfortunately, far too many U.S. high schools are not keeping up with the changing demands and, therefore, are not adequately preparing their students for either arena.* (p. 3)

Bill Gates (2005), in a statement on behalf of the Bill and Melinda Gates Foundation, goes a step further:

> *American high schools are obsolete. By obsolete, I mean that our high schools, even when they are working exactly as designed, cannot teach our kids what they need to know today. Training the workforce of tomorrow with high schools of today is like trying to teach kids about today's computers on a 50-year-old mainframe. It's the wrong tool for the times.*

Beyond improving academic rigor in the classroom, ensuring that students gain "employable" skills, or even transforming schools, *systemic* change is required to ensure that students can succeed over a lifetime of learning. This is of particular concern to the community colleges that serve an increasingly diverse population, including low-skill workers needing advancement, students seeking transfer to four-year institutions, and incumbent or dislocated workers seeking retraining, while also aiming to meet the economic development needs of their regions. According to Jenkins (2006), "given the importance of postsecondary education and training to the economic health of both individuals and regions, maximizing the return on the public's

investment in education must be a top priority" (p. 4). Likening the current system to "a sieve," rather than "a pipeline," he posits a career pathway system that will align publicly supported systems and programs to build a "knowledge-economy workforce" customized to the local labor markets, enabling individuals to secure employment and advance within those sectors.

In summary, the global economy increasingly requires a highly educated workforce, with not only academic skills but technical and "new" basic skills, including the ability to continue learning over time. To meet this need, education must improve the quality of its programs and coordinate closely with workforce and economic development systems to create coherent pathways that will promote economic development for communities and economic stability for individuals.

CTE'S ROLE IN EDUCATION REFORM AND IN THE PREPARATION OF A SKILLED WORKFORCE

In this section, current thinking about how best to design and structure CTE to ensure that students succeed and to deliver the skills needed in the workplace is examined. Discussion begins with K-12 education reform efforts that can provide lessons for effective implementation of CTE programs, with research, when available, that supports claims of effectiveness. Then the role of CTE in both education reform and preparing students for the workplace is considered. Finally, the literature on characteristics of high-quality CTE is summarized.

Lessons from K-12 education reform

Numerous reform efforts have been launched to better engage students and prepare them for their future endeavors. "Works in Progress" (2006), a publication of the Comprehensive School Quality Center CSRQ, Kazis (2005), as well as Walcott, Owens-West, and Makkonen (2005), highlight several programs for their innovation and educational outcomes. Among these are Comprehensive School Reform (CSR) models, which focus on smaller learning communities and student engagement. Such models have been adopted by scores of schools around the country. Research on CSR models indicates that many of the models show evidence of improving student engagement, retention, and learning. The High Schools That Work (HSTW) model, one of the most comprehensive, is described below. Other examples of CSR models are included in Appendix G.

High Schools That Work: A comprehensive reform model

High Schools That Work (HSTW) is a comprehensive school reform model that combines quality career technical studies with challenging college-preparatory academics to prepare all high school students for successful postsecondary experiences, regardless of the career path they choose. The program combines real-world, applied learning experiences with the rigorous academic content that traditionally was reserved for the "college prep" track. As stated by Kazis (2005), "It's not an "either/or" but a "both/and" proposition" (p. 33). The schools also provide guidance and student support and encourage teachers to collaborate on the development of challenging curricula. Ten key practices are essential to HSTW (SREB, 2006). They include:

1) **High expectations.** Motivate more students to meet high expectations by integrating high expectations into classroom practices and giving students frequent feedback.

2) **Program of study.** Require each student to complete an upgraded academic core and a concentration.
3) **Academic studies.** Teach more students the essential concepts of the college-preparatory curriculum by encouraging them to apply academic content and skills to real–world problems and projects.
4) **Career/technical studies.** Provide more students access to intellectually challenging career/technical studies in high-demand fields that emphasize the higher-level mathematics, science, literacy and problem-solving skills needed in the workplace and in further education.
5) **Work-based learning.** Enable students and their parents to choose from programs that integrate challenging high school studies and work-based learning and are planned by educators, employers and students.
6) **Teachers working together.** Provide teams of teachers from several disciplines the time and support to work together to help students succeed in challenging academic and career/technical studies. Integrate reading, writing and speaking as strategies for learning into all parts of the curriculum and integrate mathematics into science and career/technical classrooms.
7) **Students actively engaged.** Engage students in academic and career/technical classrooms in rigorous and challenging proficient-level assignments using research — based instructional strategies and technology.
8) **Guidance.** Involve students and their parents in a guidance and advisement system that develops positive relationships and ensures completion of an accelerated program of study with an academic or career/technical concentration. Provide each student with the same mentor throughout high school to assist with setting goals, selecting courses, reviewing the student's progress and suggesting appropriate interventions as necessary. **I**
9) **Extra help.** Provide a structured system of extra help to assist students in completing accelerated programs of study with high-level academic and technical content.
10) **Culture of continuous improvement.** Use student assessment and program evaluation data to continuously improve school culture, organization, management, curriculum and instruction to advance student learning.

The model does not have a specific curriculum. Rather, it requires that all students participate in a challenging sequence of courses intended to make them successful graduates, regardless of their career choices.

Effective HSTW design in schools has been shown in the research to yield notable benefits: higher student achievement in areas such as math, reading, and science; higher course completion rates; and narrower gaps in achievement between African American and White students (Walcott, Owens-West, & Makkonen, 2005).

Learning communities

Learning communities are organizational structures within educational or other organizations, and constitute “a variety of curricular approaches that intentionally link or cluster two or more courses, often around an interdisciplinary theme or problem, and enroll a common cohort of students” (Smith, MacGregor, Matthews, & Gabelnick, 2004, p. 20). They involve an intentional

restructuring of time, credit, and learning experiences for students and are intended to "build community, enhance learning, and foster connections among students, faculty and disciplines" (Ibid.).

Smaller Learning Communities at the secondary level

At the secondary level, the federally funded Smaller Learning Communities (SLC) Program was created to provide fiscal resources to schools and districts to convert large comprehensive high schools into smaller learning communities. The Office of Elementary and Secondary Education (OESE) in the U.S. Department of Education (2006) administers the program. The research basis for smaller learning communities, as provided on the Department's web site, includes the following:

- Smaller learning environments are a condition for boosting student achievement (Williams, 1990).
- School size has positive effects on student outcomes as evidenced by students' attendance rates, frequency of disciplinary actions, school loyalty, use of alcohol or drugs, satisfaction with school and self-esteem (Raywid, 1995; Klonsky, 1995).
- An effective size for secondary schools is in the range of 400-800 students (Williams, 1990).
- Enrollment size has a stronger effect on learning in schools with large concentrations of poor and minority children (Cotton, 1996).
- Research ultimately confirms what parents intuitively believe: that smaller schools are safer and more productive because students feel less alienated, more nurtured and more connected to caring adults, and teachers feel that they have more opportunity to get to know and support their students (Fowler & Walberg, 1991; Gregory, 1992; Stockard & Mayberry, 1992).

According to Rose Owens-West (2006), Director of the Regional Smaller Learning Communities Technical Assistance Center serving Arizona, California, and Nevada, characteristics of successful SLCs include:

- A focus on teaching and learning, rather than on structure
- Teacher collaboration
- Differentiated instruction
- Assessment to guide instruction
- Teacher professional development
- Challenging curriculum
- Instructional leadership

In citing findings from a study of over 50 such smaller learning communities, Walcott, Owens-West, and Makkonen (2005) emphasize that "when done well, smaller learning communities result in higher student achievement, especially among low-income and minority students, stronger feelings of affiliation and belonging, …lower dropout rates, higher college attendance rates, …a stronger sense of efficacy among teachers, and a high-quality curriculum" (p. 33).

Learning communities at the postsecondary level

Learning communities are increasingly being implemented in community colleges as well. The Washington Center for Undergraduate Education at Evergreen State College, founded in 1985 and supported by the Fund for the Improvement of Postsecondary Education (FIPSE) and the Pew Charitable Trusts, has served as a strong advocate for the learning communities movement (Price, 2005). Some 284 learning communities — at both two-year and four-year colleges — were listed on the online directory of the National Learning Commons as of November 13, 2006 (Washington Center, 2006).

A growing body of research is emerging on learning communities at the college level. Research launched by MDRC in 2002 includes an evaluation of the Kingsborough Community College in Brooklyn, New York, which provided "robust evidence" of the impact of learning communities on success among low-income students. Results of this study indicate that learning community students "achieve higher course-pass rates and are more likely to complete their developmental English requirements one year later" (Price, p. 2). However, the study did not show an "apparent impact on semester-to-semester retention" (Ibid.).

MDRC, in partnership with the national, multiyear learning communities' initiative "Achieving the Dream: Community College Counts," is undertaking evaluative research on community colleges with at least 33% enrollment of racial minorities or low-income enrollment of at least 50%. Among the 27 community colleges with the first cohort under the Achieving the Dream initiative, 13 have identified learning communities as an intervention strategy that could have positive effects on student success (Price, 2005). Future research on the experiences at these schools will offer more conclusive evidence on the relationship of learning communities and student success at the community college level.

Career academies

Career academies are usually small learning communities with a broad career theme. They are formed as a school-within-a-school and consist of a group of students who take academic and CTE classes together for at least two years with a team of teachers from different disciplines. Career academies typically integrate their career focus into the academic curriculum and emphasize student achievement and positive postsecondary outcomes. They also develop partnerships with employers, the community, and local colleges, and may require completion of activities, products, or courses beyond those that their host high school mandates for graduation. Employers also serve as advisors, mentors, and speakers, and provide opportunities such as field trips, internships, and entry-level jobs.

MDRC has conducted an ongoing evaluation of the experiences of 1400 young people in career academy settings in nine high schools across the nation. This study found that "career academies substantially improved the labor market prospects of young men ... [especially] among academy group members who were at high- or medium-risk of dropping out of high school when they entered the programs" (Kemple & Scott-Clayton, 2004, p. iii). The study's authors note that these "findings demonstrate the feasibility of improving labor market prospects and successful school-to-work transitions without compromising academic goals and preparation for college …

Career academies are one of the few youth-focused interventions that have been found to improve the labor market prospects of young men" (Ibid.). Career academies have also demonstrated outcomes such as increased attendance; decreased behavioral problems such as suspension; increased graduation rates for both at-risk and general populations; and increased transition to postsecondary education and training (Stern, Dayton, & Raby, 2000).

Further, a summary of evaluations that MDRC conducted on career academies, First Things First, and Talent Development, discusses "strong evidence about each intervention's effects" (Quint, 2006, p. iii). The summary noted the following conclusions:

- Small learning communities and faculty advisory systems can increase students' feelings of connectedness to their teachers.
- Extended class periods, special catch-up courses, high-quality curricula, training on these curricula, and efforts to create professional learning communities can improve student achievement.
- School-employer partnerships that involve career awareness activities and internships can help students attain higher earnings after high school.
- Students who enter 9th grade facing substantial academic deficits can make good progress if they receive special support, including access to caring teachers and special courses.

Middle College High Schools

The California Community Colleges have created an initiative called Middle College High Schools (MCHS), which enable high-potential "at-risk" students to obtain a high school education while concurrently receiving direct access to college courses and services. MCHSs are high schools located on community college campuses. Students earn credit toward a high school diploma while having the opportunity to concurrently take college courses and receive more intensive counseling and administrative attention.

Program goals include reducing high school dropout rates by improving the academic skills, self-concept and self-esteem, and decision-making skills of participating students. Through participation in MCHS, transfer rates, student retention, persistence, and career opportunities are enhanced. MCHS provides reduced class size and curricula responsive to student needs that are linked with effective support services. Shared characteristics of MCHSs include:

- Formal collaboration between the high school and the college.
- Location on a college campus and integration into the college, with faculty and students sharing educational resources.
- Coordination of college and high school schedules and calendars.
- Authorization to grant a high school diploma.
- School size that is small, yet large enough to sustain the school's unique classes and programs.
- Heterogeneous grouping of students.
- Implementation of collaborative, project-centered, interdisciplinary curricula.
- Expanded teacher role in school governance.

- Expectation that teachers are teacher/counselors within a structured system of support for students.
- Ongoing embedded professional development.
- Student outcomes measured by multiple assessments including performance-based assessments.
- Empowerment of students through formal leadership roles in school governance, in guidance programs such as peer counseling, and in academic support services such as peer tutoring.
- Career education or community service as part of graduation requirement.

Foundation-driven reform efforts

Foundations have also played important roles in catalyzing education reforms. Examples include the work of the Bill and Melinda Gates Foundation's Early College High Schools and Model High Schools, The James Irvine Foundation's ConnectEd Initiative, the Ohio High School Transformation Initiative, and the Carnegie Corporation Schools for a New Society Initiative.

Bill and Melinda Gates Foundation Early College High Schools

The Bill and Melinda Gates Foundation, with the Carnegie Corporation of New York, the Ford Foundation, and the W.K. Kellogg Foundation, has provided funding to establish more than 170 Early College High Schools by 2008. In crafting its vision and goals, the Early College High School (ECHS) Initiative draws on lessons learned from the experiences of dual-enrollment programs and small schools, studies of time wasted in the senior year, and existing examples of institutions that combine high school and college (College High School Initiative, 2006).

Each high school works closely with a partner college or university to expose its students to the resources, rigor, and intensity of college-level academics, while still providing appropriate personal support. The schools also aim to reduce the time and the money ultimately needed to earn a postsecondary degree.

Early College High Schools are small schools from which all students graduate with an Associate of Arts degree or enough college credits to enter a four-year baccalaureate program as a college junior. They share the characteristics of effective small schools including:

- Personalized learning environments
- A common focus
- Small learning communities (maximum of 400 students per school and no more than 100 per grade)
- An emphasis on adult-student relationships

In addition, Early College High Schools are often located on a college campus in order to increase motivation and collaboration. Students are treated as college students and see themselves as college completers (CSRQ, 2005). Schools are autonomous and develop a governance structure that allows everyone's voice to be heard and respected in the decision-making process with regard to hiring personnel, managing budgets, determining curriculum and

pedagogy, developing students' activities, and any other policies that affect the daily life of students and faculty. The schools also offer a unique opportunity for traditionally underserved students to earn a high school diploma and college credit. The ultimate aim of ECHS is not only to increase high school graduation rates but also to raise the level of college readiness, particularly among minority and low-income youth.

Bill and Melinda Gates Foundation Model High Schools

The Bill and Melinda Gates Foundation is also working with partners across the country to support the creation of high schools based on existing models of high-performing schools, focusing on intermediary organizations that replicate proven and promising model high schools through the use of specific designs and processes. As stated on the Foundation's website (2006): "These schools may emphasize different subjects, follow different educational philosophies, or build different school cultures, but they share the 3Rs: rigor, relevance, and relationships." As such, they follow ideals common to other successful school reform efforts, including:

- Student engagement
- Rigorous curriculum
- Coursework that is relevant to students' lives and aspirations
- Strong relationships between students and adults

While no data are currently available on the Model High Schools, a study conducted by the American Institutes for Research and SRI International (2004) indicates that schools in the Gates Foundation's National School District and Network Grants Program (fostering similar principles) have demonstrated promising outcomes such as greater levels of personalization, higher expectations, more time spent on collaboration, increased student interest in school, greater persistence in schoolwork, and stronger academic self-concepts. "All these are considered predictors of future improved student achievement" (CSRQ, 2005).

The James Irvine Foundation ConnectEd Initiative

Another notable foundation effort is a new initiative of the James Irvine Foundation, ConnectEd: the California Center for College and Career, launched in April 2006. The Foundation has made the center a hub for innovative practice, policy, and research to expand the number of education pathways that prepare students for college and careers. It aims to advance the role that academically rigorous career and technical education plays in reforming California high schools so that more students master the knowledge and skills they will need to succeed in the future economy.

The center aims to foster the development of programs that:

- Prepare all students for both college and career options
- Implement curricula that are
  - academically rigorous
  - relevant to student aspirations
  - adaptable to the varied learning styles of California's diverse student population

The center will also support programs that allow students to satisfy California's "A to G" requirements while connecting academics with growing industries and career sectors that will provide opportunities for career success (ConnectEd, n.d.).

Other foundation-funded school initiatives

Two other foundation-funded school initiatives worth noting are:

The *Ohio High School Transformation Initiative*, which is funded through the KnowledgeWorks Foundation of Ohio, and *Schools for a New Society Initiative*, which is funded by the Carnegie Corporation of New York. Although neither of these initiatives has yet to produce scientific evidence of student achievement gains, each shows promise of achieving this goal over time (CSQR, 2005).

Summary of key characteristics of reform strategies

The current review of the literature suggests that schools and colleges must focus more on the following in their reform efforts: high expectations and challenging curricula for students; themes and/or strategies that provide meaning and context to academic curricula (including career themes and applied learning opportunities); and personalization and individual attention to ensure that students succeed.

Additionally, the literature suggests that certain components can enable these reforms to take hold and succeed. For example, structures such as smaller learning communities and thematic, articulated pathways; linkages with the community and industry; and opportunities for faculty and staff to collaborate and continuously expand their professional capacity, are cited as important factors in school reform.

In summary, the following enumerates the characteristics of high-performing schools found in common across the literature reviewed for this report:

1) High expectations and a rigorous curriculum
2) Career technical courses with a strong academic core
3) A variety of instructional strategies that engage students and connect them to real-world applications, making learning relevant to their lives and attending to students' individual interests, learning styles, and aptitudes
4) Strong connections between students and staff, and the creation of personalized learning environments, including advisors, mentors, and teachers who help students clarify their goals and provide support to ensure that students transition successfully to postsecondary settings or work
5) Additional supports and supplemental strategies to ensure that all students succeed
6) Leadership and a culture that is mission-driven and focused on student learning
7) Sustained professional development and a focus on faculty collaboration
8) Continual improvement through examination of data and a willingness to innovate

The role of CTE in education reform

As shown below, improvement of CTE programs was identified as a key element in school reform by 6 out of 11 organizations cited by Walcott, Owens-West, and Makkonen (2005, p. 35), as well as in many of the individual reform models described above. In addition, six of the organizations also stress the need to expand counseling and mentoring, a key ingredient of most CTE programs.

Figure 7. Summary of reform strategies (Walcott, Owens-West, and Makkonen, 2005)[33]

	Achieve & NGA	AYPF	Bush Administration	Education Trust	Gates Foundation	NASSP	National HS Alliance	Pathways to College Network	SREB	CDE	LAO
Strengthen rigor of course requirements	X	X	X	X	X	X	X	X	X	X	
Align standards & tests with higher education	X			X			X	X		X	X
Increase school accountability	X	X	X		X	X	X	X	X		X
Strengthen school leaders and teachers	X	X	X	X		X	X	X	X	X	
Provide extra supports for students	X	X	X	X		X	X	X	X	X	X
Expand counseling & mentoring		X				X	X	X	X		X
Create smaller learning environments		X			X	X	X		X	X	
Improve career technical education		X	X	X					X	X	X

CTE courses account for a significant portion of high school curricula (16.2% in 2000). CTE classes are taken by the vast majority of American high school students — 96% reported taking at least one CTE course in 2000 (DeLuca et al., 2006). This holds across demographic subgroups, with African American students participating at higher rates than any other group, and low socioeconomic status students taking proportionally more CTE than academic courses (Ibid.). As such, they have the potential to contribute to positive student outcomes. Indeed, as described below, CTE courses are an important resource for increasing high school completion rates and improving labor market outcomes.

Yet as accountability for academic performance measures has increased, support for high school CTE programs, as they currently exist, has begun to wane. Critics of CTE at the high school

[33] For the purposes of this policy summary, Walcott, Owens-West, and Makkonen reviewed proposals in California from the California Department of Education and the Legislative Analyst's Office as well as proposals or "calls to action" from organizations that have a national focus or are working in high schools across multiple states.

level argue that high schools should focus more on core academics and college preparation and leave technical training to postsecondary institutions.

On the other hand, many policy organizations and initiatives focus on *strengthening* CTE programs to ensure that they cover rigorous academic content while preparing students both for the workplace and for postsecondary education.

As presented below, the characteristics of *high-quality* CTE do in fact include integration of academic content and are consistent with the characteristics of high-performing schools described above, affirming how CTE can contribute significantly to education reform efforts, especially as exemplified in models such as High Schools That Work. Further, some authors highlight that many innovative practices have *arisen* out of CTE. The National Assessment of Vocational Education study (Silverberg et al., 2004) reports the following:

> *Several practices that are quite common in high schools across the country were spurred by the interest and efforts of vocational educators, concerned in part about the academic performance of students in vocational programs. These strategies include career-themed small learning communities, flexible scheduling, linkages with postsecondary institutions and faculty and eliminating the general track.* (p. 87)

Cross-curricular planning, advisory periods, team teaching, alternate scheduling, and block scheduling were first implemented in CTE and are now making their way into the traditional high school (ACTE, 2006a; California Department of Education [CDE], 2005a). Betsy Brand of the American Youth Policy Forum states, "From a reform standpoint, CTE has led efforts in performance standards and accountability, the integration of academic and occupational curriculum, and the creation of pathways from secondary to postsecondary education" (2005, p. 26).

Indeed, some authors assert that CTE, rather than being discussed as a program under threat, could and perhaps should be discussed as a potential model for 21st century education (ACTE, 2006a; Brand, 2005; Gray, 2004; Partnerships for 21st Century Skills, 2006). As Gray (2004) states, "perhaps CTE holds the most promise of opportunity for many students and for national economic growth" (p. 3).

The role of CTE in preparing students for the workplace

One of the primary goals of high school reform is ensuring a successful transition to postsecondary education or training, or to employment. Increasingly, for success in work, at least some postsecondary education or training is necessary.

The story does not end, however, when students succeed in matriculating in a community college; the need for innovation — and the role of CTE — to ensure student success is an issue as pertinent to community colleges as it is to secondary schools. Just as in secondary programs, instruction must address students' academic needs as well as their technical skill development. Further, given the importance of community college CTE in workforce and economic development for the new economy, community colleges must employ state-of-the-art strategies and technologies to prepare students for the workplace.

CTE as a strategy for teaching basic academic skills

As discussed above, basic academic skills are required, no matter what occupation an individual chooses to pursue. Yet, until high school reform begins to yield results, students will continue to enter community colleges with substandard academic skills. In a presentation on "Academic Preparedness and Remediation in Community Colleges," Dr. Arthur Levine, President of Teachers College at Columbia University, commented that in light of changing national demographics, the new economy, and globalization, community colleges are now leading the way with new programs designed to meet the emerging needs of today's postsecondary students, one of the core needs being remediation. According to Levine, approximately one-third of higher education students in New York State need some form of remedial education (Community College Research Center [CCRC], 2001). Other presenters cited mean SAT scores below that which are considered to be required for college-level readiness, and a study conducted by the Community College Research Center indicating "a widespread and growing need for remediation resulting from changes in demographics, and poor high school education" (Ibid.).

Merisotis and Phipps (2000) described the situation quite succinctly:

> *In short, those halcyon days when all students who enrolled in college were adequately prepared, all courses offered at higher education institutions were "college-level," and students smoothly made the transition from high school and college simply never existed. And they do not exist now.* (p. 69)

At the community college level, attempts to address the need for remediation are perhaps even more complex than in high schools, given that no more than one in six students fits the profile of a "traditional" postsecondary student (i.e., full-time, 18-21 years old) (CCRC, 2001). In California, half of community college students are over 24 years old. Further, approximately 35% of community college students are not pursuing associate degrees; they may therefore not be taking traditional academic classes, so must strengthen their basic academic skills through other programs. This diversity in the community college population calls for diverse instructional strategies that address the needs of both young and older adults. While community colleges must continue to offer educational services to students who plan to articulate to a four-year program without a detour, they must also meet the unique needs of these "new" students. CTE, as a career-focused, applied learning strategy, is particularly appropriate; it addresses the need of adult learners for goal-driven, experiential learning to achieve academic as well as technical competence, and their focus on immediate and long-term employment.[34] To the extent that CTE systems are flexible, they can also meet the needs of adults who are working and balancing multiple demands in their lives.

[34] "Adults will commit to learning when the goals and objectives are considered realistic and important to them. Application in the 'real world' is important and relevant to the adult learner's personal and professional needs. Adult learners need direct, concrete experiences in which they apply the learning in real work" as a key point of adult learning theory (Speck [1996] on Adult Learning, cited by the North Central Educational Research Laboratory).

A study by Jobs for the Future and the National Council for Workforce Education (NCWE) (2004) cites four strategies that operate synergistically to create multiple paths that adults can take toward occupational and technical degrees:

1) **Integrated institutional structure and services**, including adult education, workforce development, developmental education, and non-credit programs.
2) **Accelerated learning**, so that students advance quickly to program completion, including competency-based instruction, short-term, intensive learning, and contextualized course content to help students learn more and faster.
3) **Labor market rewards**, due to a focus on high-demand occupations and close collaboration with employers, demonstrating how basic reading, writing, math, and English skills are linked to occupations.
4) **Comprehensive supports**, to help low-income adults succeed in college while supporting their families; these include career counseling, tutoring, and other academic support, personal case management, and learning communities.

Researchers also document how community colleges are organizing career pathways across departments to facilitate the implementation of these strategies.

CTE as a strategy for meeting workforce needs and teaching the "new" basics

As ACTE highlights in "Career and Technical Education's Role in American Competitiveness," (2006a) two other core roles for CTE, in addition to fostering student engagement and helping to increase students' academic skills include meeting America's workforce needs and meeting employer needs for highly skilled workers. CTE programs help prepare students for all 20 of the fastest growing occupations identified in the U.S. Department of Labor's 2006–2007 Occupational Outlook Handbook and in all 14 job sectors identified by the Department of Labor's High Growth Job Training Initiative. Through project-based learning, internships, school-based enterprises, and career technical student organization activities, CTE programs provide students with the employability and technical skills that are required in the workplace. CTE programs work directly with business and industry to incorporate the technical skills that employers require and provide industry-based certifications. As noted on the National Research and Dissemination Centers for Career and Technical Education website (n.d.a), high-quality programs incorporate both "soft" and "hard" skills, employ "new curriculum content and teaching strategies" that ask students not only to master factual knowledge, but to apply knowledge "in real situations and by solving novel problems"; "ensure…an ability to adapt as workforce needs change"; and employ innovative uses of technology.

In addition to the goal of providing meaningful content to help prepare students for the workplace, CTE also aims to provide a system which links education with student and workplace needs. In such a system, CTE provides "seamless transitions" from high school to community college, and from entry-level jobs to community college and back to higher-level jobs and further education (NCWE, 2006).

Career pathways can provide the framework for this to occur. Just as career pathways can help ensure that students receive developmental and accelerated learning opportunities, career pathways provide the framework for a coherent workforce development system that serves the needs of the workplace, as well as those of students at varying skill levels: they facilitate vertical integration among educational levels, "multiple entry and exit" for workers' career advancement, and alignment of skills with workplace needs (NCWE, 2006; Jenkins, 2006). NCWE makes a case for the importance of career pathways as follows:

> *With the globalization of the workforce, intellectual talent can be located almost anywhere on earth. Extensive research and literature suggest the communities, regions, and states that will be most competitive are those that support and grow "industry clusters" based on demand. One critical component of this strategy is the growth of human capital. Since career pathways are focused around regional or statewide industry sectors and not a single business, the development of career pathways presents a strategic advantage in supplying the talent needed by business and industry, from entry-level technicians to scientists and engineers.* (p. 4)

What the research says about outcomes from CTE programs

Studies of high school programs over the last decade have concluded the following:

- CTE and career academies appear to play a role in reducing the number of high school dropouts, particularly among those who enter high school with the lowest academic indicators and thus the highest risk of dropping out of school (Silverberg et al., 2004; ACTE, 2006a).

- Absent a quality core academic curriculum, work-based learning will not result in higher student performance. The authors of the NAVE Report found that today's CTE students are more likely than those in the past to enroll in academically challenging courses, but their achievement levels still lag behind those of their peers in non-vocational courses (Neumark, 2004, as cited in Silverberg et al., 2004).

- Enhanced math learning in CTE can improve CTE students' test scores. A study conducted by the National Research Center for Career and Technical Education at the University of Minnesota focused on the value of enhanced math learning in CTE. Five CTE programs from the fields of agriculture, auto technology, business/marketing, health and information technology were selected for the study, and a model consisting of "pedagogy and intense teacher development" was constructed (Stone, III et al., 2006, p. ix). Findings from the study indicate that students in the programs with enhanced math learning displayed improved math ability, which was statistically significant when compared with the students in a control group. Additionally, researchers found no trade-off between the student gain in math ability and acquired knowledge related to the occupational aspect of their CTE programs.

- CTE programs have a differential impact on college-going rates depending on the particular CTE model. For example, studies of school-to-career (STC)[35] programs in the 1990s found that general STC programs were able to boost the probability of college enrollment by about 13 percentage points, and internships and apprenticeships appeared to raise college enrollment among students with the lowest test scores (DeLuca, Plank, & Estacion, 2006). But researchers caution that such programs have a selection bias, so findings should be interpreted with caution (Walcott, Owens-West, & Makkonen, 2005).

- A study conducted by Stephen Plank (2001) at Johns Hopkins University, and funded by the National Research Center for Career and Technical Education, found the following associations between different patterns of high school course-taking and three outcomes: academic achievement, persistence during high school, and postsecondary destinations (as cited in Wonacott, 2002).

    - "Academic concentrators" enjoyed a small but statistically significant advantage over "dual concentrators" in measures of academic achievement. "Dual concentrators" and "academic concentrators" did not differ substantively in achievement.

    - The relationship between the CTE/academic course-taking ratio and persistence during high school suggested that to reduce the risk of dropping out, the optimal ratio is three units of CTE courses to four units of academic courses. Especially for students who are already at risk, a slight reduction in academic test scores was suggested as well worth the increased likelihood of graduating from high school.

    - Although students' high school curricular concentrations did affect the likelihood of pursuing one postsecondary option or another, it appeared that no curricular concentration precluded any postsecondary option. This suggested that the integration of CTE and academic instruction in high school was producing the intended effect of providing students with multiple options after high school.

- CTE programs also expose students to adult settings, problem solving in a work context, career choices, and other non-academic skills (Ananda, 2003).

- The California Regional Occupational Centers and Programs (ROCP) 2004 Longitudinal Study (Mitchell, 2004)[36] conducted by the School Improvement Research Group (SIRG) at the University of California, Riverside, did a matched comparison study of non-A-G track students with 953 ROCP and 1329 non-ROCP students, which showed the following:

[35] School-to-Career is a system designed to ensure students a seamless transition from secondary education into meaningful, high-quality employment or further education. School-to-Career (STC) partnerships bring together educators, business/industry/labor, and community-based organizations to integrate academic and vocational-technical education and to more closely align secondary and postsecondary curricula. STC partnerships were funded in California from 1997-2004, but many continue to operate with other sources of funding.

[36] The 2006 report was not yet available at the time of this writing.

- ROCP students have better 12th grade attendance rates.
- ROCP students improve their high school grade point averages.
- ROCP students earn higher wages than comparison group peers.
- ROCP students have more success in securing raises and promotions on the job.
- ROCP students enroll in postsecondary education in large numbers.

At the community college level, numerous positive results have been found.

- In a recent study, positive outcomes related to entry into the workplace and earnings gains for students in Occupational and Cooperative Education Programs at the California Community Colleges have been found (Arnold, 2006).

- For students pursuing vocational programs, "the long-term [earnings] benefits are greater for vocational students who receive an associate degree than for those who [only] receive a certificate" (Grubb, 2002, p. 4). Furthermore, the existing research supports a growing body of anecdotal evidence that vocational education promotes successful entry into the workforce, since "vocational students overall tend to have [up to] 37% higher earnings in the first two years after graduation than graduates from non-vocational programs" (Ibid., p. 4).

- Silverberg et al. (2004) corroborated these findings: researchers found significant economic returns to postsecondary vocational education, with the greatest benefits for those who earn a credential.

- Gill and Leigh (2003) undertook a study to examine the labor market returns of academic and CTE programs at community colleges. Drawing data from the National Longitudinal Survey of Youth (NLSY), the authors compared earnings for four groups: community college students who enter and complete a CTE program (excluding AA recipients); community college students who transfer to a four-year college; four-year college students who enter and complete their bachelor's degree; and students who enter four-year college but drop out before receiving a degree. The study found that when controlling for measured academic ability, the wages of BAs who are strictly four-year college attendees and those who transfer to a four-year from a community college are similar (i.e., students transferring from community colleges did not suffer an earnings disadvantage). A comparison of terminal-track, career-training community college graduates with students who enter, but do not complete, a four-year college degree showed higher wages for the community college graduates.

- "Success for All" (Mathur, 2004), a study commissioned by the CCCCO Joint Special Populations Advisory Committee, compared the education, employment, and earnings outcomes of special-population versus non-special-population students who exited the community colleges in 1999-2000 with at least 12 units of CTE coursework. Of the 48,736 students in the sample, 52% were found in one or more of the six special population groups. Among other findings are included the following:

- Overall, special-population women were fairly similar to non-special-population women in overall educational attainment.
- Male special-population students are more likely than male non-special-population students to leave with an associate degree, and less likely to leave with just 12-23.99 units but no new credential.
- In 1999-2000, special-population women who exited college substantially increased their median annual earnings after leaving college.
- Special-population men increased median annual earnings from before to after college, demonstrating a 149% increase from the year prior to college to the second year out of school.

Characteristics of high-quality CTE cited in the literature

High-quality CTE can be defined at the programmatic and at the systemic level. It can also be defined by the degree to which the skills taught in the programs are applicable to the workplace and propel students toward higher levels of occupational success. At the programmatic level, practitioners and researchers discuss integration of academic and CTE curricula, adherence to high industry-driven standards, and opportunities for interest-driven, hands-on, and applied learning. High-quality programs also include integration of career exploration and experiences in the workplace. At the systemic level, key components include vertical integration among levels of education and partnership among publicly funded education, economic development, and workforce preparation systems. High-quality secondary and postsecondary CTE both include programmatic and systemic components, but, perhaps due to the inherently different structures and purposes of the institutions, there appears to be a difference in emphasis at each level. Finally, high-quality CTE programs impart developmentally appropriate higher-order thinking, technical and other workplace skills, irrespective of the CTE level. The following section describes high-quality CTE at the secondary level, with an emphasis on programmatic issues; the next section describes high-quality CTE at the postsecondary level, which encompasses programmatic issues, but places these in the context of a career pathway system that serves a wide range of students through multiple transitions. The last section describes the skills that high quality CTE imparts, irrespective of level.

High-quality CTE at the secondary level: Engaging students and preparing them for transition to further education and work

Betsy Brand, Director of the American Youth Policy Forum and author of *Rigor and Relevance: A New Vision for Career and Technical Education,* makes the case that there is a great need in today's classrooms for high-quality CTE — education that integrates rigorous academic coursework with a technical and occupational curriculum, emphasizes applied teaching and learning, uses the context of careers to help make learning relevant, connects with the labor market and employers, provides ongoing guidance and counseling and exposure to the world of work, and defines pathways from secondary to postsecondary education. However, CTE must embrace all these elements and not be a vestige of high school "shop" (Brand, 2003b).

Policy proposals intended to improve career technical education tend to focus on the need to strengthen both the technical skill-building and the academic rigor of CTE programs. The California Legislative Analyst's Office (LAO), for example, recommends that districts develop

"vocational course sequences" (Walcott, Owens-West, & Makkonen, 2005). Others call for a stronger academic core in CTE programs in order to meet new labor market and college demands and accountability pressures (Ibid.).

Gary Hoachlander, in his article "Ready for College and Career" (2006), lists some key characteristics of high-quality CTE. They include:

1) Preparing students for both college and work
2) Combining academics and technical education into coherent programs
3) Systematically connecting instruction in core academics to authentic professions
4) Engaging and motivating students via exposure to the workplace
5) Providing clear pathways to a full range of postsecondary education options
6) Routinely and regularly involving postsecondary faculty in curriculum and professional development
7) Recognizing that academic achievement is not enough; strong preparation for success in technical and professional fields requires mastering other knowledge and skills that have been largely ignored in the academic classes taught in most high schools.

High-quality CTE at the postsecondary level: Connecting systems and ensuring seamless transitions

The postsecondary literature, given the postsecondary charge to foster economic development and serve students of all ages with varying needs throughout their lifetimes, also addresses curriculum and services, but stresses the *systemic* nature of the changes required. The focus is on the creation of career pathways that "provide a seamless system of career exploration, preparation, and skill upgrades linked to academic credits and credentials, available with multiple entry and exit points spanning middle school, secondary, postsecondary, adult, and workplace education" (NCWE, 2006, p. 2).

According to NCWE (2006), comprehensive career pathways facilitate the following transitions:

- secondary education to postsecondary education;
- pre-college (ABE/GED/ESL/DE) to credit postsecondary;
- postsecondary education for open enrollment students, unemployed or dislocated workers, career changers, disadvantaged youth; and
- community college to university.

Six core elements are at the heart of every comprehensive career pathways framework. NCWE (2006) identifies them as:

1) **Institutional and Instructional Transformation**
   - *Mission Integration:* Requires that academic, student support, remedial, adult education and workforce development offices work collaboratively to design pathways and roadmaps. Similarly, secondary institutions must follow the same model, with career pathways providing a framework to break down the silos of "academic" and "career and technical education" tracks.

- *Curriculum/Instructional Transformation:* Includes alternative delivery methods, in context curriculum, modularized ("chunked") curriculum, and competency-based curriculum.
- *Visual Roadmaps & Templates:* Uses visual "demand-driven" roadmaps or templates depicting coursework, competencies, skills and credentials required and describes multiple entry and exit points; provides tools for employers; and disseminates tools to educators and workforce professionals.
- *Articulation and Transition:* Includes "bridge" programs, rigorous academic credentials, dual/concurrent enrollment and dual credit, and articulation agreements.

2) **Student Supports and Tools**
   - Career planning and counseling
   - Internships
   - College and workforce readiness preparation
   - Case management
   - Credit for prior/experiential learning
3) **Partnership-Driven**
   - Inclusive involvement
   - Collaboration and trust
   - Demand-driven economic development strategy
4) **Employer Involvement**
   - Employer validation of career pathways
   - Employer involvement in the determination of relevant skills and competencies
   - Ongoing oversight of pathway relevance and content
   - Employer input and support for incumbent worker pathways
   - Employer support of pathway graduates
5) **Continuous Improvement**
   - Planning
   - Accountability
6) **Sustainability**
   - Leadership at all levels and across sectors
   - Replicable models
   - Reallocating and blending multiple funding sources
   - Alignment of state and federal policy

Skill development in high-quality CTE

The formal articulation of "new" skills needed for the workplace began in 1983 with the publication of *A Nation at Risk* by the U.S. Department of Education's National Commission on Excellence in Education. Citing serious inadequacies and "mediocrity" in our educational system, the report recommended strengthening academic standards, lengthening the time students spend learning, strengthening the teaching profession, and strengthening graduation requirements so that all students establish a foundation in five new basics: English, mathematics, science, social studies, and computer science (North Central Regional Educational Laboratory [NCREL], 1983).

In 1989, the Secretary's Commission on Achieving Necessary Skills articulated five competencies and a three-part foundation of skills and personal qualities that are needed for solid job performance, as listed below.

Competencies (that effective workers can productively use):

1) Resources: Allocating time, money, materials, space, and staff
2) Interpersonal Skills: Working on teams, teaching others, serving customers, leading, negotiating, and working well with people from culturally diverse backgrounds
3) Information: Acquiring and evaluating data, organizing and maintaining files, interpreting and communicating, and using computers to process information
4) Systems: Understanding social, organizational, and technological systems, monitoring and correcting performance, and designing or improving systems
5) Technology: Selecting equipment and tools, applying technology to specific tasks, and maintaining and troubleshooting technologies

The Foundation (what competence requires):

1) Basic Skills: Reading, writing, mathematics, speaking, and listening
2) Thinking Skills: Thinking creatively, making decisions, solving problems, seeing things in the mind's eye, knowing how to learn and reasoning
3) Personal Qualities: Individual responsibility, self-esteem, sociability, self-management, and integrity

Other authors in the early 1990s discussed the importance of "hard" and "soft" skills (Carnevale, 1991). These soft skills include managing information, resources, and relationships with people, as well as self-management. The starting point, though, is basic skills: reading, writing, computation, and, most important, ability to learn continuously throughout life. In addition, "global" workers need flexibility, problem-solving and decision-making ability, adaptability, creative thinking, self-motivation, and the capacity for reflection (Ibid.; Herr, 1990).

Murnane and Levy (1996) cite six "new basic skills" required for the 21st century workplace, including the ability to read at the ninth-grade level or higher; the ability to do math at the ninth-grade level or higher; and four new "soft skills" required for the workplace, including the ability to solve semistructured problems where hypotheses must be formed and tested; the ability to work in groups with persons of various backgrounds; the ability to communicate effectively, both orally and in writing; and the ability to use personal computers to carry out simple tasks like word processing.

Most recently, in August 2006, Davis Jenkins of the Workforce Strategy Center (quoting Richard Florida's *The Rise of the Creative Class*), likewise emphasizes the particular skills needed in the new "knowledge economy": postsecondary credentials, technical savvy, the ability to learn rapidly, and an entrepreneurial approach to employment.

Industry corroborates this view and goes one step further. The Partnership for 21st Century Skills (2006), a membership organization consisting of Apple, Bell South Foundation, Dell Inc., Ford Motor Company Fund, the American Federation of Teachers, Microsoft and the National Education Association, among others, argues for the development of specific skills that are

currently not taught in either academic or many CTE programs — skills based on the needs of the 21st century workplace. The Partnership's publication, "Results That Matter: 21st Century Skills and High School Reform", points out, "[e]ven if every student in the country satisfied traditional metrics, they still would remain woefully under-prepared for success beyond high school." (p. 2)

The Partnership has identified six key elements of 21st century learning:

1) **Core subjects.** As defined by the No Child Left Behind Act of 2001, these include English, reading or language arts; mathematics, science, foreign languages, civics, government, economics, arts, history, and geography (U.S. Department of Education, 2005).

2) **21st century content**
   - Global awareness
   - Financial, economic, business, and entrepreneurial literacy
   - Civic literacy
   - Health and wellness awareness

3) **Learning and thinking skills**
   - Critical-thinking and problem-solving skills
   - Communication skills
   - Creativity and innovation skills
   - Collaboration skills
   - Contextual learning skills
   - Information and media literacy skills

4) **ICT literacy.** Information and communications technology (ICT) literacy is the ability to use technology to develop 21st century content knowledge and skills, in the context of learning core subjects. Students must be able to use technology to learn content and skills — so that they so that they know *how* to learn, think critically, solve problems, use information, communicate, innovate and collaborate.

5) **Life skills.** While these skills have always been incorporated to some degree, the challenge today is to incorporate these essential skills into schools deliberately, strategically, and broadly. Life skills include:
   - Leadership
   - Ethics
   - Accountability
   - Adaptability
   - Personal productivity
   - Personal responsibility
   - People skills
   - Self-direction
   - Social responsibility

6) **21st century assessments.** Authentic 21st century assessments are seen as the essential foundation of a 21st century education. Assessments should measure all five key results — core subjects; 21st century content; learning and thinking skills; ICT literacy; and life skills. Assessments can use modern technologies to increase efficiency and timeliness. Standardized tests alone can measure only a few of the important skills and knowledge students should learn. A balance of assessments, including high-quality standardized testing along with effective classroom assessments, "offers students a powerful way to master the content and skills central to success."

   The results that matter — 21st century skills integrated with core academic subjects — should be the "design specs" for creating high schools that are truly effective for students and the nation. Only by setting clear goals that incorporate 21st century skills can high schools truly prepare students to succeed in postsecondary education, workplaces and community life. (Partnerships for 21st Century Skills, p. 2)

European countries are arriving at similar conclusions regarding the skills that will be needed in the future workplace. According to *Defining a Strategy for the Direct Assessment of Skills* (Haahr et al., 2004), funded by the European Commission, the European Council in 2000 set a new strategic goal for the upcoming decade: to become "the most competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion" (Ibid., p. 4). They determined that this would require a strategy that, among other things, supports the transition to a knowledge-based economy through

- "adapting Europe's education and training systems to the demands of the knowledge society, making them a 'world quality reference by 2010';
- ensuring 'a substantial annual increase in per capita investment in human resources'; and
- defining in a European framework those new basic skills that are to be provided through lifelong learning: IT skills, foreign languages, technological culture, entrepreneurship and social skills" (Ibid.).

Consistent with this, a recent study conducted on 70 projects in 17 European countries found the following areas need to be addressed in the professional development of career technical education instructors in order to be able to provide students with the skills to compete in the global economy (Mahlamaki-Kultanen, 2006):

- Innovativeness
- Counseling
- Multiculturalism
- General work and life skills
- Entrepreneurship
- Technology
- Environmental issues

In summary, there is ample evidence supporting the need for carefully planned programmatic and systemic reforms and strategies that will prepare students for participation in an increasingly knowledge-based global economy. The preceding section has identified a spectrum of reforms

designed to help students stay in school, as well as to enrich the quality and relevance of their academic experience. It has also discussed how CTE can contribute to both academic achievement and the preparation of students for both further education and the workplace by using these innovative, integrated and applied instructional strategies, creating coherent systems, and emphasizing the "new basic skills" sought by employers.

There is a greater need than ever for high-quality models of career and technical education. Presented below are models and "exemplary practices," both in other states and in California. These models and practices, taken together with the discussion of programmatic and systemic reform, reveal key elements and distinguishing features of effective CTE practices, which are then explored further in the fourth section of this literature review.

EFFECTIVE CTE MODELS AND PRACTICES THAT CAN INFORM FUTURE IMPROVEMENTS IN CALIFORNIA'S CTE PROGRAMS

The sections below provide examples of exemplary CTE practices in two groups: 1) exemplary state efforts; and 2) examples of specific programs around the nation that are considered exemplary or promising as identified by the National Research and Dissemination Centers for Career and Technical Education. In addition, to describe effective practices in California, the criteria used for identifying exemplary programs are provided for four program categories: high school CTE programs, ROCP programs, California Partnership Academies, and California Community College CTE programs.

Examples of exemplary state practice (secondary CTE)

In recent years, a number of states have recognized that high school reform cannot be accomplished without attention to secondary career technical education. The progress of three states, according to Kazis (2005) — Virginia, Maryland, and New York — in bringing CTE into the 21st century, provides a basis for optimism.

Virginia

Virginia has been upgrading its CTE programs in order to reach more students and prepare more of them for success. Some of the innovations introduced include an incentive for CTE students to pursue industry certification while still in high school and immediately after, as well as career readiness certificates for CTE students that indicate to employers students' competencies in reading, writing, math, and communications.

Virginia's incentive program, Path to Industry Certification (Warner, 2005), also established teacher training academies "to increase the number of high school teachers with appropriate industry certifications to teach the required courses." The academies' main goal is to support and train teachers in how to be "far more effective in the classroom" (Ibid., p. 30). As of last year, 1,233 Virginia teachers had taken part in the training academies, and the majority had attained industry certification.

Virginia also established the statewide Career and Technical Education Foundation with the purpose of helping to "bridge the gap between the large number of technical jobs available throughout Virginia and the comparatively small number of qualified applicants to fill them"

(Warner, 2005, p. 30). The foundation utilizes "public-private partnerships" in promoting awareness of CTE programs and opportunities, quality training programs, and career options.

The state has also made large efforts to increase graduation and GED rates. Two projects, *Project Graduation* and *Race to GED*, aim to help students and those in the workforce gain their high school degree while gaining the skills necessary to contribute more to the state's economy. In addition, the newly established Career Readiness Certificate will verify to employers that potential employees have achieved a passing level on the basic skills (reading, mathematics, writing, business correspondence, locating information) assessment tests (Warner, 2005).

Maryland

Maryland's efforts to improve the quality and outcomes of CTE have been broad, focusing on academic rigor and preparing all students for college and careers. It has created the Career Clusters Framework, which defines pathways by core business functions. The framework guides the development of instructional programs (known as CTE Pathways Programs) and helps shape the redevelopment or creation of new CTE programs. Forty-eight Model CTE Pathways Programs have been identified, and these will receive extra development and implementation support from Maryland CTE (Oliver, 2005).

According to Katharine Oliver (2005) of the Maryland Department of Education, the state's efforts to improve CTE quality and outcomes have had a number of promising results:

- CTE enrollments have risen.
- The number of CTE students who pursue a college prep curriculum has increased dramatically from 14% in 1993 to 41% in 2004.
- Employer participation has expanded as business leaders perceive an overall responsiveness and attention to quality.
- The state has placed significant emphasis on collecting and analyzing student performance data.
- The state now requires local CTE plans to analyze and suggest ways to improve student achievement based on measures of academic and technical performance, completion, and post-high school success that are disaggregated for income, race and ethnicity, and disability.

New York

New York has also made CTE reform a priority. Hughes (2005) notes that the state has instituted a program re-approval process which involves visits by school district officials and outside experts who assess evidence of curricular quality, including integrated academics, faculty certification in their fields, the use of and results from industry-recognized technical assessments, and the extent of access to work-based learning.

These and all CTE programs are required to establish and maintain clear articulation agreements with postsecondary institutions that promote and encourage students to continue their technical

education after high school. New CTE programs have also emerged with focuses on engineering/ technology and human/public service.

Further, all students are required to pass the rigorous Regents tests for graduation, regardless of academic or CTE status, and results have shown improvement. CTE enrollments have risen, attendance has improved and CTE endorsements on student diplomas, indicating their participation in designated high quality programs, have also increased. (Kazis, 2005).

New York State has also developed standards for "Career Development and Occupational Studies." These include:

- Standards for career development, requiring students to be "knowledgeable about the world of work, explore career options, and relate personal skills, aptitudes, and abilities to future career decisions";
- Integrated learning, requiring students to "demonstrate how academic knowledge and skills are applied in the workplace and other settings";
- Universal foundation skills, requiring students to demonstrate mastery of the foundation skills and competencies essential for success in the workplace; and
- Career majors, requiring students who choose a career major to "acquire the career-specific technical knowledge/skills necessary to progress toward gainful employment, career advancement, and success in postsecondary programs" (New York State Academy for Teaching and Learning, n.d.).

Overall, the state's efforts have stimulated demand from local programs to earn the state's "seal of approval". (Kazis, 2005).

Other state CTE initiatives

The following examples, taken from the *Arizona Career Technical Education Delivery System Project Report* (Kister, 2003), describe other outstanding CTE systems, primarily at the secondary level.[37]

- **Arizona.** Arizona's efforts have been focused on creating *coherent course sequences* with successive levels of skills mastery that allow students to logically progress through any given CTE program. These sequences guide students in selecting their career paths and allow them to narrow their focus as they progress through high school. Clear and outlined paths of instruction also allow students to more fully understand and benefit from their CTE programs. When implemented in the manner designed, sequences also assist students with transitions to employment.

- **Kentucky.** Kentucky has developed courses that allow students to meet requirements for academic courses by taking *combined CTE/Academic courses*. These classes carefully merge academic standards with career-oriented content in the areas of agriculture education, administration support service or information processing services, and child development.

[37] There is no evidence that California's CTE system was evaluated regarding Table 12, "State Best Practices."

- **Oklahoma.** Oklahoma has initiated a *coherent state system* to prepare Oklahomans to succeed in the workplace. Goals of this initiative include increasing student and employer access to the programs and services, developing new programs and services, enhancing partnerships, and improving performance and quality.

  Oklahoma has developed an extensive set of evaluation criteria for each program area and has identified a set of performance measures which include:
  - Performance and quality
  - Quality of graduates
  - Quality of programs and services
  - Customer, employer, student, and partner satisfaction
  - System efficiency
  - Cost/benefit ratios
  - Alignment to business needs

- **Oregon.** Oregon has developed a *Certificate of Advanced Mastery* (CAM), which is designed to ensure that students are prepared for successful transitions to their subsequent endeavors, whether postsecondary education or work. The State Board adopted new graduation requirements that link the high school diploma with some but not all elements of the CAM, beginning with students graduating in the 2006-2007 school year. The CAM requirements provide a statewide framework for schools with local flexibility for implementation.

  In order to achieve CAM certification, students are required to:

  - Develop an education plan and build an education profile
  - Meet the performance standard
  - Demonstrate career-related knowledge and skills
  - Participate in career-related learning experiences
  - Meet specific Certificate of Initial Mastery (CIM) performance standards in English, mathematics, science, and social sciences through CIM assessment options

- **Pennsylvania.** The Governor's 2005 budget included an *innovation fund* designed to help CTE schools that want to modernize and upgrade their academic and technical programs. It utilizes several methods of measuring the occupational competency of CTE students, such as the National Occupational Competency Testing Institute (NOCTI) and industry-specific assessments.

  Students who successfully meet the state's requirements are awarded a Pennsylvania Skills Certificate. This certificate is an important addition to students' portfolios when exiting the secondary CTE program and may be used to certify competence with potential employers. Results are also used to determine an improvement score in the School Performance Funding initiative that can result in incentive funds to schools.

- **South Carolina.** South Carolina passed the Education and Economic Development Act. This act requires that every student will study "college prep" academics. It also requires

that every student — with parent and counselor input — will develop an *individual plan* for graduation that will map out a course sequence for all four years of high school.

- **Washington.** Washington State has initiated a *workforce employer survey* that surveys state employers every two years to identify employers' workforce training needs and practices and their satisfaction with workforce training programs.

(For a summary, see Appendix H: A table of exemplary state practices.)

Examples of exemplary local CTE programs from across the United States (postsecondary)

The National Research and Dissemination Centers for Career and Technical Education (NCCTE) have identified "outstanding practices in exemplary and promising programs" and grouped them into 15 categories (NCCTE, n.d.). The list of exemplary practices below (taken from the Center's website) includes a short description of each category, with one example in each category where possible. All of these examples (and nearly all on the website) are from postsecondary programs. Note that in some cases, there were no examples available for a given category. The category description is provided nonetheless, to identify the characteristics of exemplary practice according to the NCCTE.

1) Access and inclusiveness. *Strong CTE programs show a commitment to making sure that students of varied backgrounds are able to enroll, participate, and learn effectively. Focusing on inclusiveness can greatly enhance nontraditional students' experiences, in and out of the classroom.*

Located at the Maricopa Skills Center at Gateway Community College in Phoenix, Arizona, the Refugee Targeted Assistance Program (RTAP) helps "refugees become self-supporting as soon as possible through career and technical training that can enable them to earn a good living with benefits." RTAP's course offerings include subjects such as skills training, English for Speakers of Other Languages, childcare, transportation, case management, and a Refugee Life Skills class.

The program embraces diversity among students, faculty, and staff. RTAP serves secondary and postsecondary workers who are from almost 50 countries worldwide. For most of these students, their primary language is something other than English, and in addition to this challenge, many also face "cultural barriers to employment." RTAP helps these students gain the skills and knowledge necessary to succeed in the workplace.

RTAP offers open enrollment to those 16 years and older. Students begin by taking ESOL classes and do so until "their English skills will not be a barrier to employment." The program offers 150 different occupational certificates, and students begin their education at the appropriate level. Program clusters are competency-based. RTAP employs caseworkers that support the students from entry to exit. Initially, the caseworkers spread the word about the program. These staff members also guide students in making the transition to the program, helping with transportation arrangements, assisting with emotional support, and providing counseling as well.

Instructors are hired for their technical knowledge, pedagogical knowledge, and awareness (and potential experience) of recent refugee situations. The program also collaborates with local business and industry in supporting the various RTAP programs as well as providing students with the connections to transition from school to the workforce.

In the 01-02 school year, RTAP served approximately 200 refugee students from around the world.

2) Alignment with standards. *Using industry-defined and recognized skill standards for major occupations helps to ensure that students are learning the skills, hard and soft, needed to be effective in the workplace. The use of academic standards in curriculum development helps students to obtain a well-rounded learning experience and prepare for further education.*

Johnson County Community College and the Burlington Northern Santa Fe Railroad partnered to create the National Academy of Railroad Sciences program, which supplies skills training and education for workers to excel in entry-level positions in the railroad industry. The Academy created and designed additional courses, in addition to those already taught in the current curriculum, to teach to specific competencies and the specialized needs of the railroad industry. The curriculum is based on national employer standards, and the college's partnership with the railroad has proved valuable, providing the college with rich access to technology, equipment, and content knowledge.

This program places high priority on collaboration with the industry and stresses both education needs and post-graduation opportunities for students. Job placement has proven successful, with an estimated 90% of students finding employment in the field.

3) Certification and credentialing. *In today's "knowledge economy," CTE programs provide valuable job-related certifications and academic credentials. High-quality programs continually update and expand the types of training, certificates, and credentials provided in order to produce sought-after workers.*

The Business and Industry Training Services Department (BITS) of the Tulsa Technology Center specializes in CTE for adult learners. Annual student enrollment averages above 20,000. The program's "Training for Industry Program" contracts exceed more than $3,194,000 annually and they provide training for more than 2,860 jobs. BITS staff work with employers to identify and target training needs as well as focus goals, objectives, and scheduling requirements.

BITS's 50,000-square-foot Technology Center, shared with a corporate supporter, provides up-to-date technology and ample space for the program's students, staff, and faculty.

4) Curriculum reform. *Preparing students for the challenges of the workplace often requires that CTE programs rethink and refine their curricula. New curriculum content and teaching strategies ask that students not only master factual knowledge, but learn to apply it in real situations and by solving novel problems.*

Central Technology Center's Telecommunications program aims to "provide high-quality education, training, and related services to students and to the telecommunications industry in Oklahoma." The program grew out of the need for qualified technicians in the telecommunications industry. Three industry leaders helped to build the program (WilTel, Southwestern Bell, and MCI), and the industry continues to help shape curriculum, standards, benchmarking, professional development, and program focus. Business and industry leaders serve in advisory capacities and also donate equipment to help the program keep pace with today's technology.

The Telecommunications program allows for up to 27 articulated credits, helping to support a dual-credit system. The program has also instituted a "job out" feature, where students can pursue an internship or job while at the same time receiving instructor guidance.

5) Evaluation and continuous improvement. *Evaluating and monitoring CTE programs' progress, addressing shortcomings, and improving overall program quality is critical to advancing the field. A system for making continuous improvements results in programs that are effective in enhancing students' learning as well as their performance on the job and in future education.*

Brevard Community College's (BCC) Allied Health Division offers the Associate Degree in Nursing Program, which "is designed to produce a well-rounded nurse who is able to think critically, make appropriate decisions, communicate effectively, and function as a member of a health team in providing care to clients." The program is known for its use of unique and creative learning tools such as the Human Patient Simulator and the Nightingale Tracker. Using the Total Testing Program, BCC offers affordable customized assessment and remediation from entry to certification.

The college supports dual credit initiatives and has also established a collaborative effort with the University of Central Florida (UCF); they share library facilities, a UCF staff member sits on the BCC nursing committee, and many BCC students continue their studies at UCF. BCC regularly surveys employers on graduates' job performance to better inform their teaching. A faculty-student committee routinely reviews current curriculum and makes recommendations for improvements. Staff also compare current curriculum to the needs and practices of the industry and community to better prepare graduates for the workplace.

6) Placement and retention. *Preparing every student for a successful career is central to CTE. Today's students will graduate into a far more complicated and challenging workplace than ever before. Our educational system must keep up with the changing times, ensuring employability and an ability to adapt as workforce needs change.*

No examples provided.

7) Partnerships. *Fostering collaboration among employers, educators, and government agencies is increasingly important for CTE programs. Leveraging partnerships and creating win-win situations can result in new funding sources, collaborative curriculum development, and student employment opportunities.*

McHenry County College's Integrated Manufacturing Management Program's mission is to "partner with community businesses and organizations to provide educational opportunities aimed at developing high performance skills: communication (oral, written, and interpersonal), teamwork, problem solving, creative thinking, and computation." Affiliated with the college's Academy for High Performance, the program also helps students develop their leadership and collaboration skills. The program has developed strong ties with companies in the community. Instructors teach programs at county businesses, the program offers full-length continuing education classes, business representatives sit on college advisory committees, and local businesses and industry representatives regularly recruit and make presentations on campus.

8) Professional development. *Keeping abreast of new developments in education, industry, and the world allows CTE instructors, counselors, and administrators to be effective. Exemplary programs offer staff a range of opportunities to stay current, usually including work-based learning experiences.*

No examples provided.

9) Program and instructional delivery. *This project strives to find unique and innovative program models that can be effectively replicated in other settings. Program and instructional approaches that have been proven to work are especially helpful to others.*

The College of Southern Idaho's Surgical Technology Program prepares students for entry-level positions in the operating room. Unique teaching techniques are used, such as the crochet lab to increase and fine-tune eye-hand coordination. Students are also required to be involved in fundraising and community efforts, which helps to develop teamwork skills.

10) Program and institutional leadership. *Strong, proactive program and institutional leadership is critical to long-term program success. Improving program design, teaching, and partnerships, and integration with the institution's strategic plan are ways to ensure program sustainability.*

No examples provided.

11) Technology enhancements. *Technology is an integral part of our daily lives and vital in the workplace. Integrating technology into CTE is imperative to the success of students and of the program itself. Through distance learning, state-of-the-art labs, use of the Internet and other means, programs can reach their potential, overcoming limitations in size, location, and costs.*

Colorado's Aims College offers the Community Technology program, which provides the skills and knowledge for students to enter the artistic and technical communications industry. The college offers upgraded computer labs and a current darkroom. The Graphics Technology and Reprographics departments share equipment and supplies, allowing students to experience a "real-world learning environment." Computer workstation settings are utilized in the Communications Media program, creating a "studio in a box" environment where students can perform multiple functions in one place.

12) Transition options. *Linkages between secondary and postsecondary education systems can help students to obtain the instruction they need at each level, without encountering barriers or requiring remediation. Outstanding CTE programs take a holistic look at student learning needs and form partnerships with other educational institutions that contribute to successful student transitions.*

The Culinary Arts and Management Program at Metropolitan Community College offers strong articulation agreements. Students are able to have credits that counted towards their associate's degree apply to their bachelor's degree, promoting easier transitions and continuing education.

13) Student development and leadership. *Students need guidance to make informed decisions about their education and careers. Excellent guidance systems are a vital part of great CTE programs. Opportunities for students to take on leadership roles can strengthen both the program and the students.*

Licking County Joint Vocational School's Pre-Employment Training Program (PET) uses ACT WorkKeys assessments to help determine students' preparedness for the program. PET's purpose is to "promote local economic development by connecting employers with a trained workforce." Through completion of the PET program, students meet the entry-level criteria for all consortium companies, and in passing the Work Keys tests and additional requirements, PET participants are automatically eligible to work for all consortium companies.

14) Sustainability and finances. *Program sustainability and financial health go hand in hand. Comprehensive multi-year planning and well-thought-out funding strategies help to ensure a sustainable program. Innovative funding strategies can be replicated by other CTE programs seeking to assure the future.*

No examples provided.

15) Systemic and whole school reform. *Playing a role in changing educational structures and practices for a broad range of students can be an extra contribution of a forward-thinking CTE program. Likewise, institution-wide reform efforts may provide a foundation for excellence in CTE.*

No examples provided.

California criteria for exemplary programs

The California Department of Education, through a rigorous review process, formally recognizes exemplary Regional Occupational Centers/Programs and district-sponsored CTE Programs. The California Partnership Academies program also identifies programs that meet high standards of implementation. Each of the programs has criteria for identifying excellence. In all three cases, schools and districts identified as "model" or "exemplary" programs are those that meet *all* the criteria to a large degree. Since programs are not recognized for specific characteristics or in specific categories, the *criteria* used to evaluate the programs are presented below as the

indicators of "best practice." The California Community Colleges also recognize exemplary programs, as described below.

Exemplary secondary district-sponsored CTE programs

Every other year, outstanding CTE programs are honored as a part of the California Distinguished Schools Recognition Program. High schools that achieve Distinguished Schools status based upon API/AYP scores may apply for CTE "Special Emphasis Honors" in a separate application process, which evaluates the CTE program across six thematic program areas according to the CDE "Rubric for Scoring Exemplary Career Technical Education Applications" (CDE, 2005b). The CDE Rubric cites the elements critical to "exemplary" CTE programs.

1) In **program administration, assessment, and accountability,** exemplary programs:
   - Operate under a current, approved, comprehensive strategic plan which focuses on student achievement;
   - Reflect school design and program structures;
   - Cultivate the participation of students in a variety of CTE experiences (e.g., career pathways and work experience);
   - Involve ongoing collaboration of key CTE stakeholders (e.g., business and industry groups, ROCPs, postsecondary institutions, adult education programs, apprenticeship programs, youth councils, and local workforce investment agencies); and
   - Establish a formalized internal and external review process, using data from a variety of sources to review programs.

2) In **curriculum and instruction,** exemplary programs:
   - Align with industry standards, SCANS/employability competencies, and academic and CTE model curriculum standards;
   - Demonstrate coherent, articulated sequences of courses and learning experiences, with special emphasis on applied, project-based, and contextual learning;
   - Have instructors create a written lesson plan that delivers "career and technical content using a variety of modalities and strategies";
   - Integrate information about career training opportunities into the instructional program, to promote awareness of career options and to expose students to information about skill requirements for entering the workforce as well as articulation linkages to postsecondary education;
   - Engage significant numbers of CTE students in a formal set of ongoing activities (e.g., participation in career technical student organizations, small learning communities, service learning, project-based learning) both in and out of the classroom to promote awareness, exploration of, and preparation for employment; and
   - Monitor and evaluate student academic progress on their academic achievements, and development of their leadership, citizenship, and career skills, using a variety of instructional activities, including portfolio assessment.

3) In **support services,** exemplary programs:
   - Make career guidance and counseling a major focus;

- Provide career resource materials that help students identify interests and aptitudes, illuminate potential career pathways, create awareness of requirements for employment certifications, and provide relevant information on nontraditional career choices;
- Give students access to materials and information that assist them in developing employability skills, job search skills, and placement skills;
- Have counselors, instructors, and staff members work closely together to support students' selection of courses, placement, and aptitudes necessary for success; and
- Make available CTE courses and services to all students, including special populations, in a variety of formats and in enough languages to accommodate school demographics.

4) In **professional development,** exemplary programs:
   - Have standards that are supported by all key stakeholders to ensure high-quality CTE teachers;
   - Create and maintain a comprehensive CTE professional development plan;
   - Inform and enrich CTE teachers' professional development through linkages with industry; and
   - Incorporate professional development into the teacher's professional growth plan.
   -

5) In **community involvement and collaboration,** exemplary programs:
   - Establish advisory committees that include members from business and industry, education, parents and students, state employment and workforce agencies, public and private agencies, and the community at large, to provide input and enrich the instructional quality of the CTE program;
   - Maintain partnerships with local Workforce Investment Boards, youth councils, community-based organizations and other business groups;
   - Establish formal articulation agreements with postsecondary institutions to create coherent education and career pathways; and
   - Engage in activities designed to promote two-way communication with business and industry.

6) In **resources, facilities, and funding,** exemplary programs:
   - Include key stakeholders in budgetary decisions and incorporate both current and future CTE program needs; and
   - Clearly demonstrate in funding decisions a link to student learning (e.g., providing student access to state-of-the-art technology, equipment, materials, and supplies).

Award-winning California Regional Occupational Centers and Programs (ROCPs)

The goal of California's Regional Occupational Centers and Programs (ROCPs) is to provide meaningful work-based and classroom-based learning opportunities that help students develop an awareness of employment options and help them prepare for entering the workforce. The CDE has identified specific criteria that distinguish "model programs and practices" for ROCPs (CDE Office of Regional Occupational Centers, 2005). According to these criteria, exemplary ROCPs must demonstrate success in two key dimensions, "instructional program" and "leadership and administration."

Instructional program

Effective instructional programs encompass excellence in three areas: curriculum and instruction, student accomplishments, and community involvement and collaboration. Within the curriculum and instruction category, model ROCPs develop appropriate curriculum plans, including effective lesson organization and relevant curricular support materials that are responsive to student needs while also allowing room for appropriate instructional innovation. These programs also emphasize coordination with workplace-based instruction, and lay the groundwork for the practice of lifelong learning. Model ROCPs are also required to demonstrate the ways in which they foster student accomplishments, including creating mechanisms to cultivate student success in developing leadership skills and achieving goals. Finally, high-quality instructional programs distinguish themselves by promoting collaboration with business to create meaningful work-related learning opportunities, including both preparation and follow-up activities. One hallmark of exemplary programs is their ability to create a "clear connection between classroom instruction and workplace learning [with the involvement of both] the instructor and workplace supervisor [to] collaboratively develop, implement, and monitor student training plans" (CDE, 2005b; CDE Office of Regional Occupational Centers, 2005, p. 36).

Leadership and administration

Model programs in terms of leadership and administration involve: business services, organizational structure, personnel services, program accountability, and student support services. Within each of these areas, various components are prescribed. For business services, the model includes budget, inventory, and student data collection. For organizational structure, the model includes: an organizational chart, a written philosophy, a governing board, effective public relations and outreach; business involvement, and a statement of staff rights and responsibilities. In terms of personnel services, such components as staffing, a positive work climate, professional development, and staff evaluation are part of the model. In program accountability, the model includes course review, a follow-up study, and an advisory committee. And in the area of student support services, the model calls for a recruitment plan, career guidance, student placement support, employment, and literacy.

Additionally, in the model programs document, the CDE provides specific items for measuring each of the components listed under the model program areas. For example, under personnel services, the component of staffing includes such measures as a "defined recruitment and selection process," and "credential audits"; under program accountability, the component of course review includes the measures, "evidence of formalized course review system", and "current labor market information."

Model California Partnership Academies

Model California Partnership Academies are those that adhere closely to the intent of the legislation, according to CDE staff. According to Barbara Weiss (2006), Consultant for California Partnership Academies, and the website for the Academies, key structural and curricular requirements include the following:

1) An amount equal to a 100% match of all funds received pursuant to this article in the form of direct and in-kind support provided by the district.

2) An amount equal to a 100% match of all funds received pursuant to this article in the form of direct and in-kind support provided by participating companies or other private sector organizations.

3) Assurance that each academy will be established as a "school within a school."

4) Academy teachers shall work as a team in planning, teaching, and troubleshooting program activities. Classes in the academy program shall be limited to academy students. Each participating district shall establish an advisory committee consisting of individuals involved in academy operations, including school district and school administrators, lead teachers, and representatives of the private sector.

5) Assurance that each academy student will be provided with the following:
   - Instruction in at least three academic subjects each regular school term that prepares the student for a regular high school diploma. These subjects should contribute to an understanding of the occupational field of the academy.
   - A "laboratory class" related to the academy's occupational field.
   - Block scheduling when possible to provide flexibility to academy teachers.
   - A mentor from the business community during the student's 11th grade year.
   - An internship or paid job related to the academy's occupational field or work experience to improve employment skills, during the summer following the 11th grade.
   - Additional motivational activities with private sector involvement to encourage academic and occupational preparation.

6) Assurance that academy teachers have a common planning period to interchange student and educational information. Whenever practical, the planning period should be in addition to the normal planning period for full-time teachers and be supported as a part of the district's matching funds.

Exemplary Community College CTE programs

The California Community College Chancellor's Office (CCCCO) and numerous professional associations have identified exemplary CTE programs at the postsecondary level. While there are too many awards to list, the key areas in which they fall provide an indication of what postsecondary CTE professionals consider to be key system components. These areas include:

- Subject area expertise and innovation
- Curriculum development and improvement
- Partnership development
- Performance accountability
- Student support structures
- Professional development
- Career development

- Career ladders
- Special populations

Across the nation and throughout California, examples and models of "exemplary" and effective practices span a wide array of components, covering both programmatic and systemic aspects of CTE. All of the examples, however, reveal nearly the same themes: curriculum that integrates career and academic content and is aligned with academic and industry standards; assessment that addresses the multiple skills taught in CTE programs; opportunities for career exploration, and experiences in the workplace; close partnerships with industry in all aspects of the system; career guidance services for students and strategies to assist students with transitions to higher levels of education and employment; leadership opportunities for students and support services to ensure student success; coherent systems that allow students to make smooth transitions from course to course, from institution to institution, and across work and education; certification systems that facilitate transitions, either to subsequent levels of education or to employment; ongoing data collection and professional development to ensure continuous improvement, adequate facilities and technology, innovative funding strategies for sustainability, and inclusion of all populations.

The following section distills the lessons from education reform and high-quality CTE programs, along with these examples, to present a list of "distinguishing features of effective CTE" common to these diverse initiatives.

DISTINGUISHING FEATURES OF EFFECTIVE CTE PRACTICES: A SUMMARY FROM EDUCATION REFORM, HIGH-QUALITY CTE PRACTICES, AND EXEMPLARY PROGRAMS

A number of characteristics of effective Career Technical Education appear throughout all the literature reviewed — in the education reform literature, descriptions of high-quality CTE programs and systems, and in the examples of effective local and state CTE practices described above. They are summarized below into six key areas.

Note that all of the areas are interlinked, and some subcomponents could easily be moved to other areas. They are grouped in this way to highlight both the interrelatedness of activities within a cluster, and the distinct issues related to some of these activities.

The six are as follows:

1) Curricular integration (integration of CTE and academics, in content, teaching, and assessment)
   - High expectations for all students
   - Careers offering the context for learning coupled with academic content and rigor to ensure that students have multiple options upon completion of coursework
   - Experiential and applied learning with exposure to the workplace to facilitate and motivate learning
   - Multiple assessments aligned to standards and curriculum

2) Industry partnerships
   - Industry involvement in program design, instruction, and assessment to ensure relevance of the curriculum and opportunities for students in the workplace

3) System Coherence
   - Sequenced courses and curricular pathways to ensure coherence in student learning
   - Articulation (coordination and course alignment of instruction with feeder and advanced- level agencies) to ensure effective transitions for students from one level to another
   - Coordination among education, workforce development, and economic development initiatives
   - System flexibility to respond to new and emerging industries

4) Personalization, career guidance, and student services
   - Opportunities for students to build relationships with peers and adults
   - Career guidance and exploration to facilitate decision-making and ensure that students are exposed to multiple options
   - Student support to ensure that students succeed

5) Availability of skilled faculty, professional development and faculty collaboration
   - Recruitment and retention of faculty
   - Opportunities for ongoing learning among faculty
   - Collaboration among faculty to enable cross-disciplinary integration

6) Continuous improvement and sustainability[38]
   - Use of data for planning, program improvement and accountability
   - Leadership and alignment of policies and resources across programs and sectors

The following sections examine these components of highly effective CTE systems in greater detail. References to research findings are presented where these findings were readily available. Many of the citations are from the National Assessment of Vocational Education (NAVE) *Final Report to Congress* (Silverberg et al., 2004), given the report's breadth, the quality and timeliness of the research, and the fact that it was conducted for the express reason of informing future federal policy in career technical education. Reference is also made to the 2002 California School-to-Career Evaluation (WestEd & MPR Associates, 2002), which, though dated, offers some of the most recent California data available on implementation of relevant strategies.

[38] Note that the sixth feature, "Continuous Improvement and Sustainability," is one that appears in many of the reform efforts described earlier. Data collection and accountability are critical components of continuous improvement and are key features of the Carl D. Perkins legislation. Given that this is such a large issue in and of itself and that, at the time of this writing, California's accountability requirements under the newly authorized Perkins Act have yet to be negotiated, this topic is only addressed in this needs assessment with regard to "special populations." Similarly, leveraging of resources depends on the structure of various funding streams supporting CTE, including Perkins funds; discussion of this issue goes beyond the scope of this needs assessment.

Integration of CTE and academics — "rigor and relevance"

Integration of academics and CTE was written into the Carl D. Perkins Act of 1998 (commonly known as Perkins III). Perkins III does not, however, define integration or clarify its primary goal. As a result, over the last decade, a variety of approaches have sprung up under the "integration" banner, encompassing a wide array of activities with sometimes quite different objectives (Grubb et al., 1991; Medrich, Calderon, & Hoachlander, 2002).

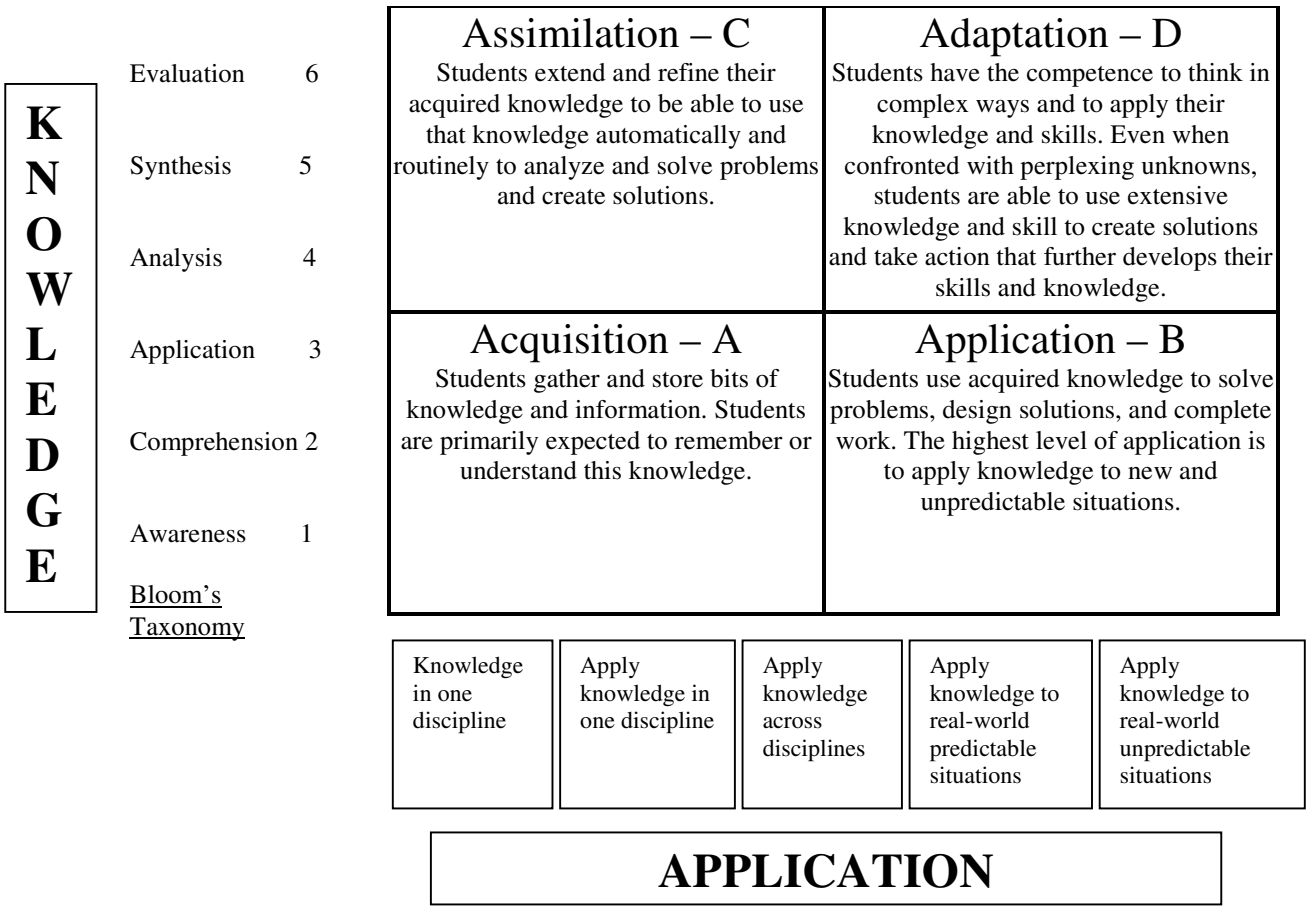
In the NAVE report, Silverberg et al. (2004) state that the integration of academic and career technical education remains a priority for states. The focus has primarily been upon increasing the emphasis on academic instruction in CTE courses and on providing "real-world" examples of, and uses for, academics in traditional/non-occupational subjects.

The extent of this "real-world" academic and CTE integration, however, is debatable. Silverberg et al. (2004) point out that despite legislative and state encouragement, there is little evidence that integrated curricula are being widely developed or used at the local level or that there is school-based support for integration (Stasz & Bodilly, forthcoming). Reasons for this may be varied, but often cited are concerns from CTE faculty that rigorous academic standards and assessments will drive out students who have been academically unsuccessful, many of whom are well-served in CTE. Others fear that expanding the academic content of vocational courses will reduce the intensity of technical training and therefore the benefits to employers (Silverberg et al., 2004).

Further, integration can take many forms and include such strategies as overlapping curricula (career examples provided in academic courses, or academic skills highlighted in CTE courses), team teaching, and common planning periods. It can also extend to the creation of academies, smaller learning communities, schools-within-a-school, and magnet schools (Business Education in California: New Delivery Systems). The authors of the NAVE report warn that, because integration is "ill-defined," wider implementation may be hindered (Silverberg et al., 2004).

One integration framework is being implemented in 22 school districts in California. Developed by the International Center for Leadership in Education, founded in 1991 by Willard R. Daggett, Ed.D., the "Rigor/Relevance Framework" assists educators in delivering instruction that facilitates integration of academic or cognitive skills with applied learning experiences, such as those offered by CTE programs. The following is a graphic representation of the rigor/relevance framework:

Figure 8. Rigor/Relevance Framework



The following describes the subcomponents of integration as revealed in the literature on education reform, high-quality CTE, and effective practices.

High academic expectations for all students

As stated by Benard (1995) in "Fostering Resiliency in Urban Schools":

> *Schools that establish high expectations for all students — and provide the support necessary to achieve these expectations — have high rates of academic success* (citing Brook et al., 1989; Edmonds, 1986; Howard, 1990; Levin, 1988; Rutter et al., 1979; Slavin et al., 1989)…*The successful schools share certain characteristics: an emphasis on academics, clear expectations and regulations, high levels of student participation, and alternative resources such as library facilities, vocational work opportunities, art, music, and extracurricular activities.* (p. 70)

All students should be expected and motivated to achieve high academic results. This is the responsibility not only of the student, but more importantly, of the faculty, administration, and the school community.

As Gary Hoachlander (2006) states in his article, "Ready for College and Career":

> *…it is no longer desirable, if it ever was, to promote dual high school tracks, one serving students bound for four-year colleges and universities and another intended for those pursuing other options after high school …Old style Voc Ed programs which geared students for specific entry-level jobs have given way to programs which prepare students in a wide range of careers from communications to graphic design, computer applications, finance…advanced marketing, and information technology.* (p. 1)

When school cultures support and encourage high expectations, the impact on students' behaviors and beliefs can extend beyond the realm of improved academic performance. These cultures can be instrumental in creating an environment in which students begin to gain awareness of possible career paths and start the process of learning about career preparation. Jordan Horowitz, in describing the reforms associated with CAPP (the California Academic Partnership Program), emphasizes that students' capacity to envision schooling beyond high school begins with "communicating clear and consistent messages about preparation, setting high expectations, providing resources and experiences that will ensure all students have options [beyond high school], connecting [relevant] information to classroom instruction and coursework, and educating parents" (Horowitz, 2005, p. 71).

Additionally, high expectations and effective delivery must include all students, including non-traditional students, students with disabilities, limited English proficient (LEP) students, single parents and displaced homemakers, and economically disadvantaged students. As discussed in "Works in Progress" (CSRQ, 2005):

> *[H]igh schools may not offer students the kinds of challenging and cognitively demanding programs and curricula that facilitate achievement. If students graduate from high school ill-equipped to meet the academic challenges of postsecondary settings — either in educational institutions or work — then they may have to take remedial education classes. These students may feel overwhelmed, disappointed, or stigmatized that they are unsuccessful academically. Because of this, they may decide to leave their jobs and may remain under- or unemployed. For students in higher education settings, taking remedial classes may mean that they cannot take content-specific classes important for a degree, thus lengthening the time needed to earn a degree and extending their financial burden.* (p. 69)

In addition, Walcott, Owens-West, and Makkonen (2005) point to research that connects higher expectations to higher student performance. Citing the California Department of Education:

> *Those who enter high school with test scores in the lowest quartile learn more in academically rigorous courses than they do in either the low-level vocational or general courses in which they are traditionally enrolled. …Students expected to master more demanding curricula are more likely to persist in school, achieve at higher levels, and be better prepared for the workforce after their formal education ends.* (p. 24)

Students themselves have corroborated the perspective that they can — and would — work harder, given the motivation to do so. In a recent poll conducted by Peter D. Hart Research Associates (2006) for The James Irvine Foundation, the vast majority (73%) of the 9th and 10th grade students surveyed who feel less positive about their high school experience and are the most at risk of not reaching their potential in high school said they could be doing better in school if they were motivated to work harder.

Careers offering the context for learning coupled with academic content and rigor to ensure that students have multiple options upon completion of coursework

Effective educational reform efforts cited for their innovation and outcomes emphasize both rigor and relevance. Standards are high and students and staff are expected to exceed them. At the same time, material is delivered in meaningful contexts — meaningful to the students' current lives and meaningful to their future opportunities. These themes were prevalent in the Walcott, Owens-West, and Makkonen (2005) report and the majority of literature reviewed (ACTE, 2006a; Brand, 2003a, b; Gray, 2004; Hoachlander, 2006; Swanson, 2004).

Some students appear to agree. In the survey conducted for the James Irvine Foundation (Peter D. Hart Research Associates, 2006), researchers looked at the experiences and attitudes of 9th and 10th grade students who felt less positive about their high school experience and were the most at risk of not reaching their potential in high school. The idea of a school where academic work is more closely tied to preparing students for college and careers was highly appealing to a large majority of students. Seventy-three percent of the students said this kind of school appeals to them at least a fair amount, and 89% of the students believed that a school where they could take courses that they need for college but also have more opportunity to acquire skills and knowledge relevant to future careers would be more interesting to them. Ninety-one percent of the students said they would be more motivated to work hard and do well if they attended this kind of a school.

A strong majority of 9th and 10th graders polled for this study said this type of school would be more interesting than the school they currently attend. Eighty-nine percent of the students believed that attending a school where students take courses they need for college and also have opportunities to acquire skills and knowledge that are relevant to success in the workplace would be much (46%) or somewhat (43%) more interesting than their current school. Additionally, 85% of the students who find high school boring or irrelevant said they would enroll in such a program (Peter D. Hart Research Associates, Inc., 2006).

California has made a commitment to integrated curriculum in developing its Career Technical Education Model Curriculum Standards that incorporate academics and such workplace skills as "effective communication" into the curricula for each of its 15 industry sectors. The Standards include 11 "foundation standards" that all students need to master to be successful in the career technical education curriculum and in the workplace. These standards are similar to the competencies described in the June 1991 report issued by the U.S. Department of Labor, "Secretary's Commission on Achieving Necessary Skills" (SCANS). The foundation standards are uniform in all sectors, although the subcomponents differ. They cover the following 11 areas:

1) Academics
2) Communications
3) Career Planning and Management
4) Technology
5) Problem Solving and Critical Thinking
6) Health and Safety
7) Responsibility and Flexibility
8) Ethics and Legal Responsibilities
9) Leadership and Teamwork
10) Technical Knowledge and Skills
11) Demonstration and Application

Experiential and applied learning with exposure to the workplace to facilitate and motivate learning

While closely related to the concept of curricular integration in general, research suggests that experiential and applied learning, coupled with career exposure, offers its own independent benefits: *engagement* (due to the "real world" or authentic nature of the tasks); *accessibility and retention of learning* (due to the "hands-on" nature of the activity); and *exposure to options* that can help students understand why school is important. For community college students, research also suggests that economic benefits accrue to students from completing a community college program. These benefits are in themselves motivating.

The discussion below provides additional information on each of these aspects of experiential and applied learning.

Authenticity that promotes engagement

Authenticity in content is key to making material relevant and engaging. The National Research Council included "authentic tasks" as a key element of successful pedagogy. Researchers Renzulli, Gentry, and Reis (2004) recommend that authentic learning opportunities that provide students with meaningful content be adopted by the nation's schools. Many authors and researchers have echoed this, including DeLuca et al. (2006), Kazis (2005), Mitchell (2004), Stone et al. (2005), and Walcott, Owens-West, and Makkonen (2005), among others. In a recent survey conducted by the Bill and Melinda Gates Foundation , nearly all the respondents said they favored providing more opportunities for "real-world" learning in high school.

"Hands-on" experiences that facilitate learning

Equally important to this discussion is the growing body of knowledge related to learning theory and the importance of "doing" as a way to enhance learning. Applied learning allows for learning with all the senses and "intelligences." Dr. Margaret Ellibee and Sandra Mittelsteadt, educational consultants, assert in "Developing an Understanding on How We Learn," that research is showing that "the more senses you use, the more likely you will remember the subject matter." Dr. Laurel Adler (2006), citing material from the National Training Laboratories, states that with lecture only, individuals retain only 5% of what they are taught, while with "doing"

they retain 60% and with teaching 90%. In other words, students learn more when they are fully engaged in applying their learning through "hands-on" activity. This information further suggests that students may retain even more if they can teach or mentor other students.

In addition, in the 1980s, three "learning styles" were identified: visual, auditory, and kinesthetic. In 1983, Howard Gardner published "Frames of Mind," describing his theory of "multiple intelligences," which postulated seven types of intelligence: linguistic, logical-mathematical, spatial, musical, bodily-kinesthetic, interpersonal, and intrapersonal. Gardner later discusses the use of multiple intelligence theory as offering multiple "entry points" to understanding.

> *The concepts of importance in each domain allow a number of "entry points," ranging from the aesthetic and the narrative at one extreme, to the logical, the philosophical and the experiential at the other. Given a variety of entry points, it should be possible to find at least one that is appropriate for each student.* (p. 230)

While these theories remain controversial, some educators have employed them to create environments that they believe enhance learning for more students. For example, in Ireland, teachers working with the Education Department of UCC found that the implementation of multiple intelligence theory in their curriculum development has enabled them to achieve higher levels of motivation, more engagement and better results with pupils in their classroom, especially with those who were previously underachieving and alienated. As Hyland (2001) states:

> *This is particularly important in Ireland where more than 20% of our young people still leave school without taking the Leaving Certificate. We know that negative experiences of learning which often results from a failure to recognize the multiple ways in which people learn, will inevitably militate against a culture of lifelong learning which will be essential if Ireland is to remain an economically viable and successful country. We cannot afford to overlook the potential of any of our young people, either for moral, social or economic reasons.*

While not unique to CTE, applied learning that engages students in multiple ways is central to career technical education. CTE courses inherently provide contexts for this to occur (Owens & Smith, 2000; Rogers, 1969). Indeed, according to the authors of the NAVE report (Silverberg et al., 2004):

> *There is little question that academic and vocational teachers use different methods to deliver instruction. Academic teachers are more likely to report having students listen to a lecture, write a paragraph, do homework, or take a test or quiz. In contrast, vocational teachers report that their students engage in more applied activities — working*
> *on extended projects, using applied curriculum, performing technology-related tasks, and engaging in career exploration activities.* (p. 84)

What is unique about high-quality CTE is that it provides opportunities for applied learning through exposure to the workplace, providing, thereby, the authenticity that motivates students,

as described above, as well as exposure to areas of personal interest for the students. ACTE cites a report by the Advisory Committee for the National Assessment of Vocational Education noted in 2003, saying that "Career and technical education empowers students by providing a range of learning opportunities that serve different learning styles…For many students, applying academic and technical skills to real-world activities, using computers and other tools, and being able to see how their learning is related to the world of work make CTE classes more interesting and motivating, and more educationally powerful than standard academic classes" (ACTE, 2006b).

Exposure to options that help students see the importance of doing well in school

Data from the 2001 California School-to-Career evaluation (WestEd & MPR Associates, 2002) shows that as students participate in larger numbers of career awareness activities, including workplace tours, job shadowing and internships, they express more positive attitudes about the importance of doing well in school. For example, in one STC partnership, 42% of students who had participated in one career awareness activity felt that STC had helped them understand the importance of doing well in school, while 83% of students who had participated in three career awareness activities felt that way. Similarly, in another partnership, 68% of students who had participated in one career awareness activity felt that STC had helped them see the importance of doing well in school, compared to 87% of students who had participated in three career awareness activities.

Economic returns that motivate learning

The authors of the NAVE report (Silverberg et al., 2004) recommend the promotion of cooperative education and other work experience programs, citing that "preliminary analyses in one state suggest that taking cooperative education has a positive effect on earnings at least during the first year or two after high school graduation" (p. 292).

Multiple assessments aligned to standards and curriculum

Silverberg et al. (2004) recommend that to raise occupational and technical skills in high schools the appropriate strategies would include:

- Require content and performance standards for vocational courses
- Promote aligned end-of-course technical assessments
- Include rewards and sanctions

According to Achieve, Inc. (2004), states are not keeping pace with rising knowledge and skill demands, and are not assessing the skills that students will need to be successful in postsecondary education and work. Achieve asserts that "only eight have aligned their high school graduation requirements with college and workplace expectations, according to a 2006 study; 26 states require students to pass an exam before they graduate high school, but these tests tend to measure only 8th, 9th, or 10th grade skills rather than the higher-level skills students need to succeed in college and the workplace; and, very few states have testing systems with

components that assess whether or not students have mastered college- and work-ready knowledge and skills.

Assessment can either support contextual teaching and learning or hinder it (Ananda, 2003). Most state assessments consist mainly of decontextualized multiple-choice and short-answer items that address academic core content, whereas contextual teaching and learning emphasizes hands-on, integrated learning of academic and real-world skills. With the current focus on standardized testing to measure schools' attainment of goals under No Child Left Behind, efforts to measure SCANS-like and academic skills in context have been de-emphasized. Strengthening local assessments in a "mixed" state-local assessment model, and incorporating assessment data-driven decision-making into program improvement efforts, are two examples of ways to make assessment an integral and meaningful component of contextual teaching and learning reforms. Both strategies rely heavily on efforts at the local level, with the state playing a key role in providing technical assistance, oversight, and approval.

Examples of assessments that can be implemented at the local level to support contextual and career-related learning include:

- Standardized tools designed specifically to assess workplace competencies, such as WorkKeys;
- Problem-solving scenarios that depict complex and realistic problems in a work-related or other "real-world" situation,
- Project assessments, such as senior projects that include background research, a research paper, development of a product related to the paper and an oral presentation to an audience;
- Portfolio assessments, involving the structured collection of student work that documents students' application of knowledge and skills in a variety of authentic contexts;
- Industry-based assessments; and
- Computer-based assessments that allow for dynamic interaction between students and assessment items, including different stimuli for questions that may otherwise be cost prohibitive, such as complex diagrams, photographs, or audio and video clips.

Oregon offers a model that combines features of local and state assessments to measure SCANS-like skills with its "Certificate of Advanced Mastery" assessments. Under this model, substantial responsibility for assessment of SCANS-like skills would be delegated to local programs and schools, while the state would provide parameters and models for assessments that measure SCANS-like skills, allowing schools and local programs a choice for which assessment tools to select or develop (Ananda, 2003).

In adopting its "Career Technical Education Model Curriculum Standards," described above, California has set the stage for developing various asssessments, tools, and strategies that can measure students' achievement of workplace readiness skills. While these CTE standards have yet to be fully implemented, they will serve as the basis for statewide assessments in career-technical education in grades 7-12.

At the community college level, assessment is often industry-driven, leading to industry certifications and credentials, and it is used to drive "competency-based curriculum." Faculty are encouraged to develop curriculum that meets academic and quality standards, is designed and organized by competencies required for jobs, and is cross-walked with industry skill standards and certifications where applicable. The use of job profiling and of "subject matter experts" (such as in ACT's WorkKeys profile or the DACUM profile) are encouraged as tools to strengthen the curriculum and meet the competency needs of business (NCWE, 2006).

Industry partnerships

The NAVE report (Silverberg et al., 2004) emphasized the need for industry involvement at all levels of CTE. The 2002 California School-to-Career Evaluation (WestEd & MPR Associates, 2002) explained why these connections are so critical:

> *Schools count on businesses and labor organizations to provide work-based learning opportunities for students, give input into curriculum that meaningfully integrates industry-valued and academic skills, and generally help schools and teachers better understand the future educational and career demands for which students are preparing. At the same time, business, labor organizations, and CBOs have vested interests in a successful state STC effort because STC is aimed at preparing today's students to be tomorrow's educated citizenry and productive workers.* (p. 57)

In postsecondary education, the link is even more crucial, as CTE programs are most often preparing students for direct entry into the workforce. As discussed in the career pathways literature (e.g., Jenkins, 2006; NCWE, 2006; Hull, 2005), industry is expected to play a primary role in the determination of relevant skills and competencies, in keeping faculty abreast of developments in their industries and workplaces, in providing ongoing oversight of pathway relevance and content, and in offering workplace opportunities and jobs for students.

The California School-to-Career evaluation (WestEd & MPR Associates, 2002) reported that employer involvement in school-to-career was, as of 2001, fairly common in California. However, employers tended to participate in low-intensity career awareness activities, such as career fairs, more frequently than other kinds of activities.

According to Mitchell (2004) in the longitudinal study of California Regional Occupational Centers and Programs 2004, over 18,000 business and industry representatives are involved in the development and monitoring of ROCP curricula in California; and over 35,000 businesses throughout California offer work-based internships to students who are training in the particular business' occupational field.

At the community college level, by design, every CTE program has partnerships with industry for curriculum input. "…[Some] colleges have developed strong links between school-based and work-based learning, through cooperative education, school-to-work learning, and school-based enterprises" (Grubb, 2001, p. 36).

However, overall, there appears in the literature to be evidence of a lack of *coherent and consistent* collaboration between industry and education/training both nationwide and in

California (Hoachlander, 2006; Mitchell, 2004; Silverberg et al., 2004; Stasz & Bodilly, forthcoming).

According to the NAVE report (Silverberg et al., 2004), while there appears to have been some progress at the state level across the country to better integrate industry and education/training, there was little or no industry-education involvement at the local level, especially the secondary level. Generally, employers provide relatively little input in competency lists and standards, and as a result do not appear to have a significant effect on local secondary vocational programs. Specifically, the NAVE report found that advisory committees that only met sporadically (once or twice a year) had little influence over program design or curricular content. This is of particular concern at the community college level where curriculum is shaped mostly by a determination of which skills contribute to employability in the local area (citing Hudis, Blakely, & Bugarin, forthcoming).

With regard to employer engagement overall, a practice that has been recommended is the use of intermediaries. "Facilitating Employer Engagement among WIB Partners: A Role for Intermediaries" (National Collaborative on Workforce and Disability, 2005), discusses a model whereby intermediary organizations work with disparate workforce development partners and create a single point of contact for employers:

> *Many employers have articulated that their success in hiring individuals represented by various workforce development programs is bolstered by the convenience of a single point of contact from among the myriad of employment service programs, along with mechanisms that ensure competent and employer-friendly support from the workforce investment system. At both the local and state levels, intermediaries can therefore facilitate more effective employer engagement among WIB partners by taking on responsibilities to coordinate employer engagement in the workforce investment system.* (p. 2)

In *Career Ladders: A Guidebook for Workforce Intermediaries*, prepared for Workforce Innovations Networks, Prince and Mills (2003) of Jobs for the Future offer guidance to intermediaries in implementing "career ladders"[39] whereby intermediaries "improve local and regional labor markets" by performing two essential roles:

1) *Organizing and planning:* Mobilizing the stakeholders in the labor market — including employers, individual workers, government officials, and education, training, and other service providers — to benefit employers and low-income workers.
2) *Providing or brokering services:* Ensuring that low-income job seekers, and the employers who hire them, have access to job matching, training, support, and other services.

According to the National Intermediary Network, numerous intermediary organizations are also operating around the country to serve youth and "help build a future workforce" (2006).

[39] The term "career ladders" refers to a set of occupations that are linked together by common or complementary skills; these linkages provide workers with opportunities to advance, and they expand the recruitment opportunities for employers.

System coherence

The ongoing need for enhancing coordination and coherence in the provision of education, job training, and workforce development is a dominant theme in the research literature. Better linkages among providers can leverage the impact of each kind of program or service; for example, as Norton Grubb (2001) observes, "In a coherent system, programs could learn from one another and provide more comprehensive and effective services. … [In institutions which] have developed [those] strong links between school-based and work-based learning …a variety of institutional policies strengthen the quality of teaching, a dimension that is almost completely missing from job training, welfare-related and adult education programs" (p. 36).

Sequencing of courses and sequenced curricular pathways

"Sequencing" refers to the structured planning of both courses and curricular pathways.

Course sequences

Course sequences in CTE are essential for the building of successive levels of mastery in a career area. The 2001 California School-to-Career Evaluation found that course sequences contributed to the knowledge of the skills, education and training needed to be successful in careers (WestEd & MPR Associates, 2001). However, according to the NAVE report (Silverberg et al., 2004), students take vocational courses in varying numbers and with different objectives in mind, not necessarily seeking skill mastery or perceiving of their career development in the way prescribed by a CTE program. Students do not, therefore, always complete a full course sequence. Further, many schools and colleges do not offer coherent course sequences, and many CTE courses and programs do not have prerequisites. The notable exceptions cited were programs such as career academies and youth apprenticeships programs. Further, while Perkins II and III supported sequences by encouraging students to "concentrate" their course taking as a way "to maximize their appeal to potential employers," the recent trend in vocational course taking has been toward "exploring" across occupational program areas rather than "concentrating." Similarly, students are much less likely to take advanced course work in their area of concentration than in the past (Levesque, 2003).

According to Silverberg, et al. (2004), these data suggest that fewer students may now view developing skills in a specific program area as their main objective for enrolling in vocational education. Focus groups with students in vocational courses suggested a variety of other reasons for their participation: to gain career exposure, help them select or prepare for a college major, use as a fallback if college or other career plans fail to materialize, pursue a leisure interest, or take courses that present less of an intellectual challenge than do other courses. The authors postulated that CTE course-taking patterns may reflect a "broader conception" of career preparation. Students may be organizing what appears to them and their counselors to be a logical sequence of occupational courses representing different program areas, for example, including both child care and health care courses in preparation for postsecondary education toward a degree in pediatric nursing. In their summary of findings, the authors nonetheless cite the implementation of CTE course sequences as a key strategy for improving employment and earnings, "particularly for noncollege-bound students" (p. xxxvii).

Career pathways

While course sequences enable progressive skill development within a specific skill area (e.g., auto technology), pathways are more encompassing (e.g., vehicle maintenance, service, and repair). Career pathways are coherent, articulated sequences of academic and CTE courses, commencing in the 9th grade and leading to associate degrees, baccalaureate degrees and beyond, and industry-recognized certificates and/or licensure (Hull, 2005). When pathways are embedded in learning communities or academies, they can facilitate cross-disciplinary curricular integration and create a focus for learning and relationship-building (WestEd & MPR Associates, 2002).

From the economic and workforce development perspectives, career pathways are a means to align education and workforce and economic development systems to build a workforce that can meet the needs of a regional economy. In this framework, a career pathway is a series of connected education and training programs and support services that enable individuals to secure employment within a specific industry or occupational sector and to advance over time to successively high levels of employment in that sector.

As mentioned under "high-quality CTE," career pathways also drive education to align its programs with economic development efforts, thus ensuring the development of a workforce that meets the needs of regional economies while also ensuring economic security for individuals.

Overall, local STC partnerships in the 2001 California STC evaluation (WestEd & MPR Associates, 2002) reported that, at the secondary level, career pathways were only available in about one-third of high schools completing the survey. The study also found that fewer than one-third of seniors surveyed participated in either a career academy, career pathway, or Tech Prep program. While career pathways appeared to be more prevalent in more affluent schools, schools serving low-income youth are more likely to have academies, due, it was surmised, to the fact that partnership academies in California are focused on serving at-risk populations. The study found that students participating in academies, pathways, or Tech Prep not only came to understand the skills, education and training needed for careers, but also the importance of doing well in school. This finding is pertinent to both high school students and students in community college who may struggle with the academic requirements of their programs or who need motivation to persevere for other reasons.

Articulation, coordination, and course alignment of instruction with feeder and advanced-level agencies

Various researchers have cited the benefits of articulation and coordination between secondary and postsecondary institutions, as in the following quotations:

> *As linkages between secondary and postsecondary settings strengthen, the movement of students between these settings improves, and their ultimate academic and vocational successes can be heightened…Having similar policies and practices across settings — related to topics such as scheduling, assignments, and social opportunities — can provide students with experiences that more closely replicate the experiences that they will likely encounter in a postsecondary setting. Having such similar experiences could*

> *enhance their opportunities for success.* (CSRQ, 2004, p. 70, citing The American Diploma Project)
>
> *For instance, when transition programs focus on creating consistent policies and practices across secondary and postsecondary settings, such as programs related to high school testing and college admissions exams, students may have less difficulties assimilating into a postsecondary environment.* (Ibid., citing Venezia, Kirst, & Antonio)

However, goals for articulation have not always been achieved. Numerous studies have cited the need for improved articulation and coordination between secondary and postsecondary institutions (DeLuca et al., 2006; Hill, 2005; Hudis, Blakely, & Bugarin, forthcoming; Rosenbaum, 2001; Mortimer & Kruger, 2000; Silverberg et al., 2004).

The majority of these studies cited the lack of formal agreements, aligned courses, or faculty integration. Some studies identified poor levels of articulation and a lack of formal structures to facilitate postsecondary transition (Rosenbaum, 2001; Mortimer & Kruger, 2000; DeLuca, Plank, & Estacion, 2006). Silverberg et al. (2004) found that, nationally, limited linkages exist between secondary and postsecondary education. Where community colleges have played an active role in developing and updating articulation agreements, few have actually changed their offerings or activities as a result of this articulation. Curriculum alignment remains relatively rare at the postsecondary level, despite continued emphasis in the law and reported state activities. Further, the use of Advanced Placement (AP) courses and Dual Enrollment, where high school students can enroll in courses at community colleges that allow them to earn both secondary and postsecondary credit, to aid and promote articulation, has not been the norm (Silverberg et al., 2004).

Tech Prep programs, which create a formalized academic connection between students' last two years of high school and the first two years of college, are also regarded as having had mixed success in gaining positive acceptance within the community college setting (Farmer & Honeycutt, 1999; Brown, 2001). Farmer and Honeycutt, for instance, contend that while the goal of the "implementation of Tech Prep programs [is to] increase community college enrollments, reduce remediation, and increase graduation rates, … Tech Prep in most cases has not yet made [a] substantial [impact] … within community colleges" (p. 724). Debra Bragg (2001) also notes that a major challenge for creating successful Tech Prep programs lies in addressing the "implementation issues" that arise in getting programs launched.

Although curricular alignment of K-12 and postsecondary coursework is not yet a widespread practice, some promising models are on the horizon, especially for certain curricular areas. One national study indicates that coordination and transfer between postsecondary vocational programs and four-year colleges "most often occurs in engineering technology areas" (Yoo, 2001).

Project Lead the Way (mentioned by Hoachlander, 2006), a collaborative project between K-12 and postsecondary faculty in the field of engineering, demonstrates this type of successful linkage, in which high school and college faculty members work together to enrich the curricular content of engineering courses within the program. This collaboration has addressed both

curricular materials and professional development in a coordinated fashion, as Hoachlander notes, "Postsecondary faculty play a central role in defining both the academic and professional content that are the foundation of high school [engineering] courses …[in addition, these postsecondary faculty members] staff intensive, two-week summer workshops that are required of all high school teachers desiring to teach a Project Lead the Way course" (p. 4).

Some studies of Tech Prep emphasize that the "improved communication between [community] colleges and their public education, business, labor, and community partners" represents one of the "numerous ways [in which] two-year colleges have benefited from participation in Tech Prep partnerships"(Brown, 2001, p. 61).

In recommending the establishment and maintenance of articulation agreements to promote students' more efficient acquisition of college credit, Silverberg et al. (2004) point out that

> *…the expansion of articulation arrangements and the rapid changes in technology and economic conditions that generate modifications in postsecondary curricula make keeping articulation current more challenging…given that Perkins grants represent about 2% of local community college spending on occupational education, a focus for federal funds on younger students might also strengthen current efforts to develop rigorous cross-level course sequences, pathways, or programs of study.* (p. 254)

Coordination among education, workforce development, and economic development initiatives

This section looks at coordination between CTE programs and other educational initiatives on their campuses, with workforce development activities in their communities, such as those funded by the Workforce Investment Act, and with economical development initiatives in their regions.

Coordination with education reform initiatives

According to Silverberg et al. (2004), the principal focus of recent education reforms has been on improving students' academic achievement and increasing their opportunities to attend college. Perkins III provides explicit instruction to grantees to coordinate with these reform efforts by "building on the efforts of States and localities to develop challenging academic standards . . ." (Section 2). In addition, the accountability systems of Perkins require states to help vocational students meet state-established academic proficiencies (Sections 113 and 122(c)(5)(B)). Perkins IV will require even closer coordination.

Coordination with workforce development initiatives

Norton Grubb's (2001) ongoing research on community colleges has focused on the "particularly crucial role [of community colleges] … as the bridge between … training programs and the mainstream educational system," as linchpins of system-wide coherence in vocational education (p. 36).

When Congress enacted Perkins III, it also enacted the Workforce Investment Act (WIA) in 1998, with provisions to encourage coordination between activities funded under WIA Title I and Perkins III (Silverberg et al., 2004). In California, the 2000-2004 California State Plan Digest for Vocational and Technical Education (CCCCO, 2000) stipulated that Vocational and Technical Education Act (VTEA) recipients be represented on the local Workforce Investment Board (WIB), enter into a Memorandum on Understanding (MOU) with the local WIB, and involve local community in program development. This includes students, teachers, representatives of business and industry, labor organizations, representatives of special populations, and other interested individuals. Participation on the local WIB is intended to promote an understanding of industry needs and issues (DeLuca, Plank & Estacion, 2006; Silverberg et al., 2004).

There is also an operational link between WIA and Perkins through the implementation of individual training accounts. One study of coordination between WIA and Perkins observed that "because individual training accounts mandated by WIA give adults much more choice in selecting where they will be trained, postsecondary vocational institutions known for their high-quality training will benefit from WIA, whereas institutions lacking such a reputation will suffer" (Yoo, 2001, p. 108).

Coordination with economic development

Some community colleges systems also link their programs to economic development initiatives. For example, in California, according to the *California Community Colleges Economic and Workforce Development Annual Report, Fiscal Year 2004-05* (2006):

> *The Program's funds act as a catalyst to help the community college system continue to grow in being market responsive and creating vital career pathways for students. The Program currently fosters ten key strategic priority areas and provides other short-term grant components that address emerging areas and local project needs. The Program brings in outside investment and leverages the State's investment in the economic and workforce development mission of the colleges, and has shown flexibility in targeting high-end industry clusters and economically distressed areas.* (p. 1)

This issue is also raised in the NAVE report (Silverberg et al., 2004) with regard to community colleges in some states participating in the creation of their One Stop Career Centers.

Flexibility to respond to the requirements of changing workplace, including new and emerging industries

Important to the success of CTE is the ability of educational institutions to adjust to the ever-changing job market and emerging industries (Silverberg et al., 2004). This type of adaptation and ongoing growth involves not only the addition of newly created curricula that reflect emerging occupations, but also, as Kazis observes, the "weeding out [of] obsolete and dated programs [in favor of those] … in growing technical fields that can lead to good careers and that interest high school students" (Kazis, 2005, p. 7).

John J. Castellani, President of the Business Roundtable, spoke to the need for flexibility in his 2004 U.S. Congressional Introduction to the Committee on Education and the Workforce.

> *We must recognize that our training system for workers was developed for an economy that no longer exists. It was intended to help a static labor market adjust to cyclical business changes. But for today and the foreseeable future, we have a dynamic labor market that must adjust to structural economic changes.* (Castellani, 2004)

Additionally, Castellani contends that, because of the rapid pace of technology change and international competition, CTE will need to adapt programs, curricula, and instructional approaches quickly to keep pace. This was echoed in the 2005 survey, commissioned by Achieve, Inc., which reported that 84% of recent high school graduates not currently in college believe that they will need to pursue more formal education or training to adapt their knowledge and skills to meet employers' changing needs (Peter D. Hart Research Associates & Public Opinion Strategies, 2005).

Personalization, career guidance, and student services

This section examines literature related to three strategies that enhance learning for students, providing needed attention, guidance and support to ensure student success. These include:

- Opportunities for students to build relationships with peers and adults
- Career guidance and exploration
- Student support services to ensure success

Opportunities for students to build relationships with peers and adults

Positive relationships have been cited by the majority of literature as fundamental to student learning, success and continuation in the education system. "Relationships," now considered the "third R" after Rigor and Relevance, has been discussed widely in the school reform literature. Similarly, it has been suggested in the discussion about effective CTE that positive student-staff relationships are key to ensuring student achievement (ACTE, 2006a; Allen & Steinberg, 2004; Brand, 2003; Cotton, 2001; Daggett, 2004; Darling-Hammond, 2002; DeLuca et al., 2006; Bill and Melinda Gates Foundation, 2006; Walcott, Owens-West, & Makkonen, 2005; CSRQ, 2005). According to Walcott et al. (2005), "Reform proposals also stress the importance of building positive and supportive relationships between youth and adults. Such relationships can motivate students, guide them in making sound curricular and extracurricular choices, and connect students to their communities" (p. 31). Such relationships are particularly important for those students who may be at risk of dropping out (Brand, 2003a; Cotton, 2001; Darling-Hammond, 2002; DeLuca et al., 2006; Bill & Melinda Gates Foundation, 2006).

<u>Learning communities</u>

As described above, a growing body of research addresses the positive effects on learning that can arise within learning communities. CTE can produce similar benefits to the degree that CTE programs promote social cohesion among students and between students and faculty. This occurs

when students take classes together or otherwise share experiences, often when they are enrolled in a common pathway or in a career-themed academy.

A growing body of research is emerging on learning communities at the college level. As described earlier, MDRC, in partnership with the national, multiyear learning communities' initiative "Achieving the Dream: Community College Counts," is undertaking evaluative research on community colleges with at least 33% enrollment of racial minorities or low-income enrollment of at least 50%. Among the 27 community colleges with the first cohort under the Achieving the Dream initiative, 13 have identified learning communities as an intervention strategy that could have positive effects on student success (Price, 2005). Future research on the experiences at these schools will offer more conclusive evidence on the relationship of learning communities and student success at the community college level.

Student organizations

A unique feature of CTE programs is their Career and Technical Student Organizations (CTSOs). State and local CTSO affiliates are linked through 10 national associations. The organizations provide skill competitions, training, and other after-school activities, as well as classroom resources and strategies that CTSOs encourage participating teachers to integrate into their CTE courses. CTSO efforts are designed to emphasize both building technical skills and developing other competencies, such as teamwork, leadership, communication, critical thinking, and basic academic proficiency. To the extent that the organizations foster teamwork, require the involvement of an advisor, and promote group activities, they may also foster beneficial peer and adult relationships that can further enhance learning. Silverberg et al. (2004) identified their importance as fostering integration. No research was identified that specifically looked at the socio-emotional value of CTSOs, suggesting this as a fruitful area of exploration in the data collection for this needs assessment.

Career guidance and exploration

> *If students do not receive comprehensive information about postsecondary opportunities, they will be unable to make informed choices after high school graduation and may fare poorly in a knowledge-based market that demands high-level skills.* (CSRQ, 2004, p. 69)

Counseling, guidance and career exploration services are designed to help students explore decisions about course selection, further education, and long-term career opportunities. Without ongoing and up-to-date information, students may experience difficulties in either selecting an appropriate educational option or finding a job that is consistent with their interests and skills. The literature suggests that both college planning and career exploration are valuable for all students.

A recent report by the Institute for Higher Education Research at Stanford University confirmed that high school students often have misconceptions about college. The study found that students without accurate information may not be adequately prepared for postsecondary coursework, may fail to take advantage of financial assistance, and may underestimate admission criteria and postsecondary transfer policies. This is particularly apparent for first-generation college students

(Wimberly & Noeth, 2004). Similar findings were observed in a study by Hill (2005), who reported that less than one-half of students planning to attend a community college after graduation were familiar with the A-G requirements, and as a consequence may have limited or ended their chances of transferring into a four-year college.

In Works in Progress (CSRQ, 2004), career guidance is discussed as being useful for students who plan to enter the workforce directly after high school:

> *For students who choose to enter the labor market directly, information received in high school can help them learn about the knowledge and skills required in specific jobs and careers. High school career and guidance counselors can provide vocational testing and counseling to students to ensure that the jobs being sought align with their interests and skills and the demands of the labor market. Without an awareness of the nature and expectations for performance in occupations and without a firm understanding of the employment opportunities available in specific fields or geographic areas, students will make inappropriate job choices that can lead to limited economic and career success.* (p. 69)

The literature also suggests that career guidance and exploration are valuable for "college-bound" and incumbent college students as well, given that, as noted earlier, only about half of the students who enter either two- or four-year colleges earn a degree within six years (Tucker, 2004) and only 15% of high school graduates complete a four-year college diploma within 10 years (Hill, 2005). Guidance and career exploration opportunities that assist students with college course selection and goal-setting may encourage persistence; it may also assist students in finding appropriate work opportunities while they are still in college and when they leave (College Board, 2001).

In fact, Silverberg et al. (2004) remark that "in part because of the emphasis on these activities in prior Perkins legislation and the School-to-Work Opportunities Act of 1994, many career development activities are being offered in American high schools, and some practices, such as job shadowing and worksite visits appeared to be growing" (p. 59).

The authors go on to say:

> *The value of these and other school activities in helping students plan for careers is unclear, however. A study of 1998 high school seniors in eight states suggests that some of the most prevalent activities — e.g., career interest inventories, business and industry speakers — were not particularly helpful to students. On the other hand, more than half of the students who took vocational courses in their junior or senior years of high school considered those courses to be "very helpful" in clarifying their career goals.* (p. 60)

The solution, as noted in "Works in Progress" (CSRQ, 2005), is for high schools to offer an array of programs to facilitate student awareness of postsecondary options.

At the community college level, according to the 2006 Community College Survey of Student Engagement (Act On Fact Using Data To Improve Student Success Special Focus: Academic

Advising and Planning), "[t]he importance of academic advising and planning is well documented…" The report continues: "Anyone interested in reaching a goal is well served by having clear milestones for progress." In focus groups, community college students reported a particularly strong need to set milestones because their educational goals compete with work, caring for dependents, and other responsibilities.

Student support services to ensure success

Effective schools and colleges also provide ongoing assistance and support to students. While the provision of support services is not unique to CTE, it may be increasingly necessary to ensure that these are provided to CTE students if CTE classes focus more intently on ensuring academic rigor. This support can take many forms and in some of the most effective schools will be dictated by the student's needs (Carl D. Perkins Vocational and Technical Education Act (VTEA) IB Special Populations Collaborative Project, 2004; Silverberg et al., 2004). Specific examples of strategies to meet the needs of special populations include:

- Support Centers for students and specific support assistance for LEP students, students with disabilities, or others
- Varying forms of delivery for sight-impaired, hearing-impaired, LEP students, or others
- Specific technical courses for LEP students
- Varying times for classes
- Childcare facilities
- Remote learning
- Interpreters
- Dual language curricula and/or instruction
- Specific client instruction (e.g., Spanish-speaking technology courses)
- Non-traditional faculty/role-models
- Alternative media (e.g., close-captioned videos for hearing-impaired)
- Subsidies
- Lifeskill training
- Modifications to transportation routes

The K-12 education reform literature also cites specific programs, such as Advancement Via Individual Determination (AVID), CollegeBound, and Upward Bound, as providing targeted support to middle and high school students to promote their academic success. Basic strategies include: high expectations, counseling, in-school tutoring and homework assistance, financial aid, parent information sessions, SAT and ACT preparation courses, and college orientation activities (CSRQ, 2005).

Availability of skilled faculty, professional development, and collaboration

This section discusses the need for recruitment and retention of skilled CTE faculty, the need for ongoing professional development, and the importance of faculty collaboration for creating effective programs and ensuring student success.

Availability of a skilled CTE faculty

In order to ensure that CTE programs are of high quality, schools and districts must address strategies to recruit and retain faculty who have both career and academic qualifications and who are skilled instructors. As Silverberg et al. (2004) point out, however, improving the quality of CTE faculty remains a challenge. According to the NAVE report, many CTE instructors come from industry and may not have adequate educational qualifications or training. The dilemma for institutions is that it is often difficult to find and attract skill-specific CTE faculty. As a result, many states appear to have relaxed their baccalaureate degree requirements for certification, for either all or specific subgroups of vocational teachers. Nationally, the proportion of states requiring that vocational teachers have at least a baccalaureate degree fell from 40.2 % in 1988 to 23.8 % in 1998. The authors add: "Substantial investments in new recruitment and in-service training approaches may be required if federal legislation continues to make supporting academic achievement a priority for vocational education" (p. 273).

Professional development

Recommendations for improving CTE (ACTE, 2006a) includes the need for high-quality teaching in all content areas:

> *Deep knowledge of content and skills in effective teaching methods, should apply to CTE teachers as well, including those entering the teaching profession through traditional teacher education programs and those transitioning into teaching from business and industry through alternative certification programs … CTE teachers should be able to demonstrate content mastery through a method appropriate to their areas of expertise, utilizing industry-based credentials or assessments aligned with career clusters where available.* (p.18)

The 2002 STC evaluation report (WestEd & MPR Associates, 2002) stresses the importance of professional development in helping *academic teachers* integrate career-related information and activities. The study found that, while most, if not all, local partnerships reported offering STC-related professional development, it was not clear how many teachers had actually participated in these efforts. It was also not clear whether those teachers who had participated had achieved the level of competence necessary to successfully implement various instructional strategies (e.g., curriculum integration) and activities related to STC. Findings indicated that many teachers generally support STC and see its value for students, but may not have had in-depth knowledge of implementation practices.

> *Educating teachers that even low-intensity (relatively easy to implement) career awareness activities can make a difference may be helpful. Assisting them to develop the knowledge and skills needed to connect career development goals and WBL to academic standards will be especially important in the current accountability-focused educational environment. Other promising professional development strategies mentioned by some partnerships included: fully integrating STC concepts and practices into teacher preparation programs, and providing opportunities for teachers to meet in industry-*

specific groups to share best practices and ideas for overcoming challenges associated with STC implementation. (p. 86)

Carefully planned approaches to professional development help ensure that teachers themselves are lifelong learners; by engaging in their own ongoing content and skills enhancement, teachers can model the habits of professional development that their students will need to adopt in order to be successful as they enter the workforce.

Rich, sustained learning among faculty is built upon the recognition that "effective professional development grows from the teachers and is not 'done to' the teachers" (Horowitz, 2005, p. 50). Horowitz's findings, based on evaluations of school reform efforts in 28 California high schools, make clear that "the most powerful professional development … begins with involving teachers in identifying content that meets their self-identified needs" (p. 45). Horowitz also notes that creating a collaborative environment for professional development was "essential" to ensuring that "professional development activities [were] valued and effective" for the individuals they were designed to reach (p. 48).

Horowitz emphasizes that careful attention must be devoted to teachers' schedules in order to ensure that professional development activities can be ongoing, since sustained opportunities for learning and interaction among faculty are essential to "build[ing] the trust necessary to discuss best teaching practices," which includes, among many other elements, strategies for improving "curriculum, assessment, … student support, school climate, and effective interventions" on behalf of students (p. 49).

Faculty collaboration

Faculty collaboration is mentioned explicitly in nearly all of the reform efforts described above, and is implicit in all of the models that include learning communities. In CTE, it is required for effective curricular integration, whether faculty are simply sharing information or actually team teaching. Collaboration is also required to ensure student success, especially as CTE programs become more rigorous.

Horowitz (2005) highlights the importance of "collective responsibility" based on mutual respect and support among teachers, focused on a shared goal. In addition, it is noted that the kind of professional learning communities that can sustain school reform do not occur without cooperation on the part of teachers and administrators. "The development of professional community — teachers working collaboratively toward a common goal with a common purpose, whether developing an instruction unit and assessment, initiating a new program, or making decisions impacting the entire department or school — proves to be the most significant and enduring result of efficacious professional development" (Ibid., p. 44). Moreover, successful programs involve "meaningful opportunities" for teachers to collaborate.

Use of data for program improvement and accountability

A number of researchers have stated that establishing common accountability systems that allow students' progress to be tracked, transitions to be monitored, and coherent pathways to be established, is important to facilitate much of the reform discussed. For example, in *Career*

Pathways as a Systemic Framework: Re-Thinking Education for Student Success in College & Careers, the National Council for Workforce Education Fall Conference recommends accountability as a key component of career pathways and posits a system that has a "[f]ocus on data-driven accountability and decision making, utilizing metrics that are understood by business and non-educational partners. Career pathways shift away from the use of compliance or anecdotal evidence by cultivating the use of evidence to ensure systems meet the needs of students and employers" (p. 8).

However, as reported by Silverberg et al. (2004), state systems face considerable barriers to establishing high-quality accountability systems. Most state and local officials concede that the quality of their Perkins data needs improvement (White et al., forthcoming). State directors note problems with the collection of data on most indicators, including: rudimentary local data collection systems that depend heavily on hand counts; lack of time to establish complex data collection systems and train local staff; differences in record-keeping practices; staff expertise; and the varying structure of vocational programs at the local level affected data quality adversely. [40]

New Perkins accountability measures will be implemented with Perkins IV, as described above. The U.S. Department of Education will be providing guidance to states regarding the implementation of these new measures. Given that the new measures have yet to be implemented and the complexity of this issue, information on this issue was not solicited from survey and focus group respondents. Similarly, leveraging of resources depends on the structure of various funding streams supporting CTE, including Perkins funds; discussion of this issue goes beyond the scope of this needs assessment.

SUMMARY

This literature review has provided an overview of the need for high-quality career technical education in light of economic globalization and current educational outcomes. It examined national research on education reform and career technical education as well as "best practices" in the CTE field, with the purpose of identifying trends and innovations in the implementation of high-quality CTE programs. This review resulted in the identification of six sets of practices or *system components* of high-quality career technical education that appeared across the

[40] Staff of the California Department of Education and the California Community Colleges Chancellor's Office discussed a number of challenges related to data collection and tracking of CTE outcomes in California (WestEd conference call, 10/23/06). Some of these include:
1) Incomplete data: data may be missing, for example, due to difficulty in contacting students after they have left programs, necessary to determine transition to postsecondary education, the military or employment; 2) Lack of student-level data: the inability of systems to provide student-level data that would allow for program improvement; 3) Data reporting processes/emphasis on compliance over program improvement: data are collected and reported for the purpose of accountability to the U.S. Department of Education, but are often not provided back to programs for program improvement purposes; 4) Discontinuity between educational and workforce and economic development outcome measures: At the community college level, data measure awards, readily measure other outcomes, such as employment in the absence of awards, but do not reflect activity such as courses taken that did not result in an award, but may have resulted in successful employment; 5) Timing: Standardized tests are administered to high school students often before they have taken any CTE courses, such that test results do not measure impact of CTE.

educational reform literature, the CTE literature, and the examples and models of effective practices, both across the country and in California. These include:

1) Curricular integration
2) Industry partnerships
3) System coherence
4) Personalization, career guidance, and student services
5) Availability of skilled faculty, professional development, and faculty collaboration
6) Continuous improvement and sustainability

These key system components lay the foundation and provide the framework for the discussion of the survey and focus group results that follows.

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SURVEY AND FOCUS GROUP RESULTS

As described in the methodology section, the primary vehicle for data collection in this needs assessment was the survey of key constituents of career technical education: administrators, instructors, counselors, and business/industry representatives.[41] In order to obtain more nuanced information and to follow up on issues surfaced in the survey, focus groups were conducted with all those constituents. In addition, focus groups and interviews were conducted with other key constituents, namely, students and parents.

The results of the survey and focus groups are presented in three sections. This first section focuses on perceptions of key constituents of career technical education regarding needs of the workforce and needs of students, as well as the role of CTE in addressing these needs. The second and largest section presents responses regarding the implementation of key components of career technical education, including both challenges and effective practices, presented by CTE system component. Finally, this chapter ends with a summary of respondents' overall recommendations for improving CTE and their vision for CTE in California, presented by respondent group.

PERCEPTIONS OF NEEDS

The findings regarding how key constituents perceive the needs that CTE must address sets the stage for the rest of the chapter. The presentation begins with what employers said about workforce needs, then moves to how educators view student preparation for postsecondary education and future occupations, what each key constituent group said about the purposes of CTE, and, finally, how students view their own education and preparation for postsecondary education and careers.

The skills employers want

To better understand the needs of the workplace for which the CTE system is preparing students, the survey solicited the views of industry representatives (N=47) on the skills and certifications they seek from employees. These issues were discussed in greater depth with a focus group, attended by staff of the Economic Development Program of the California Community Colleges and industry representatives.

Survey results on business needs

Industry survey respondents were asked to rate several types of knowledge, skills, and abilities in terms of importance for both *entry-level employment* and *long-term success* in their organizations. (For ease in reporting, ratings of "Very important" and "Important" were combined into one, overall importance rating.) With respect to entry-level employment, 100% of

[41] The survey instrument used for each constituent group, including the items and frequencies of responses for each item, are presented in the Appendix. As noted in the Methodology section, 1,311 responses were received from the surveys. The specific breakdown of responses by group is as follows: 409 administrators; 592 CTE instructors; 165 academic instructors; 85 counselors/advisors; 13 community-based counselors/advisors; 47 business/industry representatives.

respondents rated "good attitudes and workplace habits"[42] and "computational (math) skills" as important, and nearly all respondents noted the importance of "critical thinking and problem-solving abilities" (96%), "interpersonal skills and the ability to work with diverse individuals" (94%), and "reading and writing skills" (92%). The knowledge, skills, and abilities that were identified by the least number of respondents were: "skills and knowledge specific to the position" (79%) and "fundamental computer skills and knowledge" (72%), but even these were rated as important by a large majority of respondents.

Industry survey respondents were also asked to rate the same set of knowledge, skills, and abilities in terms of importance to *long-term* success in their respective industries. Once again, all respondents rated "good attitudes and workplace habits" as important. Other responses mirrored those pertaining to *entry-level* employment in many, though not all, respects. For example, nearly all respondents to this question indicated the importance of having "the ability to continue learning as the industry evolves" (98%). Over 90% rated the following as important as well: "Interpersonal skills and the ability to work with diverse individuals" (96%), "computational (math) skills" (94%), "reading and writing skills" (93%), and "critical thinking and problem-solving abilities" (91%). The vast majority also indicated the importance of "skills and knowledge specific to the industry" (85%) and "self-knowledge and career-management abilities" (81%).

When asked about various certificates, diplomas, and degrees for *entry-level* employment in their companies or organizations, the most frequently rated as important were the high school diploma and "experience in the workplace" (with both options identified by 78% of respondents). Approximately half of the respondents indicated that a college certificate (51%) or an industry-recognized certificate (49%) was important for entry-level employment. College degrees were rated as important by over 40% of respondents: 41% rated a two-year degree as important and 43% rated a four-year degree as important.

In a similar vein, respondents were asked to rate the *minimal* level of certification/degree required for *long-term* success in their respective industries. Ratings were provided for staff working at the operational level (non-managerial) and in managerial roles. For operational positions, the certification/degree identified most frequently as a minimal requirement is a high school diploma (35%). The next most frequent responses are a two-year degree (20%), an industry-recognized certificate (13%), and a four-year degree (11%). Conversely, for managerial positions, the minimum level of education required for long-term success most frequently selected is a four-year degree (52%). Other options were identified with much less frequency (13% for a two-year degree, 9% for a high school diploma, 9% for a graduate degree, 7% for an industry-recognized certificate, and 4% for a college certificate).

Focus group discussions of workplace needs

In discussing the skills needed to enter and succeed in the workplace, common themes emerged during the Economic Development and Business focus group. In general, participants emphasized that "soft skills" — including communication, critical thinking, problem solving, a

[42] Notably, "good attitudes and workplace habits" received a rating of "very important" by 87% of respondents — higher than all other characteristics.

strong personal and work ethic, ability to function well in a team setting — were essential prerequisites for students entering the job market. Some focus group members added that "general skills centered around the job context" were of higher priority than specific technical skills. "We need minimum requirements, not an ideal," observed one participant. Another added, "we will train on specific technology."

Employers also placed great weight on students' capacities to continue learning and adapting while on the job, including demonstrating the "ability to learn online." One member of this focus group pointed out that completion of CTE curricula was important to employers because "degrees are evidence of ability to learn, endure, and get closure."

Focus groups of *educators* (e.g., administrators, CTE instructors, and counselors/advisors) echoed that of employers in emphasizing the importance of students' development of the following qualities: communication, problem solving, critical thinking, appropriate clothing and grooming, honesty, and reliability. Several focus group discussants went even further, noting that employers had informed them that, while employees could be offered subsequent training to update or enhance their technical knowledge, personal "soft skills" were non-negotiable. They then clarified that the basic academic skills of reading, writing, and math were assumed.

What educators think about student preparedness for the future

Counselors/advisors were asked to identify the extent to which their school was "able to provide the curriculum, experiences and support to ensure that students [in general] are prepared for post-secondary education or training." Overall, 85% of counselors/advisors reported the school was able to prepare students for postsecondary education or training at least to some extent: 38% responded that the school was able to do so "to a great extent," 47% "to some extent," and 15% "to a minimal extent." When asked about the extent to which CTE students were prepared for postsecondary education or training, a slightly higher percent — 88% — reported that students were prepared at least to some extent: fewer reported that they were prepared "to a great extent" (31%), but fewer also reported that they were only prepared "to a limited extent" (12%); most (57%) reported that they were prepared "to some extent."

Despite this perceived high level of preparation, many counselors noted barriers to postsecondary education. In answering the open-ended question, "what factors inhibit preparation for postsecondary education or training," approximately one-third of the respondents mentioned economic concerns. They suggested that while students may be ready to go on to postsecondary education, finances prevented them from doing so. Other barriers to postsecondary education mentioned by counselors included language, transportation, and discouragement. One counselor/advisor said:

> *School has become so tedious that most kids can't wait to get out. Especially those who are not successful. What would you want if you went through 13 years of programs that only served to show you how inept you were? We know when these kids are finishing 8th grade that they won't be successful in general ed classes in high school, but we MAKE THEM attend. Each class they fail serves to lower their self-esteem. They literally give up. And we still make them sit through class. We don't have options for kids that are not academic sponges, and we don't even promote those skills they do have through the arts.*

> *By the time they drop out, they are so disenchanted with school, even if you could offer them a class that would promote the skills they do have, they think it will be the same old story!*

Counselors were also queried about whether they felt students had the opportunity to become prepared for high-skill, high-wage occupations. Fifty-eight percent reported that students had this opportunity "to some extent," 20% "to a great extent," and 22% "to a minimal extent." When asked about the factors that help prepare students for high-skill, high-wage, and high-demand occupations, the most commonly selected response was "coordinated work experience or internship programs" (76%). Other factors selected were: "well-articulated course sequences" (67%); "rigorous curriculum" (53%); and "an abundance of these types of jobs in the community" (38%).

Administrators and CTE instructors were asked about the challenges they perceived in preparing students for high-skill, high-wage occupations. For administrators, "difficulty in recruiting teachers with appropriate credentials and experience" was most frequently identified as a challenge (83%, where responses of "challenging" and "very challenging" are combined). (Instructors were not asked this question.) In general, the two groups were consistent in their perceptions of challenges. "Lack of funding for state-of-the-art equipment" was rated as "challenging" by 80% of administrators and 81% of CTE instructors. " The next most challenging issue for both administrators and CTE instructors was "difficulty in recruiting industry partners" (58% for both groups). Identified by approximately half of both groups were "lack of high-skill, high-wage jobs" (administrators 44%, CTE instructors 53%); "difficulty in keeping curriculum up to date" (administrators 49%, CTE instructors 48%); "insufficient number of students to create pathways" (administrators 52%, CTE instructors 47%); and "difficulty in staying informed about workplace needs" (administrators 49%, CTE instructors 44%).

When asked to write in "other reasons" that preparation for high-skill, high-wage occupations was challenging, many administrators mentioned lack of appropriate facilities. They also mentioned that the need for students to take remedial classes to pass the California High School Exit Exam and pressures for students to take A-G classes, took time away from taking career technical classes. One administrator wrote the following:

> *The main problem is the complete misalignment of the K-12, CC, CSU and UC education systems in California. It takes more than a one-semester course to truly develop the level of skill necessary to enter such occupations, students usually must make a choice between high-skill CTE studies and meeting A-G requirements. Unless every CTE course meets A-G requirements and every CTE teacher is recognized as highly qualified, everyone is going to come out of high school without being qualified to do anything except go on to more of the same thing they did in high school — theory without application.*

Instructors also mentioned lack of facilities as a barrier and highlighted that administrators may not know how rapidly technology changes in the workplace, necessitating new tools in the schools. They also noted students' financial constraints, explaining that preparation for high-skill, high-wage occupations requires an investment in time that some students cannot make, given their need for immediate employment to help support their families. Financial

considerations also limit students' willingness to take unpaid internships over paid jobs. Finally, one instructor suggested that counseling and guidance staff need more information about what skills are needed in the workplace.

In light of the challenges to preparing students for postsecondary education and work, focus group discussion sought to understand what role stakeholders see for CTE in preparing students for the future workplace.

The role of CTE in preparing students for the future

All focus group participants discussed the purpose of career technical education. Despite the diversity of roles and organizations represented, the responses are more similar than different, with nearly all groups mentioning preparation for *both* postsecondary education and work. For example, participants in all groups stressed the importance of career exploration as well as skill development, with many individuals highlighting CTE as a strategy to foster life-long learning. Details on the perceptions toward CTE of various stakeholders are provided below.

Business and economic development

In this focus group, respondents highlighted the importance of career exploration, suggesting that this begin as early as middle school. They discussed the role of CTE in imparting technical skills, but emphasized the importance of workplace skills such as communication and critical thinking. In addition, the importance of applied and work-based learning was emphasized, and particularly the role of CTE in using applied learning strategies to ignite students' interest in "life-long learning" — ensuring that students' natural love of learning is not "extinguished." "This is the "most important outcome" in K-14 education, on participant said. At the same time, respondents suggested that K-12 institutions and community colleges should coordinate and leverage resources in providing CTE courses to students, allowing students to take their CTE courses at their local community college, when possible.

Administrators

Administrators mentioned the need to provide students with both specific skills and exposure to multiple options. They discussed the concept of "career ladders" that would enable students to move both "horizontally and vertically" within career areas. They see CTE as supporting the success of all students and fostering high academic achievement. "CTE is for college-bound as well as other students," asserted one of the administrators.

When asked how CTE programs or courses fit into the overall program of study for students in their school/college, responses were extremely diverse, with each participant seeing the importance of serving students in the programs for which they were responsible.

- One county office of education targets programs to at-risk youth, students in the court schools, and students in alternative education.
- In one district, CTE serves all students. With funding from the Gates Foundation, the district is promoting small schools and sees the integration of CTE as a catalyst for driving reform in schools. This district's ROP resources are focused at the high school

level. Each of the 14 smaller schools has a career theme and pathway courses through the senior year, and integrates ROP courses into its program.

- Another administrator talked about the importance of CTE in the community colleges, whether in metropolitan or rural areas. In one program at his rural college, English and Fire Technology are woven together.
- One suburban high school has taken on a schoolwide theme of technology, encompassing subjects ranging from math to the arts, and leverages community and business resources to seamlessly weave CTE into all of its courses.
- One ROP administrator discussed the role of her program in providing more opportunities to students who are not ready for or interested in college, shifting the program's focus from adults to high school students, and integrating its programs more fully with the high school curriculum.

CTE instructors at the secondary level

Instructors focused on the value of integrated curricula and hands-on learning as means to helping students understand the purpose and value of learning. They see CTE as "making…education accessible to all students," motivating them to learn, preparing them for postsecondary education, and "opening doors for potential careers." One instructor stressed that all of his students leave with the idea that "any career will need some postsecondary education."

CTE instructors were eloquent in describing the purpose of CTE: "CTE provides [students]…knowledge for living as well as the wisdom and the skills they will need." Another said that beyond gaining knowledge to enter an industry, students "gain leadership skills that make us a stronger country, a greater workforce."

In describing how CTE programs or courses fit into the overall program, CTE instructors talked about the "life-long learning process": "Learning starts in high school, but it doesn't stop: job skills, job applications, work at the job site, interviews, resumes — all these fit into our curriculum."

CTE instructors at the postsecondary level

At the postsecondary level, instructors were more focused on "strengthening the state's economy" and ensuring employment so that students would go on to "contribute to the tax base." Nonetheless, they also emphasized the value of CTE for providing "meaning and relevance" to what is taught, providing opportunities for students to be successful, understand their options, and prepare for transfer to universities. They also want to impart skills that students can use in the workplace immediately, if they are not going on to four-year institutions.

In discussing the role of CTE within their institutions' overall programming, postsecondary instructors stressed the rigor of CTE and its importance in providing the habits of mind and "soft" skills that employers seek: work ethics, problems solving, and communication. "One of the biggest disservices we can do is to lower the expectations for problem solving and critical thinking," one asserted. They noted the need to "continue to elevate the role of CTE, so it is not seen as less than an 'academic' education."

Counselors/advisors

Counselors spoke about exposure to the world of work and clarification of career goals. "Even if you hate your work experience it is great to learn that that work is not for you. Nothing takes the place of experience." They emphasized the importance of work experience, even if students are planning to go to college. They stressed that, in the workplace, students have the opportunity to learn basic communication and other appropriate behaviors. The two secondary-level counselors in the focus groups warned, however, that there was "no time for CTE if the student is college bound." One of them, nonetheless, described the importance for students in seeing the relevance of their academic courses, stressing that, when students understand the relevance, the learning is "enduring."

> *As many of those kinds of connections we can make for students is better; providing a forum for students to make those connections; having academic relationships; relationships between faculty; what is missing is really connecting with kids.*

Parents

One parent and a leader in the California PTA, who spoke on behalf of the organization, were interviewed. The parent of a CTE student spoke about the importance of CTE in helping students explore their career interests in preparation for college. Her daughter is going on to college, "but she thought she was going to do pre-law, and is now changing to marketing/business." CTE programs give students "a real taste of what a career would involve" through real projects, such as the "crime scene investigation" with which her daughter was involved. CTE courses "can do what other courses don't do," the parent asserted. She described the overall benefit of the CTE program to her daughter as follows:

> *It changed her view of education from something she had to do to something she wanted to do. Having that happen before college is so important. Math and English are really important, but this could be the last the education system sees these kids — they need this information before they leave high school. Now my daughter wants to dress properly, for the competitions. With the cost of university, you can't afford to not know what you want to do.*

The PTA representative discussed the PTA's long-standing support for CTE. "We want to make sure that all students have access to skills that will give them access to a highly technical work place." The organization favors a "broad-based initiative — lifelong learning and successful transitions to career or post-secondary education." It supports "a rigorous curriculum that allows students to explore, develop critical thinking skills, and to be able to solve problems" and the integration of career concepts "from the earliest grades," with the early years offering the opportunity for students to become acquainted with various types of occupations in broad ways through parent speakers, the middles grades allowing for further exploration and field trips, and high school providing more in-depth understanding of options, through internships and other work-based learning opportunities. She concluded that students need good reasons for staying in school; they would stay if they knew "that they are [being prepared] to do something."

What students want

Given resource and time constraints, the current project did not include a student survey, but instead included several focus groups. This decision was made, in part, because a number of surveys of California students have been conducted in recent years that provide information that is valuable to CTE planning. This section first draws from these previous surveys before presenting the results of the student focus groups.

Previous studies show positive student perceptions about career-focused curricula

The relevant highlights of five student survey studies are described below. They include: the California School-to-Career Evaluation (2001), California Regional Occupational Centers and Programs (ROCP) Longitudinal Study (2004), James Irvine Foundation study (2006), the Community College Student Engagement Survey (2006), and the California Community College Chancellor's Office Advisory Committee study (2006).

California School-to-Career Evaluation

As part of the statewide evaluation of School-to-Career (STC) in 2001, WestEd and MPR Associates (together with 13 local STC partnership sites) conducted a survey of 14,412 students from schools in all economic strata about their attitudes about their (1) educational experiences, including STC-related activities and (2) attitudes about their futures and their preparation for further education and careers. STC activities — including career awareness activities, career exploration, such as internships and job shadows, and participation in pathways, academies and course sequences — had positive impacts on students' engagement in school, confidence, sense of preparedness for future employment, and level of preparation for postsecondary education. Of particular interest for the current CTE needs assessment is that the results suggested that participation in career technical course sequences played an important role in producing positive student perceptions about their educational experiences and attitudes about their future.

Engagement and confidence. Students reported that STC activities made school more interesting and helped them understand the importance of excelling in their studies. The data also indicated that these attitudes were significantly more positive among students who had had more intensive STC involvement. Moreover, there were statistically significant relationships between five measures of STC participation and the level of confidence of high school seniors regarding their educational preparation, knowledge of career prerequisites, and prospects for career goal attainment.

Positive attitude about preparation for future employment. Students with more intense STC participation were more likely to know about and value career-related activities at their schools and to feel prepared for future employment. The data demonstrated strong and consistent positive effects of STC participation on students' attitudes about how school had prepared them for jobs, had given them chances to learn needed skills, had provided useful guidance for careers, and had made career-related activities available. Further, in nearly all of the partnerships, students who participated more intensively in career exploration activities (such as internships or mentoring) showed positive attitudes toward their education experience.

Preparation for postsecondary education. Two local STC partnerships (Verdugo and UNITE-LA) obtained information about whether a student met the A-G requirements. In both partnerships, students who self-reported participation in a career-focused curriculum had a greater likelihood of fulfilling the A-G requirement compared to those who did not report participation, although the effect was statistically significant in only one of the two sites. Finally, one local partnership's survey of 1284 students in the fall after their graduation from high school found that:

- 71% of the students wished they had had more career guidance;
- 75% of the students wished they had had more career-related classes;
- 74% of the students wished they had had more activities such as internships and job shadows; and
- 56% of the students wished they had had more rigorous academic courses.

California Regional Occupational Centers and Programs Longitudinal Study (2004)

In the California Regional Occupational Centers and Programs (ROCP) Longitudinal Study of 2004,[43] the School Improvement Research Group at the University of California, Riverside conducted a matched comparison study of non-A-G track students. Researchers examined outcomes for 953 ROCP and 1329 non-ROCP students and conducted a satisfaction survey with 1507 students from more than 40 high schools in 21 ROCPs. Two of the salient findings from the satisfaction survey about ROCP students included the following:

ROCP students prefer ROCP classes over other subjects. They report a modest level of enthusiasm for their current school experiences, but nearly half the respondents indicate that they "very much" like their career education course work.

ROCP students question the value and relevance of many of their high school courses. ROCP students report significant disappointment with their high school classes. They generally report that "only a few" are relevant to getting jobs or preparing them for other aspects of adult life, and there is a similar assessment regarding whether the classes are enjoyable experiences.

James Irvine Foundation study (2006)

As discussed in the literature review, Peter D. Hart Research Associates recently conducted a study for the James Irvine Foundation, examining the experiences and attitudes of a representative sample of 619 ninth and tenth graders throughout California at risk of falling behind academically and not reaching their full potential.[44] The key findings from this research include the following:

- The vast majority (73%) of these students said they could be doing better in school if they were motivated to work harder.

[43] The 2006 survey is due in fall 2006, but was not available at the time of this writing.
[44] The margin of error for this survey is ±4.1 percentage points.

- The idea of a school where academic work is more closely tied to preparing students for college and careers is highly appealing to a large majority of students; 73% of students say this kind of school appeals to them at least a fair amount.
- 89% of students believe that a school where they could take courses they need for college and where they also have more opportunity to acquire skills and knowledge relevant to future careers would be more interesting to them; 91% say they would be more motivated to work hard and do well if they attended this kind of a school.
- Three in four students say that a smaller focused learning community would be better for them in terms of helping them meet higher standards and expectations.

Students could be motivated to work harder and do better. Most ninth and tenth graders do not work as hard as they could to get good grades in their academic subjects. However, students say they could be motivated to work harder and do better:

- 27% say they work as hard as possible, compared to 34% who say they could do somewhat better and 39% who say they could do much better.
- Boys are more likely to believe that they could be doing better in school than are girls (79% versus 67%).
- 82% of students who say that school is boring or irrelevant believe that they could be motivated to work harder and do better.

A school that combines academics and preparation for college and future jobs appeals to most students. When asked about a career-focused program that allows all to study academic subjects in ways that are "relevant to the real world":

- 73% of ninth and tenth graders say this type of school is appealing.
- Among students who say that school is boring or irrelevant, 68% say this type of school is appealing.

Students are motivated by relevance. Students believe that a high school experience that places greater emphasis on teaching academic subjects in ways that are more relevant to the workplace, and prepares them for college, is interesting and would motivate them better to work hard and do well. When asked why they found the idea of attending this kind of school appealing, the top three most frequently volunteered reasons are to:

- better prepare them and motivate them for a job, career, or their future;
- challenge them and help them focus on academics so they would study more; and
- better prepare and motivate them for college, and that they would learn more.

In their own words, students said:

- "I think our schools don't prepare us enough for after college or jobs."
- "I think it is more useful, especially if you are choosing a medical or government career because it helps you understand what you are learning about in college."
- "It would give you a jump start on what you want to do after high school."

- "It would prepare us better for the real world; now we aren't as prepared, not enough hands-on experience."

More job-focused, future-oriented, and hands-on classes would motivate students. In responding to a list of changes that could be made in schools, students said that three of these would have a very big effect in motivating them to work hard in school:

- Tying what they learn in school more closely with the skills and knowledge they need to get an interesting job when they are done with school;
- Making courses more relevant to their future by showing how what they are learning applies outside of school; and
- Providing more hands-on experiences that give them the chance to personally apply what they are learning.

Preference over current school. A strong majority of the ninth and tenth graders queried said this type of school would be more interesting than the school they currently attend.

- 89% of students believe that attending a school where students take courses they need for college and also have opportunities to acquire skills and knowledge that are relevant to success in the workplace would be much (46%) or somewhat (43%) more interesting than their current school;
- 88% of students who say high school is boring or irrelevant believe this alternative would be more interesting, and 93% of students who say they could do much better in school agree.
- 88% of students say they would enroll in a high school with this kind of approach (32% definitely, 56% probably); 85% of students who find high school boring or irrelevant say they would enroll.

Smaller learning communities would help students meet higher standards and expectations.

- 76% of students say that this kind of smaller learning community, where there is a central focus on a particular career or profession, would be better for them; 21% say it would not be any better.
- 80% of students who find school difficult say that the smaller learning community model, where there is a central focus on a particular career or profession, would be better for them.

The Community College Student Engagement Survey

Since 2001, the Community College Leadership Program at the University of Texas, Austin has annually conducted the Community College Survey of Student Engagement (CCSSE). The purpose of these surveys is to provide an assessment tool that captures the unique characteristics of community colleges and their students. The 2006 CCSSE Cohort summarized here includes responses from 249,548 students nationwide, from a total of 447 colleges in 46 states, comprised into a three-year cohort.

Challenges of community college students. Community college students have a high dropout rate, with only about one-half returning for their second year of study, and many leaving during their first semester. The survey data reveal that community college students face particular challenges:

- Most (61%) are enrolled part-time in school
- Most (57%) have jobs
- Many (34%) care for dependents
- Most commute to school, and some 21% spend 6 to 20 hours a week commuting

Student goals. Survey respondents report the following goals with respect to their community college experience: 71% of the students, whether or not they had other goals as well, reported that their goal was either obtaining or updating job-related skills or changing careers, as follows:

- Obtaining an associate degree (58%)
- Transferring to a four-year college or university (50%)
- Obtaining or updating job-related skills (41%)
- Self-improvement/personal enjoyment (39%)
- Changing careers (30%)
- Completing a certificate program (29%).

The report highlighted the increasingly significant role that academic advisement plays to students including "at-risk" students. In the 2006 Cohort, 89% of students indicated that academic advisement was *somewhat* or *very important.*

The majority of students received the most pertinent advice directly from faculty (43%) while another 23% received the best advice primarily from friends, family, or other students. Thirteen percent (13%) of respondents indicated that they did not receive any advice and 23% did not use any advising services. Part-time students were also less likely than full-time students to receive (or seek) academic advising.

The report also indicated that there is growing evidence that having a goal — and a plan to achieve it — correlates positively with persistence in college.

California Community College Career Development Survey

In September 2006, the Community College Chancellor's Office Advisory Committee on Career Development conducted a survey of 1,058 students throughout California to better understand how effective career center services were in reaching community college students, in order to make services more visible and accessible to students. In general, although a majority of students reported wanting career-related services, relatively fewer actually use them or are satisfied with the services offered. More specifically:

- 63% of students felt that would benefit from services offered at a career center sometime this year.
- 30% of respondents had never visited the career center or used its resources.

- Only 24% said they were currently using a campus career center to help them find the right career path.
- 82% wanted career centers to contact them via email or IM.
- Students are not satisfied with the services delivered in their career center — satisfaction for various services ranges from 16% to 28%.

The Advisory Committee is using these data as the basis for making recommendations to improve career center services and access to these services.

Focus groups with students

Student focus groups were conducted in November 2006 with high school and community college students in CTE programs as well as with ROCP students and two recent graduates of career academy programs, one now in community college and the other now working full time. One of the community college students had begun a bachelor's degree in engineering at the University of California, but had left the university by choice to participate in a more "hands on" program at the community college. One of the focus groups was conducted in person and others were conducted by conference call. In all, five focus groups were conducted, with a total of 27 students participating. Their programs of study spanned six different career areas: agriculture, plant science, automotive technology, education, construction, health sciences, and hospitality and culinary arts/home economics. The comments from focus group participants echo what the various research studies found about what students like and value about CTE programs. They also shed light on how CTE programs could be improved.

Of all the focus group participants, students were among the most pragmatic in their responses to the question: "What is the purpose of CTE?" Based on their experiences, students recognize that CTE programs and courses are intended to "prepare them for the real world" and provide them with more options when they finish school. Often as a result of their CTE experiences, students identify career goals and see CTE as a means to achieving those goals. At the same time, students develop skills and apply those skills in other classes, at work, and even at home. They also have the opportunity to do hands-on projects (depending on the CTE program) and gain experience through internships or work experience.

When probed about how CTE could prepare them for the real world, students' responses were similar to those of employers: they were aware that "many companies want entry-level employees with some real work experience." According to one student from a community college agricultural program, "[CTE programs are] applicable to real-world jobs. These courses are a lot like real work. We get work experience. Internships are available. It's a good way to get a feel for and to learn if we like a particular field. It gives us a better chance of getting the jobs we want when we get out of school." An automotive technology student commented, "It is important to get internships and real-world experiences."

Students added details about what "real-world experience" means to them. Across the student focus groups, participants highlighted the value and importance of getting hands-on experience and applying what they learned in the classroom to other areas of their lives. For example, one student said, "It's helpful to see how math applies to automotive technology…It's nice to not just

do problems in math that have no relevance to the real world." Another student said he valued "the balance between hands-on and theory that CTE provides." Being an active learner was another benefit of hands-on experiences for one student: "I like to do, not just sit around. It feels more important than just book learning." Another student added a similar sentiment: "Hands-on activities are the best for learning — far more satisfying than lectures."

Exploring career options and having an opportunity to learn workplace skills are other benefits of CTE. After participating in their CTE programs, several students in a construction program said they realized they want to be architects; another wants to be a psychologist, but wants to keep construction as an option. Another student shared, "Just getting involved in various clubs and activities keeps me motivated, focused, and happy…I enjoy school much more and have gained professional skills and communication skills by working closely with instructors and seeing how they act." Automotive students at one community college reported that they are required to find a car dealership that will sponsor them with part-time employment. This opportunity allows students "to get a realistic preview of what the actual work is like."

Students reported entering their respective programs for various reasons, but in nearly all cases, they relayed a personal story: one young woman had become interested in the health professions because her mother had been ill; another became interested in culinary arts because of the initial warmth and encouragement of the teacher; one agricultural student grew up around farms and had a passion for farm work; another in the automotive technology program was encouraged by a friend to join the program. Many of the ROCP high school students joined their education-focused program through word-of-mouth, general curiosity about the program, or a flyer advertising the program. Nearly all of the construction students signed up for the class because the subject interested them, but also in order to be able to help their parents who were already in the construction business.

When asked what they liked best about career technical education, students said their CTE classes were "different from other classes," more "hands on," and provided more purpose and knowledge in context. Yet, all the students also stressed that they had to work hard in their CTE courses. Students in the ROCP said they liked learning more life skills such as time and money management as well as working in teams, problem solving, and doing presentations. Some in ROCP noted feeling more confident, gaining more self-awareness, and enjoying school more. Also, these high school students liked gaining experiences they could put on work and college applications. Another benefit noted by the agricultural students is "CTE classes are smaller and full of students with common interests so they are more close-knit than general education courses." A comment from one student highlights how much he values the CTE program: "Finding the auto technology was an 'accidental treasure box' that I stumbled into…this is a dream educational situation."

Although they were not asked, all students spoke highly of their teachers. They appreciated the interaction with teachers and sense of caring; they felt connected to their CTE teachers. The construction students described how their teacher demonstrated how to do things, which they found very helpful. They liked that the teacher "gives more individual attention and you can work at your own pace." They were also motivated by the teachers' sense of excitement about the subject matter. Students in the automotive program felt the hands-on activities allowed them

to interact more with the CTE instructors: "We spend more time with CTE teachers so we get a lot closer to them." Another student shared, "My relationships with CTE instructors are much deeper than with academic teachers…they are more like mentors."

Students also received guidance from their teachers and reported feeling valued. "Our CTE teachers have high expectations for us, higher than regular teachers do. They want us to be leaders, they tell us so," said a student.

The two former academy students — one in Health and one in Culinary Arts — spoke at length about the value of their student organizations. The organizations had provided leadership opportunities and helped them develop presentation skills. The construction students did not have access to a student organization, but expressed great enthusiasm about having one.

Suggestions for improving CTE

Students gave specific suggestions for improving CTE that were shared across the focus groups. Nearly all the students stated that their primary recommendation was to make their programs more visible. The academy students' response speaks for all: "Let more people know about our programs!" Moreover, students want more financial support for their programs and more time with counselors. "They should take our course seriously," said one student. The construction students want a construction club and more opportunities to see "other jobs."

> *It'd be good to have a class where you see other jobs. We go to school and see "teaching" every day — the only job we really know is teaching… so when you go to college you don't have to pick your major…*

CTE SYSTEM COMPONENTS

This section presents findings with respect to key features of CTE practices and systems. Results are described in five broad topical areas, aligned with our summary of "distinguishing features of CTE" revealed through the literature review: 1) integrating CTE and academics; 2) industry partnerships; 3) system coherence; 4) personalization, career guidance, and student services; and 5) teacher supply, professional development, and faculty collaboration.

Integrating CTE and academics

The surveys and focus groups included a range of questions designed to identify the curricular integration goals and practices of participants in the study. The examination of curricular integration practices included questions about the extent of integration of academic and CTE curricula, as well as, specifically: the integration of academic standards; the use of different strategies to achieve integration; participants' perceptions about the benefits and challenges that accompany efforts to integrate CTE and academic curricula; and participants' recommendations for strategies to address the challenges. Discussion of these issues is followed by an examination of the degree to which students are exposed to multiple options within an industry ("all aspects of the industry"), and the degree to which CTE courses integrate "employability" skills, such as critical thinking, workplace attitudes, and technology. Finally, a separate examination is presented of issues regarding the application of knowledge in "real work situations," that is, the implementation of "work-based learning," as a unique strategy to bring additional relevance to

the curriculum. This subsection also includes a discussion of benefits, challenges, and strategies to address challenges.

Integrating CTE and academic curricula and standards

Presented below are responses related to the integration of CTE and academic curricula and standards, beginning with the extent of integration, strategies used, benefits of integration, challenges, and approaches to addressing the challenges.

The extent of integration of curricula and standards

A substantial majority of educators who responded to the surveys (88% of CTE instructors, nearly 90% of administrators, and 65% of academic/non-CTE instructors) reported that they (or their staff) have attempted to integrate academic and CTE curricula within their institutions. The educator surveys also asked respondents to identify which, of a list of strategies, they use for integrating academic and CTE curricula. Table 26 shows the breakdown in responses for administrators, CTE instructors, and academic/non-CTE instructors.

Very high proportions of administrators (87%) and CTE instructors (95%) reported that they integrated the California academic content standards into CTE curricula at least to some extent, as follows. About half of each group said they integrated these standards only "to some extent" (53% of administrators, 51% of CTE instructors). Much fewer of each group (24% of administrators, 21% of CTE instructors) said that they had done so "to a large extent." Finally, more than twice as many CTE instructors (22%) as administrators (10%) noted that every CTE course was linked to the academic standards.

California has recently adopted California CTE Model Curriculum Standards for grades seven through twelve, that integrate California's academic content standards and such "foundation" standards as communications and critical thinking, with industry-specific or "pathway" standards. Over three-quarters of administrators (79%) and CTE instructors (78%) reported being aware of the new California CTE Model Curriculum standards. When asked about their experience with those standards, 62% of CTE instructors reported "having begun to integrate the standards in some courses"; 50% of administrators noted that "instructors [in their institutions] had begun" this integration. Eighteen percent of administrators and 12% of CTE instructors reported that "instructors were aware of the standards but had not seen them"; a similar proportion (specifically, 21% of administrators and 16% of CTE instructors) said that "instructors had seen the standards but had not yet integrated them."

The responses of the three groups regarding the use of team teaching is also noteworthy. Specifically, 40% of administrators reported that they "encourage[d] academic and career technical teachers to team-teach," whereas 31% of academic/non-CTE instructors said they worked with CTE teachers "as team-teachers in classrooms," and only 18% of CTE instructors said they team-taught with academic/non-CTE instructors.[45] The percentage of academic/non-

[45] Consultation with the Working Resource Group suggested that the academic only/non-CTE instructors who completed the survey were most likely those who were engaged with, or supportive of, CTE programs; this may

CTE instructors reporting that they team-teach with CTE teachers seems unusually high. It may indicate that the academic/non-CTE instructors who responded to this survey are not representative of the full range of academic/non-CTE instructors in California. Indeed, it is plausible that a number of the academic/non-CTE instructors who responded to this survey are those with direct ties to CTE.

Table 26. Strategies used to integrate academic and CTE curricula

Integration Strategies	Administrators	CTE Instructors	Academic/Non-CTE Instructors
Implement applied/contextual learning curriculum units or projects	77%	N/A	70%
Revise academic courses to cover issues and occupational pathways related to a particular industry or career area, including financial management, technology, safety, and environmental roles and responsibilities	55%	N/A	58%
Collaborate with academic/non-CTE instructors to add CTE content to their academic courses	N/A	35%	N/A
Incorporate academic skills into career technical courses	80%	84%	N/A
Collaborate with academic/non-CTE instructors to ensure that academic standards are met in the CTE courses	N/A	59%	N/A
Encourage collaboration between academic/non-CTE instructors and career-technical teachers for joint curriculum development	76%	N/A	N/A
Work with CTE academic/non-CTE instructors to develop joint curricula that emphasize a specific career area	N/A	35%	36%
Encourage academic/non-CTE instructors and career technical instructors to team-teach	40%	N/A	N/A
Work with CTE/academic/non-CTE instructors as team-teachers in classrooms	N/A	18%	31%
Group teachers together to develop joint curricula that emphasize a specific career area (e.g., learning communities)	45%	N/A	N/A
Create common planning periods for teachers involved in the same career pathway	27%	N/A	N/A
Organize or have students participate in career-related activities outside the classroom	N/A	N/A	55%
Establish block scheduling to create more time for contextual and project-based instruction	28%	N/A	N/A
Create opportunities or programs and/or bring representatives from industry/professions into the school or classroom to share career-related information with teachers and students	82%	N/A	65%
None of the above	0	2%	1%

Comparison between secondary and postsecondary CTE instructors. A comparison of responses from secondary CTE instructors (N=295 respondents) with postsecondary CTE instructors (N=163 respondents) revealed more similarities than differences between those two groups.

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have resulted in reports of higher levels of participation in specific strategies than might have been reported with a random sample of non-CTE instructors.

Both secondary and postsecondary instructors reported that they already are substantially engaged in integrating academic and CTE curricula. For example, about 87% of secondary school instructors and 82% of postsecondary instructors indicated that they "systematically incorporate academic skills into the CTE curriculum." The two groups also mirrored each other in terms of their patterns of collaboration with academic/non-CTE instructors in creating curricula and in teaching their classes. They reported moderate levels of collaboration in "adding CTE content to academic courses" (39% of secondary and 27% of postsecondary instructors) and in collaborating in the "develop[ment] of joint curricula that emphasize a specific career area" (39% of secondary and 34% of postsecondary instructors). Team-teaching appears to be conducted less often than activities that generate curricular materials, but — once again — the frequencies reported for secondary and postsecondary instructors were similar (about 19% of secondary and 17% of postsecondary instructors).

In general, although secondary and postsecondary CTE instructors exhibit many more similarities than differences in their self-reported attitudes and teaching styles, there was nearly a two-to-one difference in "collaboration with academic/non-CTE instructors to ensure that academic standards are met in CTE courses." About 71% of secondary CTE instructors reported collaborating with academic/non-CTE instructors to ensure that standards were met, while only 38% of postsecondary instructors reported this type of collaboration. This difference may be due to the greater prevalence of "smaller learning communities," including academies and pathways, in secondary programs, that foster collaboration by design.

Benefits of integration

The vast majority of respondents in all educator groups reported that one of the benefits of integration is that "students have the opportunity to learn in multiple ways" (84% of administrators; 81% of CTE instructors; and 77% of academic/non-CTE instructors chose this option). Similar solidarity of viewpoint was apparent regarding the benefits of "students [seeing] the relevance of school" (84% of administrators; 70% of CTE instructors; and 87% of academic/non-CTE instructors). About half or more of respondents in each group reported that "students [being] exposed to a more challenging curriculum" was a benefit of integration (48% of academic instructors, 64% of administrators, 69% of CTE instructors). Academic/non-CTE instructors stood out from the other two groups regarding the benefit of "students [becoming] more interested in the material"; 84% of academic/non-CTE instructors noted this benefit, as compared to 61% of administrators and 52% of CTE instructors. Interestingly, only a moderate proportion of all three groups believed that "students work[ing] harder" was a benefit of integration (40% of administrators; 38% of academic/non-CTE instructors; and 38% of CTE instructors).

(No notable differences were observed between secondary and postsecondary CTE instructors in the patterns of their responses to the questions relating to benefits of curricular integration.)

Focus groups weigh in on benefits of integration. Our focus groups underscored the perceived value of curricular integration. One counselor's remark reflected the sentiments expressed within many focus groups: "Getting real-world examples into the academic classroom … is so much

more engaging for students." In the discussion with postsecondary instructors, a participant noted that given the benefits associated with integration, "the question is how we connect [the two] … we should have incentives to foster connection between occupational and academic [courses of study]." A comment from a secondary CTE instructor reinforced that the value of integration goes beyond enhancing the motivation and engagement of students. "The key point," he stressed, "is that the workplace demands both skills and academic knowledge, and any course should be able to integrate both of those." A member of the state PTA leadership went further, pinpointing the value of integration to achievement in both academic and career contexts. "We need to integrate academics and career exploration to ensure that students are critical thinkers as well as proficient in math, science, and language arts — because [they] will need all those skills for college and careers."

Students and parents concurred with these viewpoints, and added rich details about the practical value of integrated curricula. During the focus group discussions, students provided a variety of examples of ways in which academic concepts embedded in CTE contexts stimulated their interest in the subject material, and sharpened their mastery of the concepts presented. "It was hands-on, practical," noted one student. "I saw the purpose behind it." Students in the construction course stressed the importance of helping them learn. "You don't learn just by reading, you learn by doing it!" Participants in that focus group explained that their exposure to examples drawn from work-related contexts helped boost their confidence in tackling academic work. For example, they felt their construction class helped them with their math class. "The ruler for floor plans relates to trigonometry." In another student focus group, a student from a health careers academy reported, "I got more out of the academic classes that were linked to CTE…Many of the other non-CTE students didn't see the point of school."

One parent noted that her daughter "felt successful" in classes with integrated curricula "because of both the content and the way it was taught … [which included] feedback from the instructor, feedback from the other students. … It changed her view of education from something she had to do, to something she wanted to do; having that happen before college is so important."

Challenges in integrating curricula and standards

Challenges in integrating curricula. While the benefits of curricular integration were attested to by survey respondents and focus group participants, challenges were noted as well. Across the board, "lack of designated or paid planning time" was identified as a major challenge to integration (defined as "challenging" or "very challenging") by a substantial percentage of all educator groups (73% of administrators, 74% of CTE instructors, 74% of academic/non-CTE instructors). In addition, 67% of administrators noted the challenge associated with "time required to prepare students for 'high-stakes testing' taking away from time needed to integrate curricula" (there was no similar response option for instructors). Likewise, 76% of academic/non-CTE instructors identified as a challenge "lack of time to integrate since instruction must focus exclusively on academic standards" (there was no similar category presented to CTE instructors).

Another challenge noted by a substantial 59% of administrators (not posed to either of the remaining groups) was "academic/non-CTE instructors' perceptions that integration with CTE

dilutes focus on academic achievement." Similar proportions of administrators also acknowledged that "teachers' resistance to changing their curricula and practices" (57%); "perception that accountability requirements discourage integration" (53%); and "difficulty in implementation" (55%) created a challenge for success in integrating academic and CTE curricula. (Once again, these items were not posed to the other groups).

The second biggest challenge reported by CTE instructors (after "lack of time," noted above) was "integration with academics takes time away from occupational skill-building" (46%). (This item was not posed to academic/non-CTE instructors). A substantial proportion of both CTE instructors and academic/non-CTE instructors believe that it is challenging "to incorporate additional material and standards" (45% and 59%, respectively).

The only other response option that was noted by a substantial proportion of CTE instructors is: "more academics cause students to lose interest in school, which conflicts with my goal of keeping them engaged" (40%). (This response option was not presented to academic/non-CTE instructors.) Among academic/non-CTE instructors, 57% noted a "concern with prerequisite acceptance and CCC to CSU and UC articulations"; 43% also noted that "lack of encouragement from the administration" posed a challenge to curricular integration.

(No notable differences emerged between secondary and postsecondary CTE instructors in the patterns of their responses to the questions relating to challenges to curricular integration.)

Challenges to incorporating academic content standards into CTE curricula. Secondary administrators and CTE instructors were asked a separate question about challenges to incorporating academic content standards into CTE curricula. The challenge indicated most frequently by CTE instructors was "lack of time for this additional work" (75%). A somewhat lower, but still substantial, percentage of administrators noted this as a challenge (58%). For CTE instructors, no other challenge to incorporating academic content standards into CTE curricula was selected by even a third of respondents. Interestingly, "lack of experience in implementing integrating strategies" was identified as a challenge by 28% of CTE instructors, as compared to 63% of administrators. Another notable divergence in reported challenges to integrating standards is, "[instructors'] lack of full understanding of the content standards," which was selected by more than twice the proportion of administrators (65%) than CTE instructors (31%). Regarding other challenges to incorporating standards, 32% of administrators and 20% of CTE instructors expressed "concern that adding academic content to CTE courses" would make those courses "too difficult and [consequently] discourage students." Responses to this question also indicate that CTE instructors take the issue of academic standards seriously; only 5% of CTE instructors noted that they "…[didn't see incorporating academic standards as [their] role," although 35% of administrators believed that CTE instructors held that viewpoint.

Focus groups' perceptions on challenges to curricular and standards integration. One central concern raised in focus group discussions was that emphasis on university admission and high-stakes testing sometimes discourages instructors from integrating academic and CTE curricula. One administrator observed, "[It's a] frustration … high-stakes tests do not measure skills learned in CTE. … It's hard to justify: we value what we test." One counselor noted, "Hands-on

learning is starting to be valued; CTE classes should start to be allowed to meet elective requirements."

Postsecondary educators expressed similar concerns about academic requirements that divorced from occupational programs. "On our campus over the past twelve years, there has been such a strong focus on academic requirements …[that] a lot of our occupational students are not completing the academic course and getting the AA degree," noted one postsecondary instructor. "We are thinking of creating an 'applied' AA degree, which is currently not available."

In other discussions, participants affirmed the importance of connecting standards-driven academic courses with occupational programs of study. "The problem is that certificate programs don't require any academics," noted one postsecondary instructor, adding that "students can't write a report; they can't fill out a purchase order."

Addressing challenges: information or support needed to achieve successful curricular integration

Survey responses on support needed to facilitate curricular integration. The surveys asked about the types of information or support instructors need to successfully integrate academic and CTE curricula. A vast majority of respondents from each group indicated that having "scheduled time for instructors to develop materials" was important to successful integration (77% of administrators, 78% of CTE instructors, and 80% of academic/non-CTE instructors) as is "scheduled time to work with colleagues" (82% of administrators, 72% of CTE instructors, 72% of academic/non-CTE instructors). Nearly as many (66% of administrators, 74% of CTE instructors, 81% of academic/non-CTE instructors) identified "funds to purchase materials" as a need.

Administrators were somewhat more likely than instructors to identify professional development as a needed support for curricular integration: 73% of administrators identified as a need "professional development on how to integrate other content," as compared to 47% of CTE instructors and 52% of academic/non-CTE instructors. Similarly, somewhat higher proportions of administrators indicated that various forms of professional development were needed to support integration, as compared to CTE and academic/non-CTE instructors: "professional development on academic content" was identified as a need by 60% of administrators and 48% of CTE instructors (this was not asked of academic/non-CTE instructors); "professional development on academic standards" was identified by 61% of administrators and 43% of CTE instructors (this was not asked of academic/non-CTE instructors); "professional development on California CTE model curriculum standards" was identified by 69% of administrators, 52% of CTE instructors, and 45% of academic/non-CTE instructors; and "professional development on appropriate pedagogy and andragogy for integrated curricula" was identified by 59% of administrators, compared with 35% of CTE instructors and 38% of academic/non-CTE instructors.

Of the remaining categories of responses regarding information or support needed for successful integration, some common elements stand out. For example, at least half of respondents in all groups (64% administrators, 56% CTE instructors, 54% academic/non-CTE instructors) reported

that "time for instructors to participate in industry externships" is an important issue. Similarly, 63% of CTE instructors and 64% of academic/non-CTE instructors noted the need for receiving "evidence that the administration supports these efforts" (administrators were not asked this question). For their part, however, "evidence that integration promotes academic achievement" was identified by over 76% of administrators as information needed to successfully integrate academic and CTE curricula (this question was not posed to other groups).

Focus group perceptions on promoting successful integration. When asked about strategies that had been useful in promoting successful integration, the dominant theme in focus group discussions was faculty collaboration. A counselor observed that it was important to provide "common planning time [so] teachers can do cross-planning." "Bring teams of teachers together," suggested one administrator. Another added, "[CTE teachers] need to learn how to communicate with academic teachers." In the discussion with postsecondary instructors, the use of "learning communities" was cited as one way to help promote curricular integration: "Learning communities are a great vehicle [for integrating] academics with career courses," noted one instructor. "It is not done enough."

A variety of specific approaches were noted. For example, one secondary CTE instructor explained that in her California Partnership Academy program, grant funding provided the resources "to plan projects that are tied to the academic standards as well as the industry standards…We do three to four projects per year that utilize material from all types of curricula," this instructor noted. "We connect our courses that are pegged to the standards; we have teachers involved from 'across the board' in the planning of those courses. This helps students … see a reason for learning and apply their learning immediately."

The state PTA representative suggested that CTE instructors "need professional development to assist [them] in infusing academics into what they do … to demonstrate how integration can happen, and … how [they] can adapt it in the classroom."

Another approach, discussed at some length in the Economic Development focus group, was "performance-based instructional design." One member of this focus group noted that performance-based designs, driven by best practices in industry, were fundamental to "flexibility in curricular approaches." "The performance-based idea is really important," this individual observed. Members of other focus groups also see the positive potential of industry involvement in creation and implementation of standards. "We use industry standards [to drive curricula in our occupational courses]," stated one Adult Education administrator. "We have our industry advisors come and see our classes — for better cross-pollination," she noted, adding that, "industry standards ensure rigor."

Exposure to options and workplace skills

CTE is intended to both expose students to a variety of occupational options within an industry and to provide broad workplace skills that are both essential and transferable to any industry. It is also intended to expose students to the most current uses of technology in their fields of study.

Exposure to "all aspects of the industry"

Administrators were asked to provide information regarding the extent to which CTE programs in their institutions "offer opportunities for exposure to all aspects of the industry" for a given occupational field. The most frequently given response was that programs offer exposure to all aspects of the industry "to some extent" (46%). The next modal response was "to a large extent" (27%), followed by "to a minimal extent" (15%). Finally, 12% of respondents indicated that "all introductory CTE and occupational programs offer broad exposure."

Integration of "essential employability skills" into curricula

Several items on the educator surveys addressed whether and how various employability skills, such as the use of technology and critical thinking, are integrated into CTE curricula.

- **Critical thinking and problem-solving.** CTE instructors and administrators were fairly evenly divided concerning their responses to the question, "To what extent do CTE instructors integrate critical thinking and problem solving into their CTE curricula?" Among administrators, 31% said that critical thinking was integrated "to some extent," 33% noted integration "to a large extent," and 31% reported that "every CTE course integrates critical thinking and problem solving." Among CTE instructors, the most common response was that critical thinking was integrated into every CTE course (39%). The remaining CTE instructor responses were evenly divided between "to some extent" and "to a great extent" (29% each).

- **Workplace attitudes and habits.** When asked about the integration of information about workplace attitudes and habits into CTE curricula, administrators and CTE instructors gave similar responses. For example, 32% of CTE instructors and 35% of administrators indicated that "every CTE course incorporates workplace attitudes and habits." Likewise, 35% of CTE instructors and 34% of administrators noted that such information was integrated "to a large extent" into CTE curricula. Fewer respondents of both groups (26% of administrators, 30% of CTE instructors) said that this information was integrated "to some extent."

- **Incorporation of technology in curricula.** Virtually all respondents noted that at least to some extent, "students learn about the latest applications of technology in the career areas they are exploring" (96% of administrators, 93% of CTE instructors). However, much fewer indicated that "all of our courses incorporate exposure to the latest applications of technology" (21% of CTE instructors, 24% of administrators). Among CTE instructors, 35% reported providing instruction about technological applications "to a great extent" and 37% indicated "to some extent." By contrast, the proportion of administrators who noted that this instruction was provided "to a great extent" was higher (43%) than those noting "to some extent" (29%).

  In comparing secondary and postsecondary instructors' reports about instructing students "on the latest applications of technology," it appears that postsecondary instructors do so more broadly. While the vast majority of both secondary (91%) and postsecondary (98%)

instructors reported that they do present information about technological applications at least to some extent, only 17% of secondary instructors reported that "all of our classes incorporate exposure to the latest applications of technology," whereas 35% of postsecondary instructors report that they do this in "all classes."

Work-based learning

Although closely related to the concept of curricular integration, work-based learning (WBL) is a distinct and key component of CTE that warrants specific attention. As such, this issue was addressed in both surveys and focus groups with administrators and CTE instructors.

Extent of incorporation of work-based learning

A substantial majority of administrators (82%) and CTE instructors (71%) reported that their CTE courses incorporated a formal work-based learning component. The survey also queried counselors/advisors and community-based counselors/advisors about their role in working with instructors and programs to coordinate work-based learning. Ten (10) out of 12 respondents (83%) to this question in the community-based counselor/advisor survey and 62% of the 85 school/college-based counselors/advisors indicated that they "coordinate work-based learning opportunities to students at large, in ways that are not connected to individual CTE courses." The majority of respondents in each group (62% of counselors/advisors, 7 of community-based counselors/advisors) noted that they "coordinate work-based learning opportunities to students in special programs," and a smaller proportion from each group (37% of counselors/advisors, 3 of community-based counselors/advisors) "work with CTE instructors to coordinate work-based learning opportunities for students in specific courses."

Types of work-based learning offered

When asked to delineate which types of work-based learning opportunities are available in their institutions, as depicted in the table below, "in-class, school-wide, or community-based projects" was selected most frequently by all three groups queried,[46] followed by "paid and unpaid work experience." A large percent (70%) of administrators also selected "internships tied to curriculum." "School-based and virtual enterprises" were the least frequently selected.

[46] Community-based counselors/advisors were also asked if they provided opportunities through their own organization to high school or community college students, and to out-of-school youth. Responses from this group were low, so are not presented here, but data can be seen in the tables, Appendix I.

Table 27. Types of work-based learning opportunities offered

WBL Opportunities	Administrators	CTE Instructors	School/College-Based Counselors and Advisors
In-class, school-wide, or community-based projects	70%	65%	67%
Service learning	52%	35%	49%
School-based and virtual enterprises	46%	34%	30%
Simulated workplace experiences	53%	44%	51%
Internships linked to curriculum	70%	53%	54%
Unpaid work experience	69%	65%	65%
Paid work experience	66%	58%	67%
None	NA	NA	4%
Don't know	NA	NA	1%
Other (please specify below)	4%	9%	4%

Comparison between secondary and postsecondary CTE instructors. The implementation level of WBL at the postsecondary level seems to be somewhat higher than at the secondary level. For example, although a majority of both secondary and postsecondary CTE instructors reported "incorporating a formal WBL component" into their courses, 80% of postsecondary instructors as compared with 63% of secondary instructors reported doing so. Similarly, in response to the question, "To what extent have you integrated information about workplace attitudes and habits into your CTE curricula?," while 97% of both groups reported that they did so at least to some extent, 44% of postsecondary instructors versus 29% of secondary instructors reported that they did so "to a large extent" and 37% of postsecondary instructors versus 27% of secondary instructors reported doing so in "every class."

Some interesting distinctions also emerged in terms of the types of WBL opportunities being offered in these two different educational settings. The most prevalent type of work-based learning offered within secondary schools is community-based projects (74%), while in college settings it is "internships linked to curriculum" (69%). However, the next two most prevalent types of WBL are the same for both secondary schools and colleges: unpaid work experience (64% for secondary; 63% for postsecondary) and paid work experience (60% for secondary; 63% for postsecondary).

Benefits of work-based learning

The benefits of WBL was a topic covered, not only in the surveys and focus groups of educators, but also in the surveys and focus groups of industry representatives.

Perceptions of industry representatives. Table 28 summarizes the results of responses from industry representatives to the survey question about benefits of workplace opportunities for students. As shown, the vast majority of respondents agreed that each response option listed is a benefit of WBL. The "opportunity to explore their career interests" was cited most frequently (86%), followed closely by the "opportunity to learn workplace skills, attitudes, and habits" (84%). The "opportunity to learn technical skills," though ranked last, was cited by 72% of the industry respondents.

Table 28. Industry representatives' survey selections for the benefits of work-based learning for students

Benefits of WBL	Percent responding
Opportunity to explore their career interests	86%
Opportunity to learn workplace attitudes and habits	84%
Opportunity to be mentored by an adult	80%
Opportunity to apply their knowledge in the workplace	77%
Opportunity to learn critical thinking and problem-solving skills	77%
Opportunity to learn technical skills	72%

Industry representatives were also queried about the benefits that *employers* derived from offering work-based learning to students. All of the responses were selected by a high percentage of respondents. The most frequently selected benefits were the "opportunity to benefit students and [to] serve the community" (98%), "opportunity to train potential future employees" (93%), "opportunity to help develop the future workforce in [their respective] industry" (91%), and "opportunity to observe potential future employees before hiring" (81%). A somewhat smaller portion of respondents — though still a substantial majority, at 74% — indicated that the "opportunity to build goodwill and visibility in the community" constituted a benefit from providing work for local students.

Focus group perceptions of WBL benefits. Many *focus group* participants noted[47] that close connections with industry partners were beneficial in providing opportunities for students to gain first-hand exposure to the need for critical-thinking and problem-solving skills in authentic work situations. "This helps students see their academic courses as far more relevant," a secondary CTE instructor pointed out. "They see a reason for learning and can apply their learning immediately." An administrator noted that students may be more motivated to see the importance

[47] It is of interest to note that these responses were offered spontaneously to questions about the purpose of CTE or its role in preparing students for the future. This suggests that, in many participants' minds, it is work-based learning, a strategy unique to CTE, that holds the key to helping students clarify their goals and prepare for their future endeavors.

of "soft skills" when real-world examples are presented as part of their classroom experiences. "It's vital to have employers involved in creating scenarios," stated this administrator. "We use our [employer] advisory committees when creating courses, so [we can find out] what is lacking. Soft skills are always a major topic. Employers provide a lot of guidance."

Participants noted how WBL can increase students' awareness of possible career paths and strengthen their motivation and expectations about career achievement. "Career days on industry sites have encouraged students to consider new ideas about careers," observed a postsecondary CTE instructor, "it's been incredible for everyone." A secondary instructor pointed out that "one of the key [benefits of work-based learning] … is that students [get to] know what skills different types of jobs require... The industry is changing fast, it's important to show students how various skills fit into a given career path — to help them see how they can build a career around those skills."

Community college counselors echoed these responses, when asked whether "CTE courses prepared students for life beyond school." They said that students "get a realistic preview of what working is like." One continued, "The exposure to the world of work, to have to work for a supervisor, be part of a team, etc…Even if you hate your work experience it is great to learn that that work is not for you. Nothing takes the place of experience."

Challenges in providing work-based learning

Both educators and employers were asked in the surveys about challenges to coordinating WBL.

Educators' challenges in coordinating work-based learning. Among educators, the most prevalent challenge identified was "time required to coordinate placements" (70% of administrators, 73% of CTE instructors, 88% of counselors/advisors, and 6 out of 13 community-based counselors/advisors). (As before, percentages provided refer to responses indicating either "challenging" or "very challenging.") A majority of respondents in each educator group identified as challenges "lack of paid workplace opportunities" (60% of administrators, 62% of CTE instructors, 67% of counselors/advisors, and 7 out of 13 community-based counselors/advisors) and "transportation issues" (62% of administrators, 60% of CTE instructors, 70% of counselors/advisors, and 8 out of 13 community-based counselors/advisors). Similarly, "lack of time available for students to participate" was identified as a challenge by 56% of administrators, 59% of CTE instructors, and 64% of counselors/advisors. For the most part, "scheduling issues" was identified by the majority in each respondent group (58% of administrators, 64% of CTE instructors, 59% of counselors/advisors, but only 3 out of 13 community-based counselors/advisors). Somewhat lower proportions of respondents identified "insurance and liability issues" as a challenge (43% of administrators, 54% of CTE instructors, 51% of counselors/advisors, but only 2 out of 13 community-based counselors/advisors).

Table 29. Educators' survey selections for key challenges in coordinating WBL

Challenges to WBL	Administrators	CTE Instructors	Counselors/Advisors	Community-Based Counselors
Lack of time required to coordinate placements	70%	73%	88%	46%
Lack of paid workplace opportunities	60%	62%	67%	54%
Lack of time for students to participate	56%	59%	64%	NA
Scheduling issues	58%	64%	59%	23%

Other potential challenges were less frequently selected by respondents. For example, while 44% of CTE instructors and 53% of counselors/advisors indicated that "lack of student preparedness" represented a challenge, only 30% of administrators and 4 out of 13 community-based counselors/advisors agreed. This may be due to the fact that the instructors and counselors, more than administrators, receive direct feedback from employers. A moderate percentage of respondents identified as a challenge a "mismatch between student skills and workplace opportunities" (40% of counselors/advisors, 38% of CTE instructors, 32% of administrators, and only 2 out of 13 community-based counselors/advisors).

Administrators, CTE instructors and counselors/advisors also wrote in "other challenges." Some of their comments reinforced the previously selected responses. They included lack of time for instructors and students, lack of funding, and a lack of scheduling flexibility. The details in the following comment convey some of the complexity of this issue.

> *Given the college prep theme that drives the school, students do not have the time to dedicate for internships or work training options. All classes on campus are one hour including site-based ROP classes. This time frame is limiting for community-based work experience. After-school programs and summer programs are not available due to lack of funding and low priority of administration. All after-school and summer efforts focus on academic remediation for state academic standards. (CTE Instructor)*

It was also noted that the objectives of WBL from the perspective of school and the workplace may differ.

> *In practice the business plans of most community-based businesses and educational institutions are mutually exclusive; therefore, the business defines their needs in terms of the "soft skills" students don't have (and schools don't teach), and the school defines the learning opportunity in the workplace as reinforcement and practice of knowledge and skills learned in the classroom. (CTE Instructor)*

One of the most commonly mentioned "other" challenges is that WBL experiences are primarily unpaid. Students frequently work to support themselves and often their families. This necessity makes it more difficult for the student to take part in any unpaid work.

Many of our adult students work during the day and take courses to either improve their job situation or prepare for other careers. They don't have time to participate in daytime workplace learning opportunities, and it is extremely challenging to locate/develop/coordinate evening and weekend placements. (Administrator)

Students must work to support themselves and their families and often start and quit because of work issues. We need to pay them minimum wage to study, do homework, get tutoring ... so they can benefit lots in a short two years to get a degree/certificate or better job for life. (CTE Instructor)

An additional challenge mentioned by an administrator and linked to funding was the issue of only having certified staff to supervise WBL.

Ed Code requirements for teacher of record to supervise community classroom or cooperative vocational education placements severely limit these options. Teachers do not have time to make these visits and still cover their classrooms. The cost of paying certificated teachers for the extra time that such visits require is often prohibitive. Legislative changes to allow non-certificated supervision of students in these work-based learning experiences would enable many more students to participate. Such participation would also ultimately increase their likelihood of job placement or college acceptance. (Administrator)

Given tight budgets, we can't afford to hire staff to coordinate community-based experiences. We had a robust internship program that placed about 200 kids in local businesses each year, but we had to cut the coordinator position, and now the program is gone. State funding seems to go for traditional guidance counselors, and sometimes CTE staffing would be more useful. (Administrator)

<u>*Comparison of challenges between secondary and postsecondary CTE instructors.*</u> Interestingly, none of the nine potential challenges about implementing WBL listed in the survey were rated as "very challenging" by a majority of either secondary or postsecondary CTE instructors. However, once again, "time required to coordinate placements" seemed to be a major challenge, with 45% of secondary and 46% of postsecondary instructors rating this issue as "very challenging." A somewhat smaller proportion of ROP instructors (37%) rated this factor "very challenging," perhaps reflecting that coordination of work-based learning is often an integral part of an ROCP instructor's responsibilities, with paid time allotted for this task.

<u>*Employers' challenges in working with students and with schools/colleges*</u>. Employers were asked specifically about the challenges that they and their companies experienced in working with *students*. The most frequently identified challenge was "students lack appropriate workplace attitudes and habits" (73%). With one exception, the other response options were identified as challenging by about half of respondents, including students' "lack critical thinking and problem-solving skills" (54%), "lack the specific technical skills needed in our industry" (51%), "lack basic academic skills" (50%), and "lack technology skills" (45%). Only 24% of the

employers surveyed identified as challenging "students lack mandated health or security-related screenings."

Employers were also asked about challenges that employers experience in working *with schools and colleges*. Of the six response options offered, each was selected by approximately half of respondents. The specific proportions for each response option are: "lack of a central coordinator at the school/college" (56%), "difficulty in communicating with the school/college" (55%), "lack of time for our staff to work with students"(55%), "difficulty in fulfilling requirements for internships or work-based learning" (53%), "insurance and liability issues" (53%), and "lack of resources to pay students" (50%). It should be noted, though, that between 25-30% of employers found "*lack of a central coordinator at the school/college,*" "*insurance and liability issues,*" and "*lack of resources to pay students*" to be "very challenging."

Suggested strategies to overcome challenges in providing work-based learning

Survey respondents were also asked to write in suggested solutions to the challenges in providing work-based learning. By and large, the solutions mirrored the challenges themselves: more time, additional funding, more support from administration for the coordination of work-based learning activities. In addition, respondents recommended "community collaboration" to enhance the links between education and industry. One respondent suggested the creation of a "community organized by industry clusters comprised of employers, educators, and other interested parties working together over time to develop the infrastructure." The need to improve the "status" of CTE was also mentioned. Many respondents appear to view the current status of CTE as an impediment to expanding their programs, connecting with local business, and obtaining flexibility with course scheduling. The most common suggestion, though, relates directly back to one of the major challenges — unpaid WBL: securing paid opportunities for students.

Industry partnerships

The need for industry linkages was concisely captured by a member of the California PTA leadership: "We need more linkages, so that education is in sync with the needs of the workplace … in order for this to [succeed], there has to be more information shared."

The wide array of connections between the business community and educational institutions represents an important feature of what distinguishes CTE from other types of instructional designs and models. The results of this needs assessment attest to a rich texture of inter-connections between educators and business partners and yield insights about industry contributions across a spectrum of topics, ranging from curricular design, to outcome measurement, to development of student leadership opportunities, among others.

Types of industry involvement in program design, instruction, and assessment

Survey responses regarding types of involvement

Industry survey respondents were asked to identify the ways in which they have supported educators in their understanding of workplace requirements. The type of involvement or support

most commonly identified is serving as a member of an advisory board (86%). The other response options were identified by about half of respondents, including: consulting on skill standards and curriculum (50%), participating in assessment of student work (48%), and offering workplace tours, job shadowing, or externships for educators (48%).

In response to a related question about providing opportunities for students, the majority of respondents who completed the industry survey noted that they had been approached to provide job shadowing, mentoring, internships, or jobs for local students. Specifically, 64% indicated that "local schools and colleges" had approached them; an even greater percentage (72%) noted that they had been approached "by local students."

Industry representatives were also asked to provide additional detail about how they had contributed to the development of CTE programs, either as an advisory board member, or as an "interested employer." The most prevalent response was "provide input on required workplace skills" (90%), followed by "provide input on requirements for academic preparation" (70%), "provide input on changes in the local labor market" (70%), "assist with resource development" (60%), and "assist with "advocacy" (60%). Other options that were selected by at least half of these respondents include: "assisting with recruiting fellow employers for speakers, job shadowing, and internships" (53%), "assisting with public relations" (53%), and "providing input on specific technical skill standards" (50%).

Administrators and CTE instructor surveys also asked about the various ways in which "industry representatives participate in the design and implementation of [CTE] programs." Similar to industry survey respondents, participation on an advisory board was the most frequently reported form of industry involvement (87% of administrators, 85% of CTE instructors). For both administrators and CTE instructors, the second and third most prevalent type of employer involvement is "serv[ing] as a classroom speaker" (87% of administrators, 75% of CTE instructors) and "provid[ing] tours of their businesses" (66% and 58%, respectively), closely followed by "offer[ing] work experience opportunities" (67% of administrators, 52% of CTE instructors). Other forms of industry participation that were noted by about half or more of survey respondents included: "offer internships to students" (63% of administrators, 41% of CTE instructors), "consult on curriculum" (61% of administrators, 58% of CTE instructors), "offer job-shadowing opportunities to students" (57% of administrators, 37% of CTE instructors), and "consult on skill standards" (55% of administrators, 45% of CTE instructors).

Industry involvement on advisory boards. Of those members of the business community who have served — or currently serve — on a CTE advisory board, 65% indicated that it was for a high school, 45% for a ROCP, and 48% for a community college.

Industry representatives reported serving on boards of 6-10 members and 11-20 members at the same rate (47% selected each option). Similarly, the most prevalent response of CTE instructors regarding the size of their advisory boards was 6-10 members (47%). CTE instructors were also asked to indicate what percentage of their advisory boards are industry representatives. Overall, boards with greater proportions of industry representatives are more common. The modal response to this question was "76% or more," indicated by 41% of CTE instructors.

Survey results indicate that contact between industry representatives and educators has been periodic, but not necessarily frequent. Among respondents from the business community, committee meetings are most commonly held quarterly (40%); smaller proportions of respondents noted that meetings were held monthly (23%), biannually (23%), and annually (13%). The other two groups of respondents also indicated periodic, but not especially frequent, contact with industry representatives. For example, 36% of administrators and 33% of CTE instructors indicated that they contacted industry representatives "annually," while 37% of CTE instructors and 30% of administrators reported contact only once per semester. Monthly contact was reported with lower frequency for both groups (17% of administrators, 20% of CTE instructors). Much fewer — specifically, 9% of administrators and 6% of CTE instructors — indicated that they "never" contacted industry representatives.

When asked about advisory board responsibilities, the vast majority of both administrators (84%) and CTE instructors (85%) indicated that board members were responsible for "providing input on required workplace skills." Other common responsibilities identified include "providing input on the local labor market" (79% of administrators, 73% of CTE instructors) and "providing input on specific technical skill standards" (74% of administrators and 74% of CTE instructors). Other types of board member responsibilities were reported by about one-half of respondents from both groups. These responsibilities include: "assisting with recruiting fellow employers to provide opportunities such as speakers, job shadowing, and internships" (49% of administrators, 43% of CTE instructors); "assisting with resource development and/or contributing resources directly" (55% of administrators, 46% of CTE instructors); and "assisting with advocacy" (52% of administrators, 46% of CTE instructors).

The following table illustrates the breakdown of the key advisory board responsibilities noted above.

Table 30. Key advisory board responsibilities

Advisory Board Responsibilities	Administrators	CTE Instructors
Providing input on required workplace skills	84%	85%
Providing input on the local labor market	79%	73%
Providing input on specific technical skill standards	74%	74%
Assisting with fellow recruitment (speakers, internships, etc.)	49%	43%
Assisting with resource development	55%	46%
Assisting with advocacy	52%	46%

Focus group responses regarding the role of employers

The impact of business involvement on CTE programs is perceived as varied and widespread, influencing both the workforce development system as a whole, and outcomes for individual instructors and students. Participants in focus groups reinforced the importance of creating and sustaining strong linkages between business partners and educators to develop, implement, and maintain the relevance of CTE programs. "You need that connection to industry," one

postsecondary instructor pointed out, adding that with that connection, "you see more success … as programs and teachers are more connected to industry, you see more success with placement and transitions." Linkages were also seen as central to effective dissemination of program information into the business community, although focus group members acknowledged that informal linkages alone were not sufficient. "[We also need] a formalized system for directing people to good examples of successful programs," one member of the Economic Development focus group pointed out.

"Industry determines size and scope [of CTE programs]," observed one Adult Education administrator, "by virtue of identifying the skill-needs required." On another theme — articulation — the sentiment was similar: "Kids go where the jobs are, and that drives where they need to articulate," noted a secondary instructor. "As far as where kids go [in terms of articulation], that's driven by industry."

In addition to systemically ensuring program relevance and identifying skills needed in the workplace, focus group participants discussed the substantive operational role that employers and business partners play in CTE. "It goes beyond just advisory committees," remarked a postsecondary instructor in the course of explaining the ways in which industry partners had taken an active role with respect to CTE in his institution. "It also includes employers into classrooms, training sessions at employer sites, [and] career days — and all of these also help lead to students coming to [enroll at our] college."

Responses about the operational role of employers fell into roughly four categories: input to curriculum and assessment of student work; introduction of students to workplace skills through in-class and work-based experiences; direct support to students through scholarships; and introduction of faculty to the needs of the workplace through teacher job shadows and externships.

Curriculum design and assessment. "Employers should be part of the curriculum development process," recommended another postsecondary focus group member, adding that, "if we are serious, we [should] take those recommendations and bring them back to the employers and have them provide additional input and revisions." A few moments later, his colleague amplified this thought, remarking that "employers help us determine [the] learning outcomes [in our program] — the specific skills that students should develop." One added, "Our programs should be directly informed by industry." An administrator commented, "If we do a project-based approach [to curricular design], it's vital to have employers involved in creating [those] scenarios." Secondary instructors mentioned employers' role in the assessment of projects. "[Our institution] invites employers to come in as judges for competitive events; their critique carries more weight [among students] than critiques from teachers," noted one instructor from that focus group.

Providing exposure to workplace skills. Several focus group participants observed that, under some circumstances, employers could act in a teaching and/or leadership capacity. "Employers provide a lot of guidance," one administrator noted. The notion of employers as teachers and leaders emerged several times in different focus group discussions, particularly within the focus group of secondary CTE instructors. A secondary instructor was equally direct: "employers can

also act as teachers," she explained. "Employers can show students leadership skills." A second comment echoed, "they should talk to students about the skills required — good work ethic, flexibility, people who can think on their feet — it takes experience." Mock interviewing was also mentioned as a strategy for imparting workplace skills. In addition, the positive impact of job-shadowing programs on enhancing students' opportunities for exposure to applied knowledge and skills was a theme that received widespread agreement in focus group discussions. "The job-shadowing program is key," emphasized a secondary instructor. "[The] companies [to which] we've sent students tell us, 'We miss your students when they leave [to return to school in September]; we can't wait for them to come back.' " At another point in the discussion, a different instructor added, "[Our] job-shadowing program … [helps] kids find out what's out there, what the real world requires, so they can make corrections [to their assumptions]." The provision of internship sites for students was also mentioned as an important role for employers.

Financial support to students. Others pointed out that direct financial support was another vehicle through which employer participation had been instrumental: "We have tremendous scholarships through the National Restaurant Association," one instructor commented. Her colleague concurred: "[In our program], the agricultural industry helps them [students] a lot [financially]; it makes [education] more accessible."

Professional development of faculty. The value of workplace experience as a pedagogical model extends to professional development for teachers as well, according to some focus group participants. Externship opportunities for teachers are very highly regarded by focus group members, as were other opportunities for teacher professional development in applied contexts. For example, in the counselor focus group, one discussant observed, "Job shadowing for CTE teachers works incredibly well, [even for] just one day; a teacher [in our institution] said he would never teach the same way again." A secondary instructor added, "We need to keep current with the emerging skills that are required by industry, especially the skills that are now required but may not have been required 10 years ago; otherwise we are teaching kids information that has become obsolete." "I believe every vocational teachers should work every year in industry," asserted one postsecondary instructor. Another added, "The academic teachers and counselors should also do externships."

Finally, it was mentioned that employers can play important advocacy roles for CTE programs within the political arena.

Emerging occupations and industries

One of the key roles of industry is alerting educators to changes in the workplace and the emergence of new occupations so that they can make corresponding adjustments to their course offerings and curricula. Based on input from the Community Colleges Economic Development Program, a number of "new and emerging occupations/growth industries" were listed in the survey to explore whether the programs were available in these areas. Administrators and CTE instructors were asked to rate whether their institutions offered programs or curricula in one or more "new and emerging occupations/growth industries." The occupation identified by the largest proportion from both groups of respondents (63% of administrators, 39% of CTE

instructors) was "multimedia/entertainment." Other occupational areas identified by substantial numbers of administrators and CTE instructors include: "information technology" (60% of administrators, 37% of CTE instructors), "construction" (54% of administrators, 34% of CTE instructors), "allied health occupations" (65% of administrators, 32% of CTE instructors), and "professional and business services" (53% of administrators, 28% of CTE instructors).

Perspectives on level of employer involvement

When asked to reflect on "how [their] level of contribution (both as an advisor and provider of opportunities for students) had matched [their] capacity to contribute," 59% indicated that they made "just about the right level of contribution." However, 29% believed that they "would have liked to contribute more," and 10% noted that they had "not been asked but would have been interested in contributing." Only 2% indicated they had "been asked to do too much."

Challenges to engagement and strategies to effectively engage employers

Although focus group discussions revealed numerous details about the benefits of linkages between employers, educators, and students, participants were cognizant that these linkages also pose challenges. Among these challenges, lack of time seemed to be the most pressing. "These efforts take a huge amount of time," a college instructor observed. "Lots of time — and there are few incentives [supporting these efforts]. …Right now, it only happens if a teacher personally makes a real commitment to it."

In addition to the challenges associated with lack of sufficient time and incentives, others noted that successful educator-employer collaborations require careful balancing between frequent opportunities for informal dialogue. And other successful strategies identified for engaging employers ranged from small to large in scope. They include the following, clustered by themes:

1) **Start with feasible and/or high leverage strategies**
   - Coordinate Career Days at industry sites that create connections with employers leading to other opportunities for students
2) **Maximize the potential of advisory committees**
   - Ensure attendance of superintendent at advisory committee meetings
   - Have an agenda at advisory committee meetings
   - Serve lunch
3) **Provide support to teachers**
   - Provide grants to teachers to get involved with employers
   - Provide teachers with a structure to facilitate engagement
   - Provide teachers with business contacts
   - Create tools that can be disseminated
4) **Use intermediaries**
   - Create the role of an "employer outreach specialist"
   - Utilize an intermediary organization (e.g., regional economic development organizations or industry-education partnerships) to connect schools and colleges with the community, broker work-based learning opportunities, garner input from employers, and enlist advisory committee members

- Create a "single point of contact"
- Work directly with professional, industry, and trade associations

5) **Allow students to be the spokespeople**
   - Bring employers directly into classrooms to see what students are accomplishing
   - Invite employers to competitive events to see students perform; "our students are our best public relations tool"
6) **Ask for — and accept — input**
   - Solicit and accept input and revisions of curriculum
   - Solicit suggestions about who from a given industry or company should be involved (e.g., Human Resources staff, line staff such as scientists, or both)
7) **Take opportunities to build relationships**
   - Take the time to nurture relationships with employers; "administrators don't realize that industry partners require as much time and caretaking as students do."
   - Take the opportunity offered by student internship placements to foster communication with employers; "when students work at an employer internship site, communication flows both ways."
8) **Communicate effectively and show appreciation**
   - Show employers how they can gain from participation
   - Write thank you notes to generate good will, while building students' skills
   - Acknowledge employers' contributions publicly

System coherence

In order to support the academic and career technical achievement of students in CTE programs, it is essential that the components of the entire system link together effectively. This section discusses the findings from both the survey and the focus groups about several topics regarding system coherence, including:

- Sequencing, which comprises both course sequences and curricular pathways
- Articulation and course alignment from secondary to postsecondary institutions
- Coordination among education and workforce development initiatives
- System flexibility in response to changes in the workplace
- Multiple entry and exit options for students
- Size, scope, and quality of CTE programs

Sequencing and pathways

CTE *course sequences* allow for progressive skill development within a specific career area. The term is used here to describe sequences within a single institution. The term *career pathway* is used here to refer generally to CTE course sequences that are embedded in a structure that includes other "academic"/non-CTE courses or coursework, applied learning opportunities, career exploration, and experience in the workplace, to provide a comprehensive learning experience in a given career area.[48]

[48] Note that, in the previous sections of this report, "CTE in California" and the "Literature Review," pathways were also described, on the one hand, as systems of workforce preparation that include the education, workforce development and economic development sectors all focused on a high-demand career or occupational area in a particular region for workers throughout the age span, and, on the other hand, as one of several specific focus areas

Extent of sequences and pathways

Surveys for administrators, CTE instructors, and counselors/advisors asked whether course sequences have been defined for guidance staff to use in helping students make relevant course selections based on their career interests. In each case, a large majority of respondents responded "yes" — 83% of administrators, 79% of CTE instructors, and 74% of counselors/advisors. A majority of administrators (73%) and CTE instructors (67%) indicated that at the secondary level, course sequences resulted in students receiving skill certificates. (This question was not posed to other categories of survey respondents.)

When queried about career pathways, a majority of administrators (77%), CTE instructors (76%), and counselors/advisors (51%) noted that their institutions had formal career pathways that result in the attainment of specific occupational knowledge and skills, as compared to 35% of academic/non-CTE instructors that indicated this response (community-based counselors/advisors were not asked this question).

Challenges to course sequencing and pathways

The following presents both the survey as well as focus group responses regarding the challenges to course sequencing and pathways identified by the various participants in this research.

Survey responses regarding challenges. When asked to identify the challenges that instructors face in creating course sequences, the response selected most frequently by all three respondent groups is "challenges with master scheduling" (55% of administrators; 68% of CTE instructors; 63% of counselors/advisors). Other substantial challenges include "insufficient enrollment due to other course requirements at the school" (54%, 48%, and 49%, respectively), and "lack of time to plan/coordinate with other staff" (38%, 33%, and 49%). Other challenges, such as "lack of resources for facilities or equipment for courses," were cited as important to some respondents (41% of CTE instructors), but were notably less important for other groups.

The challenges noted in creating career pathways echo the concerns noted for creating course sequences. As before, "master scheduling issues" is a major common concern (noted by 70% of administrators, 68% of CTE instructors, 80% of counselors/advisors, and 70% of academic/non-CTE instructors), followed closely by "lack of time to plan/coordinate with other staff" (68%, 65%, 66%, and 63%, respectively), and "insufficient enrollment for a full sequence due to competing course requirements at the school" (65%, 62%, 75%, and 60%). Academic/non-CTE instructors differed from other survey respondents for some items; for example, the biggest challenge they reported in creating pathways was "lack of resources for facilities or equipment for classes" (77%), and the second-biggest challenge was "lack of time to engage employers" (73%).

Focus group comments about challenges to creating course sequences and pathways. The focus groups noted other challenges to course sequences and pathways. For example, low enrollments

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of study within an industry cluster as defined by the California Career Technical Education Model Curriculum Standards for grades seven through twelve. These paradigms are not inconsistent with one another, but rather can be seen as "nested."

for certain CTE courses may lead to course cancellation, thus disrupting students' opportunities to complete a sequence in the order that was originally intended. Members of the focus group of secondary CTE instructors emphasized that this was a serious problem, and indicated that students who leave the course sequence may not choose to or be able to subsequently re-enter the sequence. This disruption may ultimately lead to lower completion rates among CTE students. Other focus group participants (particularly within the focus group of CTE counselors) said that even when well-designed pathways exist, students may be taken out of those sequences during the process of implementing master scheduling.

Addressing the challenges to the creation of course sequences and pathways

One approach to addressing the challenge of lack of full course sequences (identified in focus group discussions) is differentiated instruction. However, differentiated instruction within a course was noted as desirable in some, but not all, contexts. For example, one secondary CTE instructor noted that "we take the student[s] where they are at, and then we tailor the program to meet their needs. This approach works well because of the effort put in by the teacher, but we don't get much administrative support." Another instructor in the same focus group added, "We do try to differentiate the classes, but that is not preferred … we find that the more we differentiate the courses, the harder it is for the education to be of the highest quality."

CTE counselors also noted that "sheer knowledge of the system is what facilitates enrollment — counselors and teachers often don't understand that sequences exist." Another participant in that focus group added that "sequencing is often misunderstood by students, in addition to counselors and teachers. We need to share this type of information with parents and administrators…we need to develop ways to get information to kids." Yet another participant acknowledged that her school's "Pathway Day" event was one way in which such information was being disseminated successfully, although other participants cautioned that "we just don't have good data" on how well students and staff understand the details and intent of course sequences, so it is premature to draw definitive conclusions about strategies to improve participation in course sequences.

Members of several focus groups reported that both formal and informal recruitment efforts were necessary to generating sufficient levels of interest among students to enter and complete course sequences to sustain adequate levels of enrollment in CTE programs. This was corroborated by parents and students who described in detail how teachers reached out and recruited students into pathways. Despite the effectiveness of personal outreach by teachers to students, focus group members stressed the importance of more systematically disseminated information.

Articulation and course alignment

Articulation of courses or programs refers to the alignment of course or program content from secondary to postsecondary educational institutions such that students can receive credit for a course at the postsecondary level that he/she took at the secondary level. Course alignment refers to the larger issue of course content and skill standards aligning "vertically" from one institution to another, allowing for students to move progressively from one skill level to another without facing institutional barriers.

Extent of articulation

Both administrators and CTE instructors were asked about articulation, with a substantial majority of each group (74% and 75%, respectively) indicating that their institution's courses were aligned/articulated with feeder schools or postsecondary institutions. Eighty percent of administrators and 71% of CTE instructors reported that formal articulation agreements exist between the local high schools and community college(s).

Benefits of articulating courses and programs

Participants in the focus groups had a variety of positive comments about the benefits of articulation agreements. For example, one college instructor noted that "the 2+2 agreements have been a good opportunity to get together with [secondary school] teachers." Another added that student leadership activities held on campus attracted the interest and participation of local high school students, thus boosting their participation in articulation agreements at that college. A counselor in a different focus group echoed a similar viewpoint, adding that "it helps to have the community college instructors talk to the high school students and tell them about the opportunities we have."

Challenges to the implementation of articulation agreements

The following presents the survey and focus group responses relating to participants' identification of the challenges to implementing articulation agreements.

Survey responses regarding challenges to articulation. Although articulation is clearly in widespread use, challenges remain in developing and implementing these agreements. The most common challenge noted by survey respondents is "lack of time to coordinate" (64% of administrators, 72% of CTE instructors); the second most frequently cited challenge for each group was "differing course content at different feeder schools" (58% and 53%). "Concerns with high school articulation interfering with CCC to CSU and UC articulations" was noted by about half of each group (47% and 50%). The remaining "challenges to articulation" were noted almost as often, with each identified by between 35% to 50% of administrators and CTE instructors. These included: difficulty working with advanced or feeder programs; lack of coherent course sequences at the feeder or advanced level that courses could articulate with; finding staff receptive and committed to coordination and/or articulation; pace of change in skill requirements; and identifying high school students who have completed articulated courses.

Focus group responses regarding challenges to articulation. Articulation was discussed at length in three of the focus groups. One overriding theme in these discussions was the disparity between concept and practice in the creation and implementation of articulation agreements. As one CTE counselor admitted, "It's not too difficult to get articulation agreements signed — but it's hard to use them smoothly once intact." In the postsecondary instructor focus group, some participants went even further. "We have had as many as 70 agreements going at one time, we shared information [across institutions] … but implementation of the agreements is really difficult: not too many students take advantage of those agreements." Another concurred, adding, "Teachers can do the pathways and articulation, but we are not getting the students on board."

In practice, articulation agreements may reveal challenges not immediately apparent during the design phase; one secondary CTE instructor cautioned that "the politics of articulation can make the whole process harder, especially problems with politics at the administrative level of the community college … I have been the victim of turf wars between different community colleges, about articulation. It can be problematic when students are allowed to articulate at one community college but not at another; it can be limiting for them." Echoing this, a different instructor acknowledged, "I feel that sometimes articulation can be a liability."

Addressing the challenges to implementing articulation agreements

Survey and focus group responses to the issues of addressing the challenges associated with the implementation of articulation agreements are summarized in the following section.

Survey responses. Two groups of survey respondents — administrators and CTE instructors — were asked to provide open-ended responses regarding "factors that they [perceived had] facilitated successful coordination and articulation." The analysis of write-in responses yielded three predominant factors that contribute to successful coordination and articulation: 1) ongoing, in-depth opportunities for communication; 2) motivation and commitment on the part of staff and faculty in all participating institutions; and 3) the availability of a dedicated staff-person for handling logistics (setting meetings, attending to administrative issues, etc.). Other representative responses included: "lack of territorial attitudes"; "[having] enough time for adequate planning"; and "taking personal time to visit schools and make friends with the instructors I articulate with."

Focus group responses. Focus group responses corroborated the surveys. Across the board, many focus group participants placed great weight on the importance of consistent communication as fundamental to ensuring smooth coordination among programs and initiatives; almost without exception, focus group members cautioned that building good communication requires consistent effort over an extended period of time.

Faculty support was also cited as an important underpinning to the successful implementation of articulation agreements; one college instructor emphasized, "We need to focus on what's needed to build articulation agreements. Inclusion on advisory committees — both ways — builds bridges and communication."

Coordination with other educational and workforce and economic development initiatives

Coordination with other educational initiatives refers to CTE's involvement with other education reform efforts that may be occurring on campuses, such as learning communities or the formation of academies. Coordination with workforce development refers to CTE's involvement with WIA-funded programs in the community and with economic development activities, primarily as reflected in the responsiveness of CTE programs to the needs of industry.

Extent of coordination with other educational initiatives

To gauge the level of coordination with other related educational initiatives, survey respondents were asked to rate the extent to which they work with academies or small learning communities at their school or college, if they had them. (Only 7% of administrators, 10% of CTE instructors, and 11% of counselors/advisors reported that they did *not* have either academies or small learning communities in their institution.) Seventy-five percent of administrators reported working with academies and small learning communities *at least* to a minimal extent (split almost equally among "to a minimal extent," "to some extent," and "to a great extent"). About 68% of CTE instructors and 69% of counselors/advisors reported doing the same; however, for these groups, about 18% of instructors and 16% of counselors noted that they were involved to a great extent. The percent of respondents reporting *no* involvement with academies or small learning communities ranged from a low of 11% (counselors/advisors) to a high of 23% (CTE instructors).

Extent of coordination with workforce development initiatives

Educators were also asked in the surveys about their coordination with local Workforce Investment Boards, Youth Councils and One Stop Career Centers. The findings show that coordination with these workforce initiatives is moderate, at best. For example, 51% of CTE instructors noted that they did not coordinate "at all" with their local Workforce Investment Board, Youth Council, or One Stop Career Center, as did 26% of administrators, and 40% of counselors/advisors. It was far less common for respondents to indicate that they coordinated "to a great extent" with these initiatives: the proportions ranged from 19% of administrators to only 6% of CTE instructors.

Types of coordination with workforce development efforts

With respect to specific workforce development efforts, One Stop Career Centers were reportedly used to some degree for career exploration and job searches (43% of administrators, 38% of counselors/advisors, and 26% of CTE instructors). Though the response rate was very small for this group, a greater proportion of community-based counselors/advisors (7 out of 10) used these community-based services, as might be expected. Four out of 10 community-based counselors/advisors and 38% of administrators reported that their staff participate on the Workforce Investment Board (as compared to 11% of CTE instructors and 15% of counselors/advisors). Staff participation on the Youth Council was indicated by 3 out of 10 community-based counselors/advisors, 26% of administrators, 5% of CTE instructors, and 10% of counselors/advisors. Reported student participation in WIA-funded programs vary widely, ranging from a low of 15% for CTE instructors to 7 out of 10 for community-based counselors/advisors (with 30% of counselors/advisors and 43% of administrators indicating this type of participation).

Successful strategies to foster coordination of education with workforce and economic development

Two focus groups addressed the issue of coordination with workforce and economic development: the Business and Economic/Workforce Development group, and Adult Education administrators. In the first group, business representatives and economic development staff highlighted the use of intermediary organizations, such as industry associations, P-16 councils, and regional economic development organizations, to facilitate coordination efforts. There was acknowledgement that successful use of intermediaries requires "hard outcome-process work" by all parties involved. One participant suggested that "regional economic development [agencies might serve as] better intermediaries [since they are] not competing with what the colleges are trying to do," but focus group members seemed to agree that the question of "What does an intermediary really do?" needed more careful examination.

One Adult Education administrator reported keeping in touch with the local labor market through regular participation in both the local chamber of commerce and the regional "workforce development summit." She then reports back to staff so that they can continuously update their courses. This would be consistent with the role that adult education plays in the overall workforce development system — that of ensuring that adults are prepared for entry-level employment.

Program flexibility

The corollary to coordination with workforce and economic development is the need for education to be able to *respond flexibly* to the changing needs of the workplace. Participants from a variety of different focus groups seemed to concur that flexibility in program design and in curriculum approaches is central to helping CTE programs keep pace with the evolving needs of industry and the economy. "Industry is changing fast," declared one secondary CTE instructor. "Students need to know what jobs are out there … they need to know the skills." His colleague concurred, adding, "We need to keep current the emerging skills that are required by industry, especially the skills that are required now but may not have been required as of ten years ago; otherwise, we're teaching kids info that's become obsolete."

One participant in the economic development focus group, with whom others agreed, stressed the importance of *skill mastery* over "seat time." He suggested that educators are "locked into the old school, '3-unit course, 3 times week for a semester' way of thinking" and proposed instead a "focus on acquiring skill sets, not semester-long courses for the sake of semester-long courses." He further proposed "efforts to create flexible courses that generate FTEs (based on industry standards). [We need something] almost like supervised independent study. Open entry, open exit, stay however long you need in order to master skills."

Other participants echoed the need for "flexibility in curriculum approach," including "performance-based instructional design for developing a skills program." One noted that corporate colleges already use performance-based instructional design and suggested that community colleges should emulate this approach.

According to respondents, this approach requires a "closer working relationship with business and industry," including responsiveness to the input of advisory committees, and the use of intermediaries as appropriate to facilitate the process.

While all participants in this group agreed with the need for responsiveness and flexibility, one highlighting the "many mechanisms" available to community colleges to customize onsite training in response to business and industry, participants cited the need to eliminate "barriers" that inhibit educators from responding to industry input. There was wide acknowledgement that it is "hard to break the traditional model of education." Other interrelated challenges mentioned during this discussion included:

- Weakness of some advisory committees
- "Accounting challenges"
- "FTEs caps"
- Difficulty in getting a new program started, at least partly due to difficulty in getting support from the administration
- "No reward system for trying new things"
- Lack of resources for in-service training ("that has to be changed from up top")
- "Faculty and staff union issues"

Strategies suggested to address the need for system flexibility included:

- Incentives for colleges to develop services specific to businesses
- Distance learning and web-based training
- Professional development for faculty

Multiple entry and exit points

One key aspect of "flexibility" is that of "multiple entry and exit points" to facilitate both access and progressive skill development for students. A frequent theme that emerged in various focus group discussions was the need for curricular designs that are in step with the actual demands and circumstances of the lives of CTE students. As one postsecondary instructor pointed out, "students look for classes to fit into their life schedule, their personal time schedule — not their course sequences." Within the Special Populations focus group, this issue was paramount: those participants indicated that programs requiring uninterrupted enrollment are often at odds with the real-life challenges that single parents and economically disadvantaged students face in meeting their economic and family obligations. CTE program that offer open-entry and open-exit (and career ladder) formats give students a chance to tailor their educational experience to the demands of their non-academic life. Focus group members emphasized that CTE programs designed in this fashion may enable more students to stay enrolled and to complete their programs, thus translating into reduced attrition rates within programs.

Size, scope, and quality of CTE programs

When asked how they determine whether CTE programs are of "sufficient size, scope, and quality to be effective," a requirement of the Perkins legislation, members of several focus groups admitted that what constitutes "sufficient size" is highly contextual and difficult to generalize across different circumstances. As one postsecondary instructor noted, "Size is about enrollment … but that doesn't really get at academic-quality issues; maybe industry representatives could come in to evaluate the scope and quality of programs." In a different focus group composed of Adult Education administrators, a similar viewpoint was expressed. "Industry determines size and scope," noted this administrator, "by virtue of identifying the skill-needs required at varying levels of employment. [For example], entry-level employment may require more skill than [was required] in previous years."

In the focus group of postsecondary instructors, similar issues were raised about appropriate program size. "From the [pedagogical] side," one instructor observed, "the size is determined by the content of the class and by the kind of skills I need to teach to the students. This needs to be dictated by the needs of the class. Also, we have to weigh in on what's economically feasible, as well as what makes sense in terms of the individual classroom and the skills that need to be taught; depending on the type of program, it would relate to the skills needed to enter the job market."

Another pointed out that geographical context of the CTE program can greatly affect what is regarded as "sufficient" enrollment. "We struggle with the number of students [in our programs]," noted one administrator, "because of the rural setting, because students must drive from within a large geographical area." In discussing strategies to reach a desired program size, another participant noted, "We are a large school district, and we have to [be careful about] focusing our resources or spreading them too thin.…We try to target our money where we have the commitment to make our course sequence work." This perspective was echoed by the Adult Education administrators.

Postsecondary focus group participants raised cautions about the potential disadvantages of externally imposed definitions of "adequate" program size. "That question — about size and scope — should be defined by the faculty," one postsecondary instructor declared. "We shouldn't put restrictions on size arbitrarily; we shouldn't dictate to the faculty." Moreover, institutional capabilities or resources may also drive decisions about appropriate program size or scope. "There are financial restrictions," observed an Adult Education administrator. "We may choose to provide a course for which we may not be able to provide a more advanced level. … [Those] financial restrictions will force us to choose between multiple diverse classes at a lower level, or a fewer number of different occupations, but with more course sequences."

Personalization, career guidance and student services

A hallmark of CTE is its focus on support of students' individual learning and career needs and goals. This section describes Career Technical Student Organizations (CTSOs), career guidance services, and the other services available to students, especially to support special populations.

Opportunities for peer learning and leadership development: the role of CTSOs

CTSOs were identified by many focus group participants as a thriving and valuable component of high-quality CTE programs. Focus group discussions revealed specific ways in which CTSOs enhance student engagement, raise career and academic aspirations, facilitate transitions to postsecondary education and careers, and cultivate the communication skills, critical thinking capabilities, and leadership potential of the students who belong to those organizations.

The intensity of enthusiasm with which focus group participants recounted their CTSO experiences was a striking feature of discussions. "The power of those clubs to keep kids engaged cannot be underestimated," declared a CTE counselor. The parent of a student who had eventually assumed a leadership position within her CTSO said that this experience had been transformative for her daughter: "[That] organization was … a motivating factor" [for her], this parent explained. "[Student members] travel and compete; my daughter competed with her business plan. They also [provide] industry knowledge and role-play [opportunities]." When asked what characteristics about the CTSO had been most rewarding for her daughter, this parent emphasized that "competition and the social aspects" were valuable, "but the most important [element] has been her leadership. She discovered her ability to succeed based on her ingenuity. Before this, she was never interested in doing something above average. [Then] she became president [of the CTSO] and has been 'all over it' ... Her work [has] paid off … [previously], she had leadership potential that was never allowed to flower. … This has really allowed her to rise to the occasion. This has made her think of herself differently."

Almost without exception, when CTSOs were discussed in focus groups, participants spoke about how specific qualities inherent in those organizations enabled students to make tangible progress in academic or career development. "Student organizations are the key in so many ways," observed a high school CTE instructor, "[through] competitions, leadership opportunities. These organizations give students life experience, real-world experience." Members of other focus groups pointed out that CTSO involvement sometimes became the direct catalyst driving career preferences: "We have a student leadership program [in our institution], and in our program we actually have many students go on to careers in teaching because of that leadership program," remarked one secondary instructor. At the college level, CTSOs were seen as valuable because they offered opportunities to engage in hands-on, applied projects, while providing access to rich sources of career information. A college instructor noted that CTSOs are one of her preferred strategies for assisting CTE students in making successful transitions to employment: "We try to get students involved with the professional organizations. [That's] where they get to network with people who are actually working in the field, so they can see it firsthand." Her colleague concurred, adding that the power of CTSOs to enhance students' confidence and capabilities enable these organizations to be an important recruiting tool. "We have competitive events [through our CTSO]," this instructor explained, adding that this is one of their keystone events for cultivating industry partners, as mentioned above. "Our industry representatives see our kids perform. We let our students speak for us."

Counseling and career guidance

Appropriate, timely and well-informed career exploration and planning — based on current industry trends, and incorporating a variety of tools and techniques tailored to a range of student needs — is fundamental to CTE programs. Described below are the services provided to students by counselors and other career guidance staff, and career guidance or exploration as a *function* that is often performed by instructors and industry-based mentors.

Counselor referrals to CTE courses and programs

Counselors were presented with two survey items designed to explore their viewpoints regarding referrals to CTE courses or programs. When asked to what extent each of three factors contributed to their decision to recommend CTE courses to students, almost all respondents indicated that "interest in career area" (96% of respondents) and "opportunities in career area" (92%) were governing factors. By contrast, only about half (54%) noted that "course grades" contributed to their decision to recommend CTE courses.

On another survey question, respondents were asked to indicate their level of agreement on various items relating to the value of CTE courses and the applicability of CTE courses for different types of educational needs and career goals. (For ease of reporting, "agree" refers to "agree" and "strongly agree.") These results indicate that most counselors/advisors believe that CTE courses are valuable for nearly all students. For example, 69% agreed that "in high school, CTE courses are invaluable for students who are planning to go to college," and 82% noted that "in high school, CTE courses are invaluable for students who do not know what they want to do after high school." Similar proportions indicated that "in high school, CTE courses are invaluable for students who are not planning to go to college" (84%) and "in high school, CTE courses are invaluable to any student who wants to be prepared for life after high school" (83%).

Fifty-three percent agreed that "CTE courses should be more rigorous," though only 17% "strongly agreed" and an equal proportion did *not* agree. However, a substantial majority (67%) did *not* agree with the statement that "students should only take CTE courses if the courses meet UC/CSU A-G requirements" (only 8% agreed); similarly, 76% did *not* agree with the statement, "when suggesting courses for students, I steer them away from CTE courses if they are capable of handling an A-G course" (only 7% agreed with this statement).

When asked to express opinions regarding the role of CTE courses in community college settings, 76% of respondents indicated that "in community college, CTE courses can count toward meeting general education degree requirements"; 71% noted their *disagreement* with the idea that "in community college, CTE courses are appropriate only for students who are not planning to transfer."

Survey results also revealed that counselors/advisors tend to have a positive outlook on the myriad benefits of CTE, and that this high regard was widespread. In fact, for each of nine survey items regarding various attributes of CTE, more than 90% of respondents indicated their agreement; there was practically no variability by item. The statements to which respondents indicated their agreement are:

"CTE courses are good places to learn skills for future careers." (97%)
"CTE courses are good places to learn skills that can be used in everyday life." (96%)
"CTE courses are good places to explore career interests." (96%)
"CTE courses offer important learning opportunities for all students." (96%)
"CTE courses are good places to learn critical thinking and problem-solving skills." (95%)
"CTE courses are good places to learn in alternative ways." (95%)
"CTE courses are good places to gain access to experiences in the workplace." (95%)
"CTE courses are good places to learn about workplace attitudes and behaviors." (92%)
"CTE courses offer an important way to keep students engaged in school." (92%)

Fifteen counselors wrote in explanations for their responses to this set of questions. Four of the comments emphasized the importance of academic rigor or connecting CTE to academic standards, while others emphasized CTE's value for career exploration or the development of other "life" skills:

> *CTE should be appropriately integrated with high academic stds [sic] curriculum so that students can earn "general ed" credit via a CTE course — both in high school as it is in community college. Often students learn better when the academic subject is taught in "context" with career focii. On the other hand, "lost" students (w/o goals and focus) can be "captivated" with a coordinated curriculum function. (High stds [sic], however, is the key!)*
>
> *CTE courses can greatly benefit all students regardless of aptitude or ability. Students are provided with career direction and exposure to life lessons of the "real world."*

One respondent highlighted the challenge of scheduling CTE classes, given students' crowded schedules and the limited number of CTE classes:

> *Finding time in students' schedules for CTE classes is becoming a huge challenge. Not only college requirements, but sports, student government, music programs are all offered less frequently than in the past, so students with interests in these programs, as well as CTE, which are being taught less frequently as well, pose problems.*

Focus groups revealed complexity of referral scheduling issues in light of college admission requirements. Focus groups and interviews were conducted with a total of seven counselors or career staff/consultants representing the views of both community colleges and secondary programs, as well as a county office of education program serving foster youth, to probe further into counselors' perspectives on CTE. Two of the respondents were from traditional high schools, one of which emphasized a "college prep" curriculum.

When compared side-by-side, our survey results and focus group findings regarding counselor attitudes and referrals reveal some notable disparities. Comments shared by the high school counselors/advisors indicated that counselors had substantial reservations concerning whether and when to refer students to CTE courses. This stands in contrast to their assertions about the value of CTE classes and the nearly universal pattern of agreement regarding the benefits of CTE reported in the surveys.

Counselors clarified that their reluctance to refer was due primarily to issues regarding curricular requirements for UC/CSU admission. "[There's a] definite stigma towards taking CTE, [since] it doesn't even count towards the GPA," noted one. "It's not practical at all if [a student is] trying to go to college." Echoing a similar theme, a colleague added, "We steer kids towards CTE only if [they are] not college-bound; [otherwise], we steer them to electives that meet the A-G requirement. I would not be doing my job if I did otherwise," this counselor acknowledged. The other pinpointed an important consequence of recommending CTE courses. In his institution, he admitted, "there is little cross-over between CTE and academic pathways … the reality is that [we] cannot recommend this sort of thing [CTE courses] for competitive, college-bound kids, because it would hurt their chances of admission."

In a separate focus group, others discussed the pressure faced by administrators: "Administrators are under a lot of pressure to have students meet A-G requirements." They also suggested that parents lacked adequate information about the rigor of CTE programs: "A lot of parents need help understanding that CTE is not just shop class."

In a separate interview, a counselor explained his thinking about CTE in light of A-G requirements. He stated that the role of counselors is to help students explore and clarify their goals by "better inform[ing] students on how to make connections in the real world between what they are doing occupationally and academically in the classroom and what they would like to do [in the future]" and then to help students understand "what is it going to take for them to occupationally and academically satisfy that end." In this view, A-G courses and college admission are seen as means to an end, but not ends in themselves.

At the same time, he highlighted the fact that many CTE courses are, in fact, A-G approved. He further clarified that the new CTE curriculum standards will help ensure the rigor of CTE courses and that, in the process of then taking challenging courses, students will become motivated to higher levels of achievement, in service of their personal career goals:

> *So now it's a matter of letting people know if you take elective classes like CAD and others … computer design and other engineering courses, for example, that it really requires a higher level of math, a higher level of science. And these are the kinds of things that once the students get involved in them, realize how much fun they are, how engaging they are and then, of course, it's going to challenge them toward taking higher levels of math, science and other courses in the A through G curriculum to be able to satisfy those particular kinds of professions. So it helps them to get a better real-world connection: where they are headed and what they need to do.*

Career resources and services

The surveys for administrators and instructors, as well as counselors, asked a number of questions related to the career guidance and exploration services and opportunities available to students on both high school and college campuses. The goal of this set of questions was to probe various aspects of the career exposure and guidance function, given its important role in CTE. Topics included the following:

- Timing of services
- Extent of services provided
- Types of career guidance and exploration offered
- The role of counselors
- Student exploration of "non-traditional occupations"
- Counselor interaction with faculty
- Challenges in encouraging instructors to incorporate career exploration
- Challenges to providing career exploration to students in special programs
- Student perceptions regarding barriers to career guidance

Examination of these responses is followed by discussion of focus groups' responses specifically on *effective career guidance strategies*.

Timing of career resources and services available to students. When asked about when career guidance is first offered, the most frequently provided response is in high school (35% of administrators, 33% of CTE instructors, 28% of academic/non-CTE instructors, and 43% of counselors/advisors.) A somewhat smaller subset of respondents noted that, in their institutions, students first received career guidance in middle school (31% of administrators, one-quarter of academic/non-CTE instructors and counselors/advisors, and 22% of CTE instructors). It is somewhat unusual for students to first receive career guidance in elementary school (10% of administrators, 13% of counselors/advisors, 5% of CTE instructors, and 4% of academic/non-CTE instructors indicated this response).

Extent of services provided. When asked about the extent to which students have the opportunity to explore career interests or receive career guidance as they select and progress in a CTE program, fewer than 20% of any group of respondents indicated that "all of our students have the opportunity to explore options before selecting a CTE program" (17% of administrators; 12% of CTE instructors, 8% of academic/non-CTE instructors, and 14% of counselors/advisors). It was nearly as unusual for respondents to indicate that "all of our students have the opportunity to review their options throughout the course of their CTE program" (23% of administrators; 20% of CTE instructors, 5% of academic/non-CTE instructors, and 22% of counselors/advisors). By contrast, roughly one-third of survey respondents noted that students have the opportunity to explore "to some extent" (36% of administrators, 33% of CTE instructors, 32% of academic/non-CTE instructors, but only 22% of counselors/advisors). Responses indicating that students received "only a minimal extent" of career exploration opportunities ranged from a low of 16% reported by administrators to a high of 29% reported by counselors/advisors (24% of CTE instructors and 23% of academic/non-CTE instructors responded this way).

Forms of career exploration and planning provided. The forms of career exploration and planning that are available to students vary widely, although there is remarkable consistency in response patterns across the five different groups of survey respondents who answered this question about types of career exploration and planning made available to students. The most frequently reported forms of career exploration and planning are (in descending order): "written or multimedia tools that describe various careers" (78% of administrators, 64% of CTE instructors, 55% of academic/non-CTE instructors, 91% of counselors/advisors, and 9 out of 12 community-based counselors/advisors); "career assessments or reflective exercises" (76% of

administrators, 62% of CTE instructors, 44% of academic/non-CTE instructors, 87% of counselors/advisors, and 7 out of 12 community-based counselors/advisors); and "consultation with a counselor or staff member who has career guidance training" (77% of administrators, 65% of CTE instructors, 51% of academic/non-CTE instructors, 82% of counselors/advisors, and 9 out of 12 community-based counselors/advisors selected the category most closely resembling this response). Among the somewhat less frequently chosen options, "development of a formal education plan that incorporates career options or goals" was indicated by 57% of administrators, 44% of CTE instructors, 31% of academic/non-CTE instructors, and 69% of counselors/advisors. The survey of community-based counselors/advisors included an alternative response option: "counseling and goal setting", which was selected by 75% (9 out of 12) of the respondents. In addition, "speakers, tours, or informational interviewing" was indicated as an option by 52% of administrators, 41% of CTE instructors, 29% of academic/non-CTE instructors, 65% of counselors/advisors, and 83% (10 out of 12). The least frequently selected response, "job shadowing," was indicated by a majority of community-based counselors/advisors (7 out of 12) and between 30% to 50% of all other categories of respondents.

The following table summarizes the key types of career exploration provided to students according to survey respondents.

Table 31. Types of career exploration provided to students

Career Exploration Opportunities	Administrators	CTE Instructors	Academic/ Non-CTE Instructors	Counselors/ Advisors	Community -Based Counselors/ Advisors
Media that describe various careers	78%	64%	55%	91%	75%
Career assessments	76%	62%	44%	87%	58%
Consultation with counselor	77%	65%	51%	82%	75%
Formal education plan that incorporates career options; formal goal setting	57%	44%	31%	69%	75%
Speakers, tours or informational interviewing	52%	41%	29%	65%	83%
Job shadowing	43%	37%	30%	47%	58%

Counselors/advisors were asked to provide additional detail about their "role in providing career exploration opportunities to students." While many survey respondents indicated that they provide a wide range of career services to students across many grade levels, some counselors identified more specific goals and functions. These more specialized roles include: 1) provision of career services specifically to certain populations, such as adults in ROP programs, or special-needs students; 2) the development and/or adaptation of curricular materials about career exploration, for use in a classroom setting; 3) coordination of career activities with employers and other external groups, including career fairs, guest speaker programs, job shadowing, and volunteer opportunities for students; 4) coordination of student work-experience placements; and

5) development and implementation of computer tools and modules for career exploration and planning.

Exposure of students to non-traditional careers. One goal of the Perkins legislation is to encourage students to explore non-traditional careers and occupations. Survey respondents were asked to indicate the extent to which students are exposed to non-traditional careers. Across all four categories of survey respondents, exposure "to some extent" was the most frequently chosen option (41% of administrators, 32% of CTE instructors, 29% of counselors/advisors, and 27% of academic/non-CTE instructors). Among the other choices, "exposure to a minimal extent" was selected somewhat more often than "exposure to a great extent," although the proportions varied by respondent group. For example, among counselors/advisors, 37% reported that students were exposed to non-traditional careers only "to a minimal extent," while 30% indicated that students were exposed "to a great extent." The corresponding figures for CTE and academic/non-CTE instructors are 29% minimal versus 21% great, and 25% minimal versus 8% great, respectively). For administrators, however, 28% of respondents said that students were exposed to non-traditional careers to a great extent, as compared to 24% who said "to a minimal extent." Fewer than 10% of each category or respondents indicated "no [exposure] at all" to non-traditional careers and occupations.

Counselor interaction with faculty. Both groups of counselors were queried about "the ways in which [they] work with instructors and programs to provide or coordinate career exploration opportunities for students." The most frequently cited response is that they provide career exploration opportunities "to students at large, in ways that are not connected to individual CTE courses or special programs" (78% of counselors/advisors and 8 out of 12 community-based counselors/advisors). Sixty-two percent of counselors/advisors and 6 out of 12 community-based counselors/advisors noted that they provide those services "to students in special programs." Half of the respondents in each group noted that they "work with CTE instructors to provide or coordinate career assessment and exploration opportunities to their students in specific courses" (46% of counselors/advisors, 6 out of 12 community-based counselors/advisors).

Challenges in encouraging instructors to incorporate career exploration. Counselors/advisors were asked to identify challenges to encouraging CTE instructors to incorporate career exploration into their curricula. About 83% indicated that "logistics and transportation issues for off-campus activities" was challenging (i.e., either "very challenging" or "challenging"). "Lack of time available to students for off-campus activities" was selected by 66% and "CTE instructors lack time necessary to coordinate off-campus activities" was selected by 67% of those respondents. In comparison to the three most common challenges, the two remaining categories — "CTE instructors lack time to incorporate career exploration into their curricula" (32%) and "CTE instructors lack a full understanding of the career exploration and management skills required in the workplace" (30%) — were seen as less problematic. Four themes emerged in the write-in responses to this question: lack of funding; lack of administrative support; lack of time for staff development on career exploration topics; and difficulties getting permission from academic/non-CTE instructors to release students from class in order to attend off-campus career-related activities.

Community-based counselors/advisors were queried about a similar issue, but were presented with a slightly different set of response options. In responding to the question, "What challenges, if any, have you experienced in working with schools and colleges to help implement or broker career exploration activities for students?" 5 out of 12 chose two responses: "CTE instructors lack time for this additional work," and "lack of resources." The remaining responses ("CTE instructors lack a full understanding of the career exploration and management skills required in the workplace"; "lack of materials"; "difficulty in communication or coordination"; and "none") were selected by 4 out of 12 respondents.

Challenges to providing career exploration to students in special programs and to students "at large." The survey of counselors/advisors explored the challenges associated with "providing career exploration activities for students in special programs" versus those associated with serving "students at large." Results indicate only modest differences in counselors' perceptions about the challenges of serving these two populations. For example, two challenges — "lack of time available to students for off-campus activities" (61% for students at large, 53% for students in special programs) and "logistics and transportation issues for off-campus activities" (57% for students at large, 64% for students in special programs) — dominated the list of available options. Other substantial challenges include "lack of time to coordinate off-campus activities" (54% at large, 50% special programs), and "lack of resources" (43% at large, 47% special programs). By comparison, a "lack of materials" was not perceived to be a substantial problem (24% at large, 23% special programs). Among the remaining categories, "no challenges" were indicated by 14% of counselors regarding students in special programs and 10% for students at large. Of those counselors who selected the response category "other," the write-in comments reflected counselors' frustrations with the lack of interest or motivation that they perceived among some students to whom they were attempting to offer career exploration activities.

Instructors' role in career guidance. Focus groups explored the role of instructors in providing career guidance and development services to students. They see career "advising" (not "counseling" — which is strictly in the purview of the counseling staff), as an important, but time-consuming function. As noted by a member of the Adult Education administrators' focus group, "[our] teachers help students with career advising." In other groups, participants noted that having CTE instructors also function as guidance staff for their students creates substantial challenges: "Our CTE teachers [are] overloaded trying to do career guidance while also trying to teach," admitted one postsecondary instructor. "We need a full-time position devoted to career counseling just for CTE." Participants suggested that colleges "should have the number of counselors proportionate to the number of CTE students so that the CTE teachers aren't too overloaded trying to do career guidance while also trying to teach." "Would love to see that be a requirement under Perkins," another postsecondary instructors added.

At the same time, CTE instructors want to ensure that counselors are informed about industry trends and the needs of the workplace: "We have tried to educate our counseling staff [about industry trends], but they are overworked and understaffed … they just don't know [that information]."

Student perceptions regarding career guidance. Four student focus groups provided key details about students' experiences with seeking and receiving guidance regarding educational and

career-related decisions. Students received most of their guidance from instructors, though a few had also spoken with counseling and career center staff. One community college student had received guidance from a counselor assigned to his CTE department. Students also obtained career guidance outside the school setting. The primary sources of career guidance mentioned were: other students, parents, and professionals/industry partners in the relevant occupational field. One community college students said that students had to take the initiative: "It really depends on the individual; if they want information they go out and get it."

Some secondary students voiced frustration with the lack of availability of extensive career guidance within their school setting, commenting that counselors were often too busy to speak with them: "Counselors don't care," declared one focus group participant, recalling his experience in seeking guidance at school. "If you go [to the counseling center] and they're busy, they'll try to get you out of there … they want you out." In a separate focus group, one participant noted, "you have to make a special appointment to have a dialogue."

Students also explained that they had, on occasion, felt that as CTE students, their needs were perceived as secondary to those of their college-bound contemporaries. "They [counselors] only presented the 'college' option," one participant noted, "[they're only] concerned with signing kids up for college."

Strategies for effective career guidance. Strategies for effective career guidance were explored in focus group discussions. Several themes emerged from these discussions:

1) **Bringing career-awareness activities into lower grade levels, in order to set clear expectations about the academic preparation required for a variety of career options.** One participant in the CTE counselor focus group declared, "This is the most important question so far; career exploration is not extensive enough in high school … it is critical that kids get to explore options early; some form of career exploration should happen at every grade level." This sentiment was echoed throughout several focus groups, from different settings and institutions (for example, when suggesting the best way to improve the design of CTE in the future, one member of the economic development focus group urged, "[Introduce] career development and work-based learning skills starting at a younger age."

2) **Create opportunities for current students to make sustained contact with peers and mentors who have achieved career success.** Noted one secondary CTE instructor, "One of the best types of career guidance we have is having former students come back [and discuss their experiences with current students]."

3) **Encourage student participation in CTE student organizations.** "We try to get students involved with professional organizations," said one college faculty member. "[That is] where they get to network with people who are actually in the field, so they can see it firsthand." ("Nothing takes the place of experience," remarked a school counselor.)

4) **Provide exposure to employment-related information.** Several focus group members declared that exposure to employment-related information both at school and at employer sites were interdependent and essential complements. For that reason, there was widespread

support for the notion of workplace-based demonstrations (such as job shadowing), but many felt that these activities should be integrated with activities at the school site, such as career fairs. Relying on both approaches, noted a CTE instructor, provides "one of the key things: for students to know what skills different types of jobs require."

5) **Ensure appropriate staffing of the career advising function; foster communication among all parties involved in this function.** Have instructors work with "career techs" at high schools, rather than counselors. Assign the advising responsibility to faculty and/or other staff (including but not limited to counselors) dedicated to CTE and knowledgeable about industry and workplace issues. Further, communication among the various groups involved in this function helps all maintain current information: "We've hosted 'counselor night' where vocational faculty and counselors come in. This helps counselors know about what all the career opportunities are for students. We have hosted evenings when industry representatives inform counselors about careers."

6) **Ensure flexibility in the design and provision of career guidance services, in recognition of the wide array of circumstances and needs of students within CTE programs.** "Personalization and individualization," emphasized one postsecondary instructor, explaining that "[that's why] we're also offering self-paced career guidance classes [at our institution]." "Some kids need one-on-one time to get past the intimidation factor," noted a CTE counselor, adding that, "career exploration needs to be engaging to the student."

7) **Reach out to special population groups when new programs are introduced**, to ensure that all are adequately informed.

Focus group discussions on guiding transitions to postsecondary education and employment

Focus group participants were probed for more specific insights and recommendations about strategies for assisting students with transitions to postsecondary education and employment.

Guiding transitions to postsecondary education and training. In the focus group with CTE counselors, participants were asked to identify strategies they use to help students enrolled in CTE courses make a successful transition to postsecondary education or training. These participants indicated that opportunities for high school students to directly observe campus life — such as through on-campus information fairs or peer-to-peer campus tours — were the most effective means of creating awareness and cultivating realistic, well-informed expectations. As one postsecondary counselor observed, "Getting [the high school students] to be at our campus and meet our faculty helps them to know if the 'feel' is right."

These ideas were echoed by participants across several focus groups in our study. For example, one CTE instructor emphasized the importance of peer-to-peer connections, noting that "[when] former students come back and talk to [current] students and share their successes, it shows students that it's possible [to aspire to higher education]." A closely-related issue, the role of CTE student leadership organizations in promoting career awareness and leadership potential, was raised by several focus group members as one critical element in raising aspirations and

promoting self-confidence, both of which may be associated with greater motivation and capacity to handle college-level coursework. (CTSOs are explored in greater detail in a subsequent section.)

Discussants in the focus group of educators serving special populations emphasized that career guidance activities not only cultivate greater awareness and better expectations among students, but also may have positive spillover effects on parents. These participants also noted that mentors of all sorts — including peer mentors — help students develop first-hand, realistic ideas about the demands of college life; without those guideposts, students may not be as capable of choosing wisely or seeking the support services they may need to succeed in postsecondary education.

Guiding transitions to employment. The dominant theme in focus group discussions of career guidance strategies for ensuring successful transitions to employment was integration: integration of academic and CTE curricula; integration of school-based and work-based career awareness activities; and integrated program designs, to enable students to make smoother transitions, back and forth, between education and the workforce as lifelong learners. Using integrated approaches to career development was raised repeatedly in discussions about a spectrum of career guidance topics, with the majority of participants emphasizing that thoughtful integration can yield substantial benefits for both students and institutions.

On the issue of preparing students for success in the workplace, focus group participants offered ideas about time-tested strategies that they had found successful. These include job shadowing, internships, online and in-person mentoring programs, and professionally oriented competition events. Focus group members spoke with great enthusiasm about the value of these strategies, but also admitted that creating these activities is a time-intensive effort, requiring an ongoing commitment from instructors as well as employers. Noted one postsecondary instructor, “These efforts take a huge amount of time, and [currently] there are few incentives” for instructors to devote the kind of sustained effort that these activities necessitate.

When focus group members discussed transitions to employment, they emphasized the over-riding importance of helping students to acquire the “soft skills” required to demonstrate professionalism in applying for jobs and succeeding in the workplace.

Services to special populations

According to the Perkins legislation, students who are designated as “special populations,” include individuals with disabilities, individuals from economically disadvantaged families, individuals preparing for nontraditional training and employment, single parents, displaced homemakers, English learners, and individuals with other barriers to educational achievement. As described earlier, these individuals constitute a large and important segment of CTE students.

The following discussion spans the needs and challenges facing special populations within CTE programs, systemic service delivery issues that affect the success of special populations, and recommendations for system improvements. It is based on survey results of administrators, CTE

instructors, and counselors as well as data gathered from a focus group session of six teachers, consultants, and administrators who serve special populations students.

Student needs and challenges

Student needs and challenges to a) accessing CTE and CTE-related services, b) persisting in programs and mastering content, and c) transitioning to employment were explored in a focus group with six practitioners and consultants with expertise among them in all of the special population groups. Since the term "special population" is so broadly defined by the Perkins criteria, the range of needs and challenges facing students who belong to one or more special populations designations covers a wide range of issues. Nonetheless, there are certain characteristics and issues that particular subgroups of special populations often encounter.

Barriers that students face in learning about and enrolling in CTE programs. During the focus group of individuals who work specifically with special populations, the following themes were raised concerning barriers that students face in learning about and enrolling in CTE programs.

1) Lack of information and awareness. Across all special populations categories, many students lack awareness of the availability of educational and career technical opportunities that are open to them. Typically, this lack of awareness is coupled with anxieties that students develop about their potential to participate in education and career technical development, which in turn can lead to lack of self-confidence. Focus group respondents noted that the combination of lack of awareness, incorrect assumptions about the feasibility of obtaining further education and training, and low self-confidence often deters students from investigating their eligibility for support services, which further hampers their ability to succeed in academic and workplace settings.

This lack of information and awareness also extends to students' parents; focus group participants reported that the parents of special populations students sometimes have inadequate or incorrect information about the educational options open to their children, and may counsel them towards lower-wage career choices as a result. For example, a common misperception is that postsecondary education means only a four-year college; students and their parents may be unaware of the range of two-year and certificate opportunities available.

2) Lack of role models. Another prevalent challenge facing special populations is the lack of role models for both educational and career technical achievement. Focus group participants noted that the lack of available mentors means that students often do not gain the skills and techniques they need to compete academically and to successfully enter the workforce.

3) Other logistical challenges. Lack of adequate transportation and lack of child care are two substantial challenges faced by special populations students, especially those in the economically disadvantaged or single-parent categories. Both focus group respondents and survey participants emphasized the frequency and severity of this challenge, and noted that the lack of these logistical supports is often correlated with higher rates of student attrition within CTE programs. These logistical issues also hamper successful transitions into the workplace.

4) English proficiency. Lack of English fluency is a substantial challenge to success in both the classroom and the workplace.

5) "Special needs" designation. Another distinct, but closely related challenge for ELL students, as well as for disabled students, economically disadvantaged students, and other members of special populations, is the stigma that often accompanies the "special needs" designation. Focus group participants described this issue as one of the main reasons that students who are otherwise eligible often refrain from self-identifying and obtaining the support services for which they are qualified. As a result, there is sometimes under-reporting of the extent to which special populations are represented within programs, which in turn makes it more difficult to obtain funds to hire staff to meet the needs of these students.

Challenges to persistence in studies and mastery of course content. Not surprisingly, most of the challenges to *becoming* enrolled in CTE programs also emerge as reasons that special populations students may encounter difficulty in *persisting* in their studies and in making a successful transition into further education or the workforce. Five types of factors were identified in our focus group as challenges to staying enrolled. Three of these — lack of adequate transportation and child care, lack of adequate and correct information about the availability and feasibility of educational options, and the stigma of self-identifying as "special needs" — echo the findings discussed above.

The two remaining factors noted by focus group respondents were: 1) competing demands of work and family obligations; and 2) the need for additional training and professional development for CTE program staff in the appropriate techniques and strategies for serving special populations students.

Challenges to employment. According to focus group respondents, the primary challenges to employment faced by students include: lack of information about career options (especially information about new trends and emerging occupations, and requirements for entry into various careers); lack of confidence; lack of work readiness; and lack of employment placements.

Systemic challenges to serving special populations

Survey responses related to challenges in ensuring that all students benefit from CTE. In the survey, educators were asked what challenges they encounter in ensuring that all students — not just special populations — can benefit from CTE programs. Administrators and CTE instructors both indicated that their programs were lacking in time/resources to offer CTE materials in other languages, echoing a comment emphasized strongly by focus group participants. (This issue was the most frequently rated as "challenging" or "very challenging," out of nine response options by both administrators (66%) and CTE instructors (72%)). "Lack of time/resources or counseling staff to ensure outreach and enrollment," was the second most frequently cited response by both administrators (69%) and CTE instructors (67%). Respondents in all categories noted that "lack of resources to offer a broad array of courses" represents an important challenge (65% administrators, 61% CTE instructors, 71% counselors/advisors). Similarly, a substantial number of administrators (69%), CTE instructors (64%), and counselors/advisors (67%) reported a challenge associated with "the lack of time/resources to provide the necessary support services."

Other program features that respondents indicated as "challenging" or "very challenging" included: "lack of time/resources to provide the necessary remediation" (61% administrators, 64% CTE instructors, 70% counselors/advisors) and "lack of time/resources to sufficiently differentiate instruction" (69% administrators, 64% CTE instructors, 67% counselors/advisors).

Table 32. Challenges to ensuring that all students benefit from CTE

Challenges	Administrators	CTE Instructors	Counselors/Advisors
Lack of time/resources for outreach and enrollment	69%	67%	NA
Lack of time/resources to offer a broad array of courses	65%	61%	71%
Lack of time/resources to provide the necessary support services	69%	64%	67%
Lack of time/resources to provide necessary remediation	61%	64%	70%
Lack of time/resources to sufficiently differentiate instruction	69%	64%	67%

Write-in and focus group responses related to challenges in serving special populations. Write-in responses to the survey and focus groups corroborated and expanded upon many of the challenges cited.

1) Difficulties in early identification. One issue mentioned by nearly all participants is that of "missed opportunities" for intervention on behalf of special populations because students are not identified early enough in the educational pipeline to catch potential problems before these problems worsened. Many CTE programs lack formal, systematic procedures for identifying students' needs early in the enrollment process; without that early-identification, students may experience problems completing assignments and making a successful transition to employment. Focus group discussants also pointed out that early identification is sometimes thwarted because some students in special populations categories do not wish to self-identify.

2) Inflexibility of programs. Programs requiring uninterrupted enrollment are often at odds with the real-life challenges that single parents and economically disadvantaged students face in meeting their economic and family obligations. Some focus group participants offered an alternative. Specifically, CTE programs that offer open-entry/open-exit (and career-ladder) formats give students a chance to tailor their educational experience to the demands of their non-academic life. CTE programs that are re-designed to offer that option may enable students to stay enrolled and to complete their programs, thus reducing attrition rates within programs.

3) Need for professional development. Professional development was cited by focus group participants as an important prerequisite for serving the needs of special populations in appropriate and effective ways. In both focus group discussions and online surveys, respondents

described a need for training and professional development targeted to the situations and needs that special populations face regarding both academic content and workplace readiness.

4) Lack of bilingual instruction or "Vocational ESL" programs. Focus group participants discussed this issue at length, suggesting that the lack of Vocational ESL programs hampers students who are less-proficient in writing and speaking English in accessing and succeeding in higher-wage, higher-skill career areas. The lack of sufficient numbers of bilingual staff and counselors in some CTE programs can also result in ELL students experiencing isolation and thus lower levels of participation in support services and in other important CTE activities, such as student leadership organizations and work-based learning opportunities.

5) An insufficient number of classroom aides. Focus group participants asserted that an insufficient number of classroom aides is a major obstacle to serving special populations. This concerned was also echoed by survey respondents.

6) Insufficient time to cover course content. One additional factor related to students' mastery of content was the perception among CTE staff that there is insufficient opportunity to cover the full range of CTE course content, due to an increased emphasis on college preparation in academic courses. This challenge was discussed only briefly in the focus group, but was noted at some length in write-in responses to the open-ended survey question (Q33, "please list other challenges"). (Three administrators, three CTE instructors, and four counselors submitted comments about that topic.)

7) Lack of sufficient information on industry trends; lack of time for staff to stay up-to-date. The findings based on focus group discussions indicate that CTE staff believe that students as well as instructors could benefit from gaining more awareness of the requirements of entry into a wide range of careers, as well as from updating their knowledge of trends and emerging occupations in the economy. Focus group participants also noted that CTE instructors may not have sufficient time to keep up-to-date on local industry conditions because instructors often carry the dual responsibility of teaching and securing employment placements for their special populations students. For students, lack of awareness of a wide range of career options may be associated with missed opportunities to prepare for entry into higher-wage, higher-skill career paths.

8) Inadequate supply of work-based learning and employment placements. There was much focus group discussion regarding the extent and adequacy of employment placements, with widespread agreement that there are currently fewer placement opportunities than would be ideal for the full development of workplace readiness for special populations. Discussants cited the need for industry sponsors for both resources and activities (e.g., scholarships, in-kind resource contributions, mentoring, job shadowing, and internship opportunities). Many pointed out that because of an inadequate supply of employer time and resources, opportunities for collaboration between instructors and members of the business community are limited. This in turn has a negative impact on the richness of the career content included in the CTE courses for students from special populations. (These issues were identified primarily by focus group participants; only a handful of survey respondents noted these concerns in open-ended responses.)

9) Lack of good quality data and performance measures. Other challenges that were raised by focus group members include: insufficient data to document program successes, particularly in comparison to programs serving students who are not designated as special populations; lack of longitudinal and follow-up data; lack of knowledge about how to collect and report data; and lack of coordination among program staff in sharing data and in using those data to support changes in program design and implementation. (A small number of survey respondents provided corroboration of these comments via write-in comments on open-ended questions: four administrators, five instructors, and three counselors noted that good-quality data and measures of performance were necessary "to successfully respond to the needs of special populations.")

Survey responses regarding extent of institutional responsiveness

Despite the perceived challenges, educators responded positively to the survey question, "To what extent has your program been able to respond to the needs of special populations?" CTE instructors and administrators were about evenly split in responding "to a great extent" (41% of administrators, 45% of CTE instructors) and "to some extent" (47% of administrators, 40% of CTE instructors). Although among counselors/advisors, more indicated responsiveness "to some extent" (53%) than "to a great extent" (30%), the findings are still positive. Much smaller percentages of respondents responded "to a minimal extent" or "not at all" (7% of administrators, 12% of CTE instructors, 17% of counselors/advisors).

Survey responses regarding strategies to address challenges

Survey responses. When asked for detail about how their institutions were responding to the needs of special populations, the two most frequently selected strategies were "providing aides or interpreters" (65% of administrators, 66% of instructors) and "providing alternative methods of instruction" (68% of administrators, 62% of instructors; counselors were not asked this question). Other strategies reported in widespread use include: "modifying curriculum" (59% administrators, 57% instructors); "conducting outreach and recruitment" (51% of administrators, but only 23% of instructors); "establishing retention efforts" (39% of administrators and 26% of instructors); and "establishing special support centers" (29% of administrators, 38% of instructors).

Interestingly, "offering childcare" and "subsidizing transportation" are two responses that were chosen least often by both administrators (24% and 22%, respectively) and instructors (21% and 15%) in the surveys. However, members of the focus groups mentioned both as needs of special populations.

An open-ended query about "What kind of information or support is needed to successfully respond to the needs of special populations?" was also posed in the survey. Administrators identified additional funding and more professional development as important (there were 20 write-in responses on each) as well as more extensive outreach (14 write-ins). There were fewer than nine write-ins for any other type of response. Among instructors, outreach efforts aimed at early identification of potential problems was indicated most often as a write-in response (25 respondents), followed by comments indicating a need for more job placement support and mentors (19 write-ins), more professional development opportunities (14), the need for

Vocational ESL/bilingual staff and materials (12), and more aides in the classroom (11). Counselor responses followed a similar pattern, with the three most frequent write-in comments citing the need for additional funding (8), the need for more job placement support/mentors (8), and the need for outreach related to early identification (7).

Focus group responses. Both the surveys (open-ended questions) and the focus group shed light on alternatives for program improvement to create better academic and career outcomes among CTE students who are designated in one or more special population categories. These alternatives cover a range of strategies that can be grouped into four categories: curriculum and program design; support services; improving transitions to employment; and measurement/accountability.

1) **Curriculum and program design**

- Introduce CTE curricula and career awareness activities earlier in the educational pipeline, so that students in the middle school grades can begin to develop knowledge and skill sets in these areas at a younger age.

- Seek and incorporate input from industry partners into CTE curricula, especially with regard to opportunities specific to special populations.

- Develop more professional development opportunities for program staff (administrators, instructors, counselors, aides) so that staff gain more expertise in assessing and responding to the needs faced by special populations.

- Create Vocational ESL programs and detailed curricular materials in languages other than English.

- Re-design existing programs to allow for more open-entry/open-exit options for students; create career ladders to dovetail with the non-academic demands faced by all students, including those designated as members of special populations.

2) **Support services**

- Cultivate early identification of potential problems for students with special needs; improve coordination and communication among program staff regarding strategies to meet those needs.

- Increase the resources devoted to remediation and tutoring-support services, including remediation provided in languages other than English. Increase the use of project-based, applied teaching strategies. Use cooperative learning and peer tutoring when appropriate.

- Identify and use multiple techniques for developing student leadership skills, including student organizations in which special populations are valued participants. Develop community service leadership opportunities.

- Build confidence and skill by providing more opportunities for special populations to practice job-readiness skills, such as networking and interviewing, and to participate in work-based learning.

3) Transitions to employment

- Emphasize career awareness about higher-wage/higher-skill occupations. Bolster that awareness by creating closer linkages between academic programs and industry partners, including: take-a-student-to-lunch; mentoring, job shadowing, and internships. Expand the type and number of student placements.

- Create recognition programs for employers that are leaders in offering employment placements (and in providing scholarship assistance) for special populations students.

- Demonstrate to employers that special populations students can succeed in the workplace; create a track record that is supportable and visible.

- Establish a liaison position between instructors and members of the business community to reduce the dual challenge faced by instructors of simultaneously teaching and developing employment placements

4) Measurement and accountability

- Collect quantitative data to document the effectiveness and success of programs that serve special populations. Train staff about the appropriate ways to collect, interpret, and communicate these data.

- Create systems to gather data on student progress within programs; use those data to inform curriculum design and support services. Keep track of reported data in a timely fashion so that the information gathered can be used to target dropout prevention and reduce program attrition.

Availability of skilled faculty, professional development, and collaboration

In order to ensure that CTE programs are of high quality, schools and districts must address strategies to recruit and retain faculty who are qualified in both their career technical area as well as in academic content and pedagogy/andragogy. Carefully planned and sustained opportunities for teacher professional development are essential to ensuring that CTE instructors remain current on industry knowledge, employer demands, and teaching strategies to serve a wide array of student needs and circumstances. Finally, creating structures and mechanisms for collaboration among faculty facilitates information sharing about CTE, professional development, and the curriculum integration that ensures rigorous and relevant programs. This section examines the findings about recruitment and retention of faculty, and professional development and collaboration from several angles.

Availability of skilled faculty

Degree of success in recruiting staff

Administrators were posed several questions regarding their institution's experiences with recruiting and retaining qualified instructors. In response to the question, "To what extent are you able to recruit instructors with appropriate credentials and experience into your CTE programs?", 56% said that they were able to recruit instructors with those qualifications "to some extent," compared with 28% that said "to a minimal extent." Only 12% reported being able to recruit appropriate instructors "to a great extent," and only a handful (4%) reported they were "not at all" successful in recruiting appropriately trained instructors.

Challenges in recruiting staff

In responding to an open-ended question about "the challenges to recruiting instructors with appropriate credentials and experience," write-in responses tended to cluster into certain categories. These categories can best be conveyed by the representative responses that are provided below:

- "Pay is too low … there are too few financial incentives to compete with job opportunities that are available in private industry";
- "The supply of qualified teachers is too small; there's too much competition for those teachers who do have the credentials";
- "The credentialing process is too cumbersome and extensive"; "[It is difficult to] find instructors with the appropriate credentials and experience, who are also skilled teachers who can connect with students in an appropriate manner";
- "There are too few credential-granting programs";
- "NCLB highly qualified teacher standards are too difficult to meet";
- "Most of our positions are part-time"; "it's very difficult to retain part-time faculty";
- "[Undesirable] geographical location… too far away from the city [to attract/retain staff]";
- "Rapidly changing skill sets mean that instructors hired for tenured positions must constantly retrain, while their teaching colleagues in other fields do not face the same challenges. Many feel that they must work much harder than their colleagues, with the constant need to reinvent themselves."

Degree of success in retaining staff

In contrast to our findings about recruitment, the survey results suggest that institutions may have somewhat more success in retaining staff than in recruiting them. Nearly half of administrators (48%) noted that they were able to retain instructors with appropriate credentials and experience "to some extent," while 37% said they could do so "to a great extent." Only 13% reported "a minimal" amount of success in retaining staff, and virtually no respondents (1%) indicated that they were "not at all" able to retain qualified instructors.

Challenges in retaining staff

When asked to document the challenges they had experienced in retaining instructors, "teacher burn-out" was the dominant response. Some administrators provided additional details about this type of challenge, noting that "Teaching can be very stressful," and "so many requirements are placed on our part-time teachers that they get discouraged and overwhelmed, and leave teaching." Other respondents cited "burn-out from having less-than-desirable support staff."

Issues of competition from industry were once again raised, and many respondents expressed frustration with losing qualified instructors when opportunities "with better compensation" arise in the private sector.

Other concerns related to retention included:

- Inadequate professional development opportunities, especially for new teachers.
- Geographic issues and cost-of-living concerns (e.g., keeping staff in rural and high cost-of-living locations).
- Low enrollment, leading to course termination and faculty lay-offs.

Focus group responses regarding the challenges to recruiting and retaining staff

One striking feature of the comments from focus group members about recruitment and retention of CTE instructors was the intensity of sentiment that many participants expressed. In general, both the content and the context of participants' comments revealed that their experiences in educational and industry settings had prompted them to hold strong opinions about how to recruit and retain qualified CTE instructors.

"The system is broken," observed one administrator, referring to the extensive difficulties he had experienced in recruiting well-qualified teaching staff. "There needs to be local determination of who is qualified to teach CTE," this administrator added. Nearly uniformly across the board, a variety of focus group participants emphasized that two items — 1) a limited supply of well-qualified instructors, fluent in both pedagogy and industry knowledge, and 2) the demands of the teacher-credentialing process — were often in direct conflict. "It's a real concern that many CTE instructors are retiring and are not being replaced," observed a secondary CTE instructor. A

colleague in the same focus group concurred, adding that "industry keeps stealing our star [teachers]; they get more money [in the private sector]."

One instructor captured this conflict in her observation: "Teachers who come from industry sometimes don't know how to teach; that can be a disservice [to students] … they don't address academic standards. We need to have someone with both perspectives, [since] the teaching profession requires many special skills."

Strategies for addressing challenges

In the administrators' focus group, the discussion surfaced possible strategies for addressing these recruitment/retention challenges. Two approaches emerged, but both are acknowledged to be difficult to implement:

1) *Look for teachers with experience in industry or provide industry-based training to teachers*. Respondents suggested, "Look for teachers with career experience." Since "[I]t's hard to find people who are willing to work with kids … [we're considering] getting veteran teachers to get industry-certified."

2) *Recruit from industry and provide them with teaching credentials*. This idea had been attempted by focus group participants, but was found to be frustrating. "The biggest challenge is getting around credentialing issues in emerging technologies," noted one participant.

Professional development

Ongoing professional development is a significant component of all the education improvement practices reviewed, and is central to effective CTE implementation. Information about current professional development offerings, challenges to offering effective professional development, and recommended professional development was sought through both surveys and focus groups with all respondent groups. While most of the focus was on effective professional development for instructors, questions were also posed about effective strategies for offering professional development to counseling and guidance staff.

Types of professional development that are provided

CTE instructors were asked what forms of professional development was offered to them, and administrators were asked to identify the forms of professional development that they provide to (or coordinate for) CTE instructors. The most common response (approximately 90% in each group) was "participation in educational conferences." There was similar consistency regarding the second most common form of professional development, "participation in industry-specific conferences" (identified by 78% of administrators, 65% of CTE instructors); "training on the use of technology" (67% of administrators, 59% of CTE instructors) was in third place. Other categories of professional development that were chosen by at least 40% of respondents include: "training on assessment of student learning" (57% administrators, 45% CTE instructors); "training on academic content" (56% of administrators, 39% of CTE instructors); "industry-

specific training" (58% of administrators, 41% of CTE instructors); "training on the implementation of academic standards" (54% of Administrators, 42% of CTE instructors); and "training on the integration of academic and CTE content" (49% of administrators, 37% of CTE instructors).

These statistics are summarized in the table below. It is important to note the inconsistency between multiple-choice and write-in responses regarding professional development: three of the most frequently *requested* forms of professional development in write-in responses, namely, direct mentoring by industry representatives; workplace tours/job shadowing; and teacher externships — were among the least commonly *provided* professional development alternatives.

Table 33. Types of professional training provided to CTE instructors

Types of Training Provided	Administrators	CTE Instructors
Educational conferences	91%	89%
Industry-specific conferences	78%	65%
Training on technology	67%	59%
Training on assessment of student learning	57%	45%
Industry-specific training	57%	41%
Training on academic content	56%	39%
Training on implementation of academic standards	54%	42%
California CTE Model Curriculum Standards	36%	30%
Training on the integration of academic and CTE content	49%	37%
Pedagogy and andragogy	37%	20%
Articulation	37%	29%
Direct mentoring by industry representatives	15%	12%
Workplace tours/job shadowing	30%	28%
Teacher externships	37%	20%

Counselors/guidance staff role in professional development. The survey included a series of questions designed to examine the ways in which staff provide or participate in professional development. Counselors/advisors and guidance staff were asked whether they "have the opportunity to work with CTE instructors at [their] school/college to provide or coordinate career-related professional development"; only one-third replied that they have this opportunity.

The counselors/advisors who reported having the opportunity to provide or coordinate professional development were requested to provide more detail about their "role in providing or coordinating" that type of professional development. Responses fell into four categories, summarized below with the following representative comments:

- "I coordinate and offer opportunities for instructors to attend professional development functions … I let instructors know when PD opportunities are available."

- "I provide job-search skills workshops for instructors."

- "CTE instructors attend our counseling department meetings."

- "Our counseling department is independent of any specific CTE program, but we do refer students to those programs."

Challenges in providing/obtaining effective professional development

Three categories of respondents (administrators, CTE instructors, and community-based counselors/advisors) provided information about the challenges they had encountered regarding professional development. Administrators and CTE instructors were presented with a multiple-choice item; community-based counselors/advisors were asked to provide a write-in response to this question.

Among administrators, "lack of time for instructors to participate in professional development" was by far the most common response (72%), and this echoed the write-in responses from community-based counselors/advisors. Administrators noted that "lack of time to include specialized professional development for CTE staff" was also a substantial challenge (67% of administrators selected this response). In a similar vein, "lack of time" was denoted by more CTE instructors (75%) than any other multiple-choice option. "Lack of resources" was the second most frequently chosen response by both groups (63% of administrators, 54% of CTE instructors). Other categories were selected by a smaller proportion of respondents, including: "lack of industry partners to offer externships for instructors" (35% of administrators, 32% of CTE instructors), and "lack of teacher motivation" (41% of administrators; not included on instructor survey). Among those who selected "other," "lack of administrative/district concern and support" and "lack of substitute instructors" were typical responses.

Focus group participants highlighted unique challenges facing CTE instructors in meeting high standards regarding pedagogical skills while simultaneously ensuring mastery of the latest technology and emerging trends in their fields of specialization. However, focus group comments, taken together, revealed substantial levels of interest in a range of professional development opportunities.

Effective professional development strategies and topic areas for CTE instructors

The survey included a series of questions designed to more closely examine respondents' perceptions about the value of professional development in aiding their efforts to achieve certain instructional goals. There were few differences between administrators and CTE instructors regarding their opinions on types of professional development that aided their ability to help students either achieve high academic standards or learn technical skills.

Professional development strategies to increase the ability of CTE instructors to help students attain high academic standards. Both administrators and CTE instructors were asked to provide write-in responses regarding "the three forms of professional development that *have proven* most effective in increasing the ability of CTE instructors to help students attain high academic

standards." Analysis of these write-in responses revealed common elements in the perspectives of both respondent groups regarding this issue. Specifically, three main strategies emerged:

1) Direct instruction and workshops related to curriculum development and standards-implementation was the dominant category of response from both groups. Comments such as: "[receiving] direct instruction in understanding the academic standards"; [obtaining] training in curriculum development to reinforce the standards"; [attending] curriculum integration workshops and/or workshops on developing lesson plans integrating academic standards" were representative of the responses on this topic.

2) Teacher collaboration and teacher mentoring constituted the second major category of responses from both groups to this question. Respondents indicated that "learning from other teachers' best practices"; "mentoring of new teachers by their CTE colleagues"; "opportunities to conduct team-teaching"; "mentoring, collaborating, and networking with other teachers"; and "[attending] joint planning sessions with CTE instructors, academic/non-CTE instructors, counselors and administrators" reflected a larger set of participant responses about forms of professional development that they felt supported attainment of high academic standards.

3) Instructors receiving direct experience in industry and otherwise maintaining industry linkages was the third theme that emerged. Representative responses of this sort included: "having instructors job-shadow in industry"; "[participating in] workplace tours"; "[receiving] industry-sponsored training"; and "maintaining ongoing connections with our industry partners to update skills and knowledge." Though some may have read the question as referring to professional development in general, it appears that some administrators and CTE instructors believe that strong industry linkages benefit students academically, as well as technically.

Professional development strategies that have proven most effective in increasing instructors' abilities to teach technical or industry-specific skills. Administrators and CTE instructors were asked to comment on the "forms of professional development that have proven most effective in increasing instructors' abilities to teach technical or industry-specific skills." Responses from both groups were clustered around several clearly defined topics regarding industry linkages. "Attending industry-specific technical workshops and conferences" was by far the most common write-in response; other prevalent comments included "job shadowing at employer sites"; "externships and sabbaticals in industry"; "training in the use of latest technology"; "reading technical magazines"; and "self-study/online research."

Other professional development that respondents perceive would be beneficial. Three groups of survey respondents (administrators, CTE instructors, and school counselors) provided write-in responses to the question, "What other forms of professional development would be beneficial but are not currently provided?" Of all the open-ended survey questions regarding professional development, this question yielded the widest range of suggested topics. (Comparative analysis across the three groups of respondents revealed far more commonalities than disparities, as was the case with the other open-ended items.)

Responses to this item clustered around two of the same themes mentioned above as proven strategies:

1) Industry links/training. Representative comments included: "paid externships in industry"; "industry-specific training by business partners"; "more training in the use of the latest technology"; "networking opportunities with local businesses"; "direct mentoring by industry partners"; "more job shadowing opportunities"; "have classes taught at workplace sites"; "increase the number of workplace tours," and "training about emerging industries/occupations."

2) Opportunities for faculty collaboration and/or enhancement of teaching skills. The most common response of this sort was "more time to work collaboratively with other teachers." Closely-related responses included: "more opportunities for team-teaching"; "articulation and joint meetings with other school districts"; "resources to allow faculty to work with other colleges"; "PD and training on pedagogy"; and "peer coaching/training."

Other forms of professional development that were perceived as beneficial included: "Guided self-evaluation tools"; "training in grant writing"; "inexpensive local workshops for CTE teachers on academic standards and integration"; "workshops to train teachers about the needs of at-risk youth and special populations"; "more online training for faculty"; and "a form of sabbatical leave designed specifically for the vocational professional."

Focus group responses. A variety of strategies for providing professional development were discussed in several different focus groups. As with survey respondents, focus group respondents stressed the importance of industry partnerships and pedagogical skills when asked about effective professional development strategies.

1) Staying current; strategies for updating knowledge and for teaching technical information. One secondary instructor captured the comments of a variety of participants across several groups when he asserted, "We need to keep current with the emerging skills that are required by industry, especially the skills that are now required but may not have been required as of a decade ago; otherwise, we're teaching kids information that's become obsolete." There was emphatic agreement that workplace-oriented professional development opportunities are essential to ensuring that CTE faculty can stay current in their fields. "It's critical to have faculty in touch with industry," noted one administrator. The alternatives that focus group participants deemed most effective for achieving this goal included: teacher externships in industry; industry-sponsored mentoring opportunities for teachers; faculty participation in industry professional associations, technical conferences, and trade shows; and collaboration between CTE instructors and industry partners in developing curricula and project-based learning opportunities.

2) Enhancing teaching skills. Some focus group participants asserted that there should be an increase in both the number and depth of opportunities for CTE instructors to enhance their skills as teachers. "Teachers need to see this type of professional development as a requirement for their job, not just an add-on," said one member of the economic development focus group. Her colleague added, "Staff development needs to focus on instruction and on breaking down complex information in ways that neophytes to a field can appreciate and understand." In the focus group with secondary instructors, one participant noted that instructors' competence in pedagogy could be linked directly to enrollment and overall program success: "One problem,"

he cautioned, “is that some teachers can’t teach the skills, and then students drop out, and then the program closes down.”

Counselors’/advisors’ views about professional development

Counselors/guidance staff were also asked an open-ended question about what kinds of professional development would be beneficial for *themselves*. The most common response (N=49) was receiving information, or learning how to access information on business and employment trends. Many also stated they would like to receive information on the local employment market, to better understand the job skills sought by local employers.

Further, many comments indicated that counselors required ongoing training and updates on what is occurring inside the CTE courses. They asked for “introduction to CTE courses and what their goals and opportunities are.” In this regard, they also suggested that “[c]ounselors need more time and funding to attend state career/technical education conferences and visit other schools where innovative and successful programs are thriving.” Others added that job shadows for teachers and counselors would be an excellent way to obtain a first-hand view of how workplace experiences can bring relevance to classroom learning.

Other types of professional development suggestions included: connecting with local agencies and employers; strategies for including career technical education curriculum within the master schedule; and best practices for supporting staff members in their quest to develop career-based curricula. However, as one respondent stated:

> *We have what we need. We just need fewer responsibilities so that we have more time to work with the students. When I worked as a career counselor in another state I was able to organize all sorts of activities for the students — job shadows, internships, business tours, career path speakers, seminars on all sorts of related work experience fields. There is no time to do those things when a counselor has 550 students to care for.*

Collaboration

Collaboration among faculty was an important issue to many of the individuals who participated in our focus groups. Focus group members perceived a variety of benefits associated with opportunities for collaboration — not only for professional development.

Collaboration as a means to build bridges to non-CTE faculty and staff, and to the community.
One benefit that was raised on numerous occasions was the potential of collaborative work as a means for communicating the value of CTE to a wider audience, thereby enabling academic/non-CTE faculty and others outside the CTE community to gain greater understanding and respect for the benefits of CTE as a way of teaching and learning. “CTE can be a catalyst to change high schools,” emphasized an administrator, “and it’s time for a radical change. We are seeing some great results; we need to promote CTE more, [because] there are a lot of negative perceptions out there.” The dialogue in other focus groups touched this same nerve: “We need to … expand the concept that all education is career education,” observed a postsecondary faculty member. “All education is about helping people get careers.” As if to echo that thought, a participant in the

economic development focus group brought the discussion back to the link between collegial respect, professional development, and system reform, noting "We need to do professional development [about this issue] for traditional faculty. Traditional faculty need to get open to the idea that they are training students for the work environment, not just for college … internal work needs to be done to bring along the entire faculty in a way that acknowledges the real world."

Collaboration for professional development. Collaboration was identified by some focus group participants as the cornerstone of professional development, particularly for instructors new to the profession of teaching. In responding to a question about which types of professional development have been most effective, "mentoring: pairing young teachers with [those with] more experience," was one typical response offered by many participants in our focus groups. Secondary faculty members had particular enthusiasm for this approach. "We need more support for teacher collaboration in CTE," declared one instructor, when asked how she thought CTE programs could be strengthened. "[Create] more opportunities for teachers to … network and share with veteran teachers," proposed another instructor. "[Provide] opportunities [for teachers] to talk to other teachers … [it's] something that gives them hope; something they can apply the next day in the classroom. That gives hope and encouragement, working with other teachers in your school, having time to go sit in the classrooms of other teachers and watch them teach. This can be inspiring to new teachers."

Integration of CTE with academics. Participants also spoke highly of "learning communities," and the collaborative opportunities and benefits these designs could provide. Among administrators, learning communities were highly valued; in discussing how student needs "[could be] met through academic infusion into CTE curricula," an administrator proposed, "I would like to see the learning communities expanded, to link academics with CTE courses … it is not done enough." In a separate focus group, instructors seemed to concur: "The question is how we can connect occupational courses with academics," observed one postsecondary instructor. "We should have incentives to foster the connection between occupational and academic courses; more students could do both within a learning community … if you don't have a learning community structure, … you need to create it." Somewhat later in that focus group discussion, a colleague noted, "We need to connect academics and CTE in a meaningful way. The academic teachers don't know how to do this, so the CTE faculty has to help them."

IMPROVING CTE: VISIONS FOR THE FUTURE

As a culminating section to the report findings, below are presented comments and insights from each of the constituent groups regarding needed improvements in CTE and each group's vision for CTE in the future. These comments were provided in response to questions at the end of each survey and focus group requesting this summary information. Overall, there were more commonalities than differences in themes that emerged from these responses, as the following section illustrates. Nevertheless, each group contributed a unique perspective, and the details of these ideas add richness and depth to the overarching themes. For this reason, rather than report the information thematically, this section gives voice to the particular views of each group.

Administrators

Among administrators, two themes dominated the write-in comments and focus group discussions, although several additional ideas also provided meaningful details. The first of these themes — the need for enhancing awareness of the benefits of CTE — was echoed by other stakeholders in our study, and is one of the key findings that emerged in the aggregate results. A second theme encompassed such systemic issues as the need for enhanced access to CTE, coordination among system components, responsiveness to industry needs, and improved data-sharing.

Promoting awareness of the value of CTE

Within focus groups, several administrators were emphatic about their views regarding the need to increase awareness of the unique academic and career-related benefits that CTE programs provide. One administrator in a focus group discussion remarked, "CTE can be a catalyst to change high schools and it's time for a radical change. We are seeing some great results. We need to promote CTE more. There are a lot of negative perceptions out there. We need to drive more rigorous and innovative strategies, [and demonstrate those successes]." In discussing how CTE programs could be strengthened, a different administrator noted that he believed it was most important "to make clear to educators their value as motivating factors in keeping kids engaged in academic classes. Integrate academic and CTE classes — keep students motivated and keep them in school and engaged to stay in school and move to higher education."

Administrators also emphasized that raising the profile of CTE within the educational community was essential to the survival and viability of these programs. "We need to leverage our successes for grants," one administrator explained. "We have been short-sighted in the past and I'm happy to see [that] changing." A different administrator added, "Having the public understand that CTE is a good thing for our students and having our students understand that industry certification gives them an edge in the job market."

Enhancing access, coherence and responsiveness

Although administrators expressed strong sentiments about the need to surface the benefits of existing programs, they also suggested that the system as a whole could be improved by allowing more flexibility with respect to A-G requirements and by enhancing the depth and quality of linkages among schools, postsecondary institutions, and members of the business community.

Some administrators touched on specific reforms that they felt would enhance the educational and career potential of students both within and beyond CTE programs. One administrator stated, "It would be extremely helpful to a district like mine if criteria for the UC A-G requirements could be expanded to allow some of our best CTE classes to qualify. We have a nationally recognized broadcasting program that exemplifies the best of differentiated instruction, project-based learning, group collaboration, school-industry partnerships and academic rigor, and yet many students hesitate to enroll, fearing it will crowd A-G classes out of their schedules. This is so wrong!" Another administrator expressed the view that students would benefit from "[fewer] testing requirements and more emphasis on higher-level thinking skills and more problem solving. Students need more project-based learning when they are grappling with big ideas."

One administrator expressed his ideas concerning the value of system coherence with particular clarity: "Students should be able to identify an area of interest in middle school, receive preparatory coursework and job shadowing throughout high school, and continue with more advanced coursework at community colleges, including internships," this administrator explained. "To accomplish that," he added, "all segments of education need to see themselves as part of a continuum designed to optimizing the educational goals of individual students. The system must remain flexible to reflect changes in community needs and technology advances."

Coupled with this, administrators emphasized the importance of flexibility. One administrator reflected the comments of many of his colleagues when he stated that the quality of CTE programs hinged on their ability to remain "flexible and responsive to the current and future needs of the workplace/industry."

Other administrators proposed specific changes within programs or in administrative procedures that could enhance access and program improvement. For example, one administrator cited a need to enhance "appropriate and timely data-sharing across segments, [along with] infrastructure and programmatic support, such as child care, short-term courses, and courses offered on the weekends."

Vision

Many administrators noted that CTE should be a comprehensive, articulated system beginning in elementary or middle school and involving ALL students and parents to "reach any career goal of their choosing and [have] the support and encouragement to get them there." Further highlighting this vision, another respondent wrote, "All students, upon graduation, have the experience and instruction to make informed postsecondary choices that can include going directly to work, further training in industry-specific areas, community college, four-year college, military careers, or entrepreneurship." Along the same lines, another supported "articulated, formalized pathways, K-16, that are flexible and responsive to the current and future workplace/industry." Besides having students start career exploration early, accountability for CTE was also noted by administrators: "Every student starts career awareness and development in elementary school and continues to refine it until s/he leaves high school with a solid transition plan to the workplace and/or postsecondary education or training. CTE is fully funded and held accountable through testing and reporting."

Many administrators also envisioned CTE as part of the educational mainstream: "CTE is held in the same esteem as academic pursuits. Students enrolled in CTE are not perceived to be those that are unable to go to college." Another simply stated, "that all students and all subjects would be considered Career Technical Education."

Another administrator detailed the benefits of an integrated CTE/academic approach for students: "CTE needs to become part of the mainstream on our high school campuses, not in the 'periphery.' The integration of academic standards in CTE courses provides a way for many students who are typically unsuccessful in the traditional classroom environment to learn core academic content through applied learning. By fostering a collaboration between academic and

CTE instructors (which will take some patience and perseverance), students will benefit by receiving the education they need in a way that is relevant for them. Academic instructors can learn from CTE teachers as well — understanding how to better implement project-based learning as well as critical thinking and analytical skills in 'real world' scenarios."

Instructors

The comments and ideas shared by both types of instructors (CTE instructors and academic/non-CTE instructors) encompassed many common elements, and in fact reflected more commonalities than differences. Both CTE and academic/non-CTE instructors emphasized the need for integration and coordination of curricula and programs to promote relevance, enhance learning, and facilitate career exploration.

CTE instructors

In several important respects, the insights shared by CTE instructors mirrored ideas that had been expressed by other stakeholder groups. As was true for other groups, these respondents emphasized the ways in which the design of CTE programs enabled students to formulate a more tangible understanding of the relevance of academic concepts. One instructor noted that "some students get a renewed interest in pursuing their education because of participating in our program." Another instructor added, "CTE gives students a concrete sense of what the purpose of education is. CTE is the glue that holds the education field together and makes it relevant."

Instructors also observed that concepts developed within CTE had direct applicability to all groups of students: "Only in CTE classes, like agriculture, can students fully develop themselves," one CTE instructor noted. "My classes teach not only the curricula required by standards and industry, but [also] the techniques and importance of speaking, work ethic, responsibility, citizenship and community. No other course in high school teaches students these things."

Both secondary and postsecondary CTE instructors cited a need for professional development and training as a key area through which CTE programs could be strengthened. Instructors emphasized that professional development opportunities, which fostered collaboration between academic/non-CTE and CTE instructors, were especially valuable: "We need support for teacher collaboration," one instructor observed. Another remarked, "We need to connect academics and CTE in a meaningful way; the academic teachers don't know how to do this, so the CTE faculty have to help them."

Professional development regarding industry knowledge and skills was also desired by instructors ("We need continual training in technical areas," stated one respondent; "I would like to learn current industry-specific training methods that I could implement in my own classroom"). In a similar vein, both secondary and postsecondary instructors felt a need for expanded opportunities for teacher externships, a form of professional development that many respondents valued but that few had been able to engage in.

Academic/non-CTE instructors

Many comments provided by academic/non-CTE instructors indicate that they favor increased integration of academic and CTE curricula. One instructor's comment was typical: "Academic courses should be [given] a real-life work experience component, and technical programs should have more theoretical background instilled … all students [should] get a balanced exposure to both rigorous academic environments and the widest possible vocational environments so that they are better able to make informed choices about their own futures."

Another theme that emerged is reducing the apparent and actual separation between academic and CTE programs, and instead moving the system towards greater flexibility and inclusiveness for all students. "Meaningful preparation for interesting, skilled work should be available to every student," one academic/non-CTE instructor stated. "Programs also should have flexibility so that students can change their minds both as it concerns the topic, as well as concerning level of training … We should fold academic and career education into the strands of the same curriculum."

Other comments from academic/non-CTE instructors addressed issues of educational standards and testing. "The greatest change we need," one instructor explained, "is a diminished emphasis on multiple-choice statewide testing. The need to score well on standardized testing is driving our curriculum to "cover" a wider variety of topics in academic classes in a superficial manner, but robbing students of meaningful long-term projects which integrate career-technical standards and academic-content standards in ways which encourage the higher-thinking skills."

Vision

There was substantial breadth in the types of suggestions provided by instructors in response to survey and focus group questions regarding "vision for CTE" and strategies for strengthening CTE programs. Respondents cited a need to broaden the definition of courses eligible for A-G approval so that CTE courses could qualify, following the notion that "CTE programs lead to both workplace readiness and readiness for higher education," one instructor noted. Other suggestions for reform included: enhanced opportunities for employer involvement in the design and implementation of curricula, as well as in the provision of internship and work-based learning; more systematic strategies for collecting and using performance and assessment data; and funding to sustain and develop a variety of program-related components, ranging from funds for upgrading technology and equipment to increased funding for Career Technical Student Organizations (CTSOs).

One instructor described her vision as follows: "I envision a California where every high school has a variety of sequenced CTE courses for students to participate in, and that participation in a CTE area of their choice is required for high school graduation."

School/College-Based Counselors/Career Advisors

Taken together, the comments from school and community-based counselors/advisors addressed issues regarding the timing and scope of career-related guidance as well as a spectrum of other topics, including CTSOs, curricular design, academic standards, and the role of other

constituencies in the career development process, such as parents and members of the business community.

Counselors observed, "CTE needs to be more rigorous, incorporating current state education standards." Others called for enhanced involvement by industry advisors, in response to the need to "keep programs responsive to changing industry and skill requirements," as one counselor noted.

Several counselors asserted that counseling staff could play a key role in fostering ongoing cooperation among faculty members. "Bring counselors to the table in curriculum [development]," one counselor suggested. Another noted, "Counselors can contribute to the dialogue between CTE and academic teachers … they are in a position to take leadership roles … they could be pivotal in creating those dialogues. … It has to do with those relationships between educators: we've got to work together to be able to … show how we all work toward the whole child, and not just working in silos."

Special emphasis was also placed on the role of CTSOs. CTSOs were identified as an important mechanism through which students gained opportunities to connect and apply academic, vocational, and interpersonal skills; within these organizations, students could cultivate and hone their talents as leaders and collaborators. "The power of clubs to keep kids engaged cannot be underestimated," observed one counselor.

When asked to provide insights regarding how CTE programs could be strengthened, a predominant theme in counselor responses was the suggestion that career guidance activities be introduced relatively early in the educational pipeline. "We should begin career exploration earlier, in K-8," one counselor stated. "Students who have career goals early can then use CTE courses and work experiences in high school to hone their preferences. Currently there is too little time and too much pressure to choose a CTE track and stick with it, rather than explore."

Another counselor put it this way: "As for young people, I don't think there's too early an age for them to begin to take a look at options and begin to make decisions … [to] help them recognize some of the things they would like to do in their lives, for a period of time. … It's no longer a paradigm of staying for the gold watch, but rather a world of lifelong learners. … So I don't think it's too early to help give [students] the skills to be able to invite a change, to be able to invite taking some risks: to learn how to learn."

Vision

Like administrators, counselors/advisors expressed concern about CTE's current image. They also re-emphasized the importance of having parents involved. One counselor noted, "Revamping of the CTE image. Better marketing so that students know about the careers available through CTE programs." Another counselor shared, "Parent perceptions are critical…Hands-on learning is starting to be valued, this will hopefully filter back to the parents. CTE classes should start to be allowed to meet elective requirements."

For community-based counselors/advisors, their vision of CTE in California focused on the importance of career exploration and workforce readiness, specifically highlighting the ideas of skill building, internships/mentorships, and job experience prior to students entering the workforce on their own. One respondent said, "All students need real-life skills as well as interview workshops and job readiness education. Students need to recognize that having vocational skills will allow them to become employable as they pursue secondary education or move into employment after high school."

Parents and Students

The focus group discussions and interviews with parents and students revealed several themes that were also prevalent in the comments of other participant groups in this study. Once again, interviewees emphasized the importance of disseminating information about the benefits of CTE including the value of project-based and applied learning in enhancing student motivation and engagement. In addition, they highlighted the support and encouragement received from instructors, as well as ways in which CTSOs had promoted leadership and career development, in addition to peer collaboration and teamwork skills.

Interviews with parents as well as with a member of the state PTA leadership also indicated strong support for integrating academic and CTE curricula. "A complementarily integrated approach to both could be part of the salvation of our system," one respondent observed.

Vision

In addition, echoing the visions of other stakeholder groups in the study, these interviewees stressed, "We need more linkages [between educational institutions and members of the business community], so that education is in sync with the needs of the workplace, … [so that students have] skills in areas where there are jobs."

Business/Industry

As was true for other stakeholder groups in this study, members of the business community indicated that enhancing the depth and quantity of links with industry would strengthen the relevance of academic curricula within CTE programs. Not surprisingly, they preferred more extensive use of "applied concepts" in the design and implementation of CTE coursework. In a similar vein, participants decried what they saw as an over-emphasis on college preparation, to the detriment of a more balanced approach to career and academic development. In responding to questions about how CTE programs could be strengthened, they indicated that schools could do a better job of collecting and conveying labor-market data to students within CTE programs.

Further, other industry representatives recommended increasing awareness of innovative and effective work-based programs and applied learning strategies to leverage more resources for replication. "Good programs need to be replicated," one respondent declared. "[We need to] make them available for all instructors to see, to read about … [through a] formalized system for directing people to good examples of successful programs."

Vision

In survey responses as well as within focus group discussions, members of the business community identified "flexibility" as an essential component of their vision for the future of career technical education. "Flexibility in responding to needs is the biggest issue," observed one respondent, in response to a query about system improvement. "[It's] hard to develop statewide programs that work for everybody: [strategies] must arise from communities themselves." At the same time, they emphasized the need for system coherence and avoidance of duplication between secondary and postsecondary education: "Linkages with community colleges are critical to avoid re-inventing the wheel." Finally, focus group respondents stressed the importance of introducing students early to career possibilities and inspiring in students, above all, a love of learning.

SUMMARY AND RECOMMENDATIONS FOR SYSTEM DEVELOPMENT

At the outset of this statewide needs assessment, two research questions of interest were posed:

- *What is the current status of CTE in California and what are the major trends?*
- *What resources and system improvements are essential at the state and local levels to ensure that CTE meets the current and evolving needs of students, communities, and the economy?*

A review of the literature, analysis of existing program data, and surveys and focus groups provide answers to these questions. In this concluding section of the report, we summarize the study's overall findings, based on the review of existing program information and enrollment data, and data collected through surveys and focus groups. This is followed by the study's overarching recommendations for improvements to CTE, drawing on both the data analysis and the literature review. These recommendations are aimed at guiding the preparation of the Carl D. Perkins State Plan and informing system-wide implementation strategies.

SUMMARY OF FINDINGS

- *What is the current status of CTE in California and what are the major trends?*

The findings of this study demonstrate that CTE is a complex system designed to meet the career preparation needs of students, the workforce needs of industry, and the economic development needs of communities. It provides a wide array of programs at both the K-12 and postsecondary levels, spanning instruction, career guidance and exploration, workplace experience, economic development, and training and retraining of adults at various levels of education and through successive career transitions. Many of these functions are performed within CTE instructional programs themselves, while others are performed through separate programs either on or off school and college campuses, requiring coordination among disparate organizations.

Given historical factors and the requirements of varying funding streams, career areas and enrollments are currently clustered somewhat differently across programs and at each level. At the secondary level, career preparation is offered in 15 industry sectors clustered into six broad career areas; at the postsecondary level, courses are also clustered into six career areas, some different than those for secondary, spanning over 130 occupations.

Overall, the system served over 2.7 million students during the 2005-06 school year. However, data collected showed declining enrollments in secondary school CTE programs since 1993, paralleled by declining numbers of classes. The data, in and of themselves, do not explain why this is occurring. However, they do suggest that students may not be receiving the CTE services that would promote the development of skills needed for employment and meaningful exposure to the full range of postsecondary educational and career options. While no assessment of the

quality or rigor of these programs has been made, the literature suggests that, without the availability of CTE programs, students may lack access to the very strategies that could also keep them engaged in school and promote their academic success.

Decreasing secondary enrollments notwithstanding, surveys and focus groups revealed that students who are enrolled in CTE highly value their CTE programs, given the opportunity to learn through "hands on" experiences in areas of career interest and in supportive environments. Employers, for their part, depend on the CTE system to provide students basic workplace competencies and academic skills, in addition to technical skills.

Key findings related to industry and student needs

The primary clients of CTE are students and industry. The views of these two groups, as reported in the surveys and focus groups, are presented below.

Perceptions of workplace needs

When queried about the skills and certifications they seek from employees, employers asserted that "soft" skills — specifically, communication, critical-thinking, and problem-solving skills, along with the ability to function well in a team setting — were essential prerequisites for succeeding in a workplace environment. Additionally, employers expressed a desire for employees who are able to engage in lifelong learning, including the ability to learn online. They also indicated their expectation that students would enter the workforce already possessing competency in basic academic skills, although employers generally indicated a willingness to provide additional technical training. Survey respondents were asked to rate the minimal level of certification/degree required for long-term success in their respective industries. For operational positions, the certification/degree most frequently identified as a minimum requirement was a high school diploma (selected by 35% of respondents). For managerial positions, the minimum level of education identified as a requirement for long-term success was a four-year degree (indicated by about half of survey respondents).

Students' views about career technical education

Of all the focus group participants, students were among the most pragmatic in their responses to the question: "What is the purpose of CTE?" Based on their experiences, students recognize that CTE programs and courses are intended to "prepare them for the real world" and provide them with practical options when they finish high school. Participating students have developed clear career goals and see CTE as a means to both achieve those goals and develop the concrete skills they would need in the near term. They also see the value of CTE in providing skills that they could use in their personal lives and in support of their families.

Students in focus group settings described the sense of responsibility and accomplishment that they had gained from the instructional styles and curricula provided within their CTE programs, and many of these students noted that Career Technical Student Organizations (CTSOs) had been instrumental in providing a range of personal growth and leadership development opportunities. When asked what they liked best about career technical education, they said that their CTE classes were "different from other classes," more "hands on," offering purpose and

knowledge in context. In general, students spoke highly of the support they had received from teachers; many students recounted specific instances of ways in which the interactive style of instruction had prompted a greater level of engagement with school and a growth in their own motivation to succeed.

Key findings related to CTE system components

The following section presents key findings for each of the five system components examined through the surveys and focus groups.

Integration of CTE and "academics"

Curricular integration

The surveys and focus groups included a range of questions designed to identify the curricular integration goals and practices of participants in the study. The examination of curricular integration practices included questions about the extent of integration of academic and CTE curricula, as well as, specifically: the integration of academic standards and employability skills; the use of different types of strategies to achieve integration; and participants' perceptions about the benefits and challenges that accompany efforts to integrate CTE and academic curricula, along with solutions to those challenges.

Current practice. Survey results indicated that educators use a variety of strategies to integrate their curricula. Of the 592 CTE Instructors who responded to the survey, over 80% "systematically incorporate academic skills into the CTE curriculum" and nearly 60% "collaborate with academic teachers to ensure that academic standards are met in the CTE courses." Each of the next most frequently identified strategies — "collaborate with academic teachers to add CTE content to their courses" and "work with academic teachers to develop joint curricula that emphasize a specific career area" — were selected by 35% of CTE instructors.

Of the 165 academic/non-CTE instructors, 58% revise their curricula to include career related information. More frequently, academic instructors "implement applied/contextual learning curriculum units or projects" (70%), or "bring representatives from industry/professions into the school or classroom" (65%). Thirty-six percent of academic instructors also reported that they "work with career-technical teachers to develop joint curricula that emphasize a specific career area."

Benefits. In both surveys and focus groups, most educators stated that integrated curricula allow students to learn in multiple ways, help students see the benefits of school, and promote student engagement. Students reported that integrated teaching strategies help them learn and help them see the purpose of their academic subjects. It also makes learning enjoyable.

Challenges. While the benefits of curricular integration were noted by survey respondents and focus group participants, challenges were indicated as well. Across the board, respondents indicated that lack of time presents a challenge to integration on many different levels. "Lack of designated or paid planning time" was identified as a major challenge to integration by a substantial percentage of all educator groups; this encompassed more specific challenges related

to time, including "time required to prepare students for 'high-stakes testing' taking away from time needed to integrate curricula" and "lack of time to integrate since instruction must focus exclusively on academic standards." In addition, educators report lack of time required to develop materials and to enable faculty to work together.

Combined data from the focus groups and surveys revealed that respondents believe that traditional methods of delivering academic content (through lecture and drill) pose the risk of student disengagement (40% of CTE instructors indicated that "more academics cause students to lose interest in school, which conflicts with my goal of keeping them engaged"). Discussions within focus groups shed additional light on this issue, suggesting that CTE instructors are not opposed to academic rigor, but instead have reservations about the effectiveness of instructional strategies often used to deliver the content.

Effective strategies. When asked to indicate strategies to achieve successful integration, the two most prevalent themes were: allowing additional time for faculty to develop materials, and providing time for faculty collaboration.

Within focus group discussions, respondents noted a variety of additional strategies to cultivate enhanced collaboration, including expanding the role of learning communities and career academies (which are structured to promote cross-curricular cooperation), and creating projects tied to academic and industry standards. Survey data revealed that integration could be enhanced by increased opportunities for faculty to participate in industry externships. Respondents also reported that integration would be fostered by receiving additional support from the administration, as well as by seeing evidence that integration promotes academic achievement.

Work-based learning

Current practice. A substantial majority of administrators (82%) and CTE instructors (71%) reported that their CTE courses incorporate a formal work-based learning (WBL) component. The survey data revealed that the most prevalent kind of work-based learning model is "in-class, school-wide, or community-based projects," followed by internships, unpaid work experience and paid work experience. Internships are more prevalent in postsecondary than in secondary school settings. Job shadowing was cited by participants from each of the key constituent groups as another valued work-based learning strategy.

Benefits. Participants noted that WBL can increase students' awareness of possible career paths and strengthen their motivation and expectations about career achievement. Survey results from industry representatives also stressed the importance of work-based learning as a mechanism to cultivate basic workplace attitudes and habits. In addition, coordinated work experience was the most frequently cited strategy for helping students prepare for high-skill, high-wage, and high-demand occupations. Students themselves expressed the importance to them of workplace experience as a means to prepare them for life in the "real world".

Challenges. Both educators and employers were asked in the surveys about challenges to providing WBL. Among educators, the most prevalent challenge identified was "time required to coordinate placements." A majority of respondents in each educator group identified as

challenges “lack of paid workplace opportunities” and “transportation issues.” Similarly, “lack of time available for students to participate” was identified as a challenge by a majority of administrators, CTE instructors, and school counselors.

Effective strategies. The most common suggestion offered by survey and focus group respondents was to provide paid work-based learning opportunities to address the need of many students for income while they are still studying. Other strategies to overcome challenges mirrored the challenges themselves: more time, additional funding, and more support from administration for the coordination of work-based learning activities. In addition, respondents recommended “community collaboration” to enhance the links between education and industry.

Industry partnerships

Role and current practice

Results from surveys and from focus groups underscored the importance of industry partnerships to the content and structure of high-quality CTE programs. Industry partnerships are central to CTE in a variety of ways. Industry partners provide key information about the skills needed in the workplace; input from industry can be essential in the development of CTE curricula. Results indicated that industry representatives participate in the development of standards within CTE programs, as well as provide assistance with resource development and advocacy. Further, the involvement of industry in providing opportunities for students (including job placements, internships, and mentoring) is a cornerstone of CTE. Industry representatives also contribute by participating as scholarship sponsors and as judges in competitive events in Career Technical Student Organizations (CTSOs). In addition, focus group participants suggested that industry be involved in determining the appropriate size, scope and quality of programs, based on the skills needed in the workplace.

According to the industry survey, levels of participation by industry representatives varies; most commonly, advisory board meetings are held once per quarter, yet approximately one third of advisory boards meet only once per year. When asked to reflect on “how [their] level of contribution (both as an advisor and provider of opportunities for students) had matched [their] capacity to contribute,” 59% of industry representatives indicated that they make “just about the right level of contribution.” However nearly 30% indicated that they “would like to contribute more” and 10% reported that they would contribute, but had never been asked.

Challenges

Industry reported that the greatest challenge in working with students is their lack of appropriate workplace attitudes and habits; the greatest challenge in working with schools and colleges is lack of a central coordinator at a school or college.

Effective strategies

Focus group participants indicated that formal as well as informal linkages with industry representatives are important to ensuring adequate flow of information and collaboration

between educators and business partners. They proposed the idea of designating an intermediary party (individual or organization) to build and maintain relationships with employers. Other suggestions included starting with "easy" and/or high leverage activities, such as career days, that can lead to other opportunities; managing advisory committees well; providing support to teachers in the form of tools and contact to facilitate outreach to employers; allowing students to be spokespeople for CTE; being responsive to industry input; and showing appreciation to employers for their contributions.

System coherence

In order to support the academic and career technical achievement of students in CTE programs, it is essential that the components of the entire system link together effectively. System coherence incorporates several elements, including course sequencing and pathways, articulation, and coordination across sectors. It also encompasses issues of system flexibility and the "size, scope, and quality" of programs.

Course sequences and pathways

Current status. Approximately 75% of educators reported that there are CTE course sequences available to students in their institutions. Approximately 75% of administrators and CTE instructors reported that there are career pathways. Fewer counselors and non-CTE instructors reported that there exist pathways on their campuses. Focus group results suggest that counselors and non-CTE instructors may lack information on courses and pathways available.

Challenges. When asked to identify the challenges that instructors face in creating course sequences, the response selected most frequently by all three respondent groups was "challenges with master scheduling." Other substantial challenges include "insufficient enrollment due to other course requirements at the school" and "lack of time to plan/coordinate with other staff." The challenges noted in creating career pathways echo the concerns noted for creating course sequences. As before, "master scheduling issues" is a major common concern, followed closely by "lack of time to plan/coordinate with other staff," and "insufficient enrollment for a full sequence due to competing course requirements at the school." Academic instructors differed from other survey respondents for some items; for example, the biggest challenge they reported in creating pathways was "lack of resources for facilities or equipment for classes," and the second-biggest challenge was "lack of time to engage employers."

Low enrollment in CTE courses is seen as a key barrier to course sequencing and the creation of pathways. Low enrollment was reported to result from students' lack of information about course options and program content; in addition, some focus group participants indicated that A-G requirements discourage some students from taking CTE courses. Focus group participants also noted that the focus on high-stakes testing and remediation takes time away from students' schedules, preventing them from enrolling in CTE courses.

Effective strategies. The primary strategy recommended for addressing challenges in course sequences and pathway formation was increasing CTE enrollment, primarily through better dissemination of information about CTE courses and the benefits they offer. Short of this,

instructors discussed the need for effective differentiated instruction to accommodate multiple skill levels within a single class.

Articulation

Current status. Both administrators and CTE instructors were asked about articulation, with a substantial majority of each group indicating that their institution's courses are aligned or articulated with feeder schools or post-secondary institutions. Approximately three-quarters of each type of respondent reported that formal articulation agreements exist between the local high schools and community college(s).

Challenges. Although respondents delineated benefits, such as enhanced opportunities for faculty collaboration, that arise from articulation, the study revealed that substantial challenges exist regarding the creation and implementation of articulation agreements. The most common challenge noted by survey respondents was "lack of time to coordinate"; the second most frequently cited challenge for each group was "differing course content at different feeder schools." "Concerns with high school articulation interfering with CCC to CSU and UC articulations" was noted by about half of each group. Other challenges cited in focus group discussions were concerns about the politics of articulation; one focus group participant noted that "turf wars" between community colleges sometimes interfere with articulation, when such conflicts deter students from attending the campus of their choice. Lack of student awareness of the existence of articulation agreements also contributes to low participation rates, despite the existence of such agreements.

Effective strategies. Faculty support was cited as an important underpinning to the successful implementation of articulation agreements. Across the board, many focus group participants emphasized the importance of consistent communication as a fundamental building-block in ensuring smooth coordination among programs and initiatives; almost without exception, focus group members cautioned that building good communication requires consistent effort over an extended period of time, as well as the ability of staff to handle articulation logistics.

Coordination with other initiatives

Current practice. To gauge the level of coordination with other related educational initiatives, survey respondents were asked to rate the extent to which they work with academies or small learning communities at their school or college. Nearly three-quarters of administrators reported working with these educational initiatives at least to a minimal extent. However, when educators were asked about their coordination with local Workforce Investment Boards, Youth Councils and One Stop Career Centers, results show that coordination with these workforce development initiatives is moderate, at best; when programs do coordinate with workforce development efforts, this is done through participation on the Workforce Investment Board.

Focus group participants also pointed out the distinction between the *frequency* of contact with other initiatives versus the *quality* of those interactions. Respondents cautioned that frequency does not necessary equate with quality, and emphasized that creating high-quality linkages requires a substantial investment of time.

Effective strategies. Focus groups highlighted the use of intermediary organizations, such as industry associations, P-16 councils, and regional economic development organizations, to facilitate coordination efforts. An example of an effective strategy included regular participation in both the local chamber of commerce and the regional workforce development organization, with feedback to staff for curriculum updates.

A number of issues in this area require further examination: effective data collection and dissemination regarding local and regional labor market trends; the use of intermediaries; the coordination and leveraging of resources with workforce development programs such as One Stop Career Centers; and the coordination of education with economic development via the creation of regional career pathways.

Flexibility in responding to industry needs; multiple entry and exit points to meet student needs

The corollary to coordination with workforce and economic development is the need for education to be able to *respond flexibly* to the changing needs of the workplace. Participants from a variety of different focus groups highlighted the importance of flexibility in program design and in curriculum approach, "otherwise, we're teaching kids info that's become obsolete."

Flexibility for students requires a shift in perspective from "seat time" to *skill mastery.* Focus group participants proposed a "focus on acquiring skill sets, not semester long courses for the sake of semester long courses" — "efforts to create flexible courses that generate FTEs (based on industry standards). [We need something] almost like supervised independent study. Open entry, open exit, stay however long you need in order to master skills." In such a system, curriculum would be developed using performance based instructional design approaches.

Participants cited the need to eliminate barriers that inhibit educators from responding to industry input. Strategies suggested to address the need for system flexibility included:

- Incentives for colleges to develop services specific to businesses: "colleges need rewards for generating specific training, maybe not even for credit"
- Distance learning and web-based training
- Professional development for faculty

This issue requires additional exploration as the CTE system is developed further.

One key aspect of "flexibility" is that of "multiple entry and exit points" to facilitate both access and progressive skill development for students. A frequent theme that emerged in various focus group discussions was the need for program designs that are in step with the actual demands and circumstances of the lives of CTE students. Within the focus group of administrators and practitioners who work with "special populations", this issue was paramount; participants indicated that programs that require uninterrupted enrollment are often at odds with the real-life challenges that single parents and economically-disadvantaged students face in meeting their economic and family obligations. CTE program that offer open-entry and open-exit (and career

ladder) formats give students a chance to tailor their educational experience to the demands of their non-academic life; they may therefore enable more students to stay enrolled and to complete their programs, resulting in reduced attrition rates within programs.

Size, scope, and quality of programs

Focus group participants suggested that industry be involved in determining the appropriate size, scope and quality of programs, based on the skills needed in the workplace. They also acknowledged funding limitations that require difficult choices between breadth of occupational offerings and full course sequences.

Personalization, career guidance, and student services

Counseling and career guidance

Current practice. Survey responses revealed that career guidance typically begins in high school, but several focus groups stressed the importance of beginning in the middle school grades. Results indicate that counselors most often provide career guidance services to students-at-large in their schools or colleges, not in ways that are connected to specific CTE courses or special programs.

In surveys, school and college counselors/advisors indicated in large percentages that students with varying goals can benefit from CTE courses, especially with regard to exploring career options and learning about basic workplace requirements. However, since many CTE course are not A-G approved, counselors in focus groups stated that they have reservations about recommending CTE to "college bound" students because it affects their competitiveness in applying to four-year universities.

The forms of career exploration and planning that are available to students vary widely, according to the survey and focus group results. The top three forms noted by respondents are the use of written or multimedia tools that describe careers; career assessment or reflective exercises; and consultation with a counselor or staff member. The development of a career plan and the use of job shadowing were less frequently selected by survey respondents. Survey responses also showed that students were exposed to information concerning non-traditional careers "to some extent", though not extensively. Only about half of students have the opportunity to explore career options before selecting a CTE program; 29% of counselors/guidance staff reported that students only had this opportunity to a "minimal extent."

*Student perceptions regarding career guidance***.** Five student focus groups provided key details about students' experiences with seeking and receiving guidance regarding educational and career-related decisions. Students reported that they receive most of their guidance from instructors, though a few had also spoken with counseling and career center staff. One community college student had received guidance from a counselor assigned to his CTE department. Students also obtain career guidance outside the school setting, from other students, parents, and professionals and industry partners in the relevant occupational field. One community college students said that students have to take the initiative: "It really depends on the individual; if they want information they go out and get it."

Some secondary students voiced frustration with the lack of availability of extensive career guidance within their school setting, commenting that counselors were often too busy to speak with them. Students also explained that they had, on occasion, felt that, as CTE students, their needs were perceived as secondary to those of their "college-bound" contemporaries.

Challenges. Focus group and survey participants were asked to identify challenges encountered when encouraging CTE instructors to incorporate career exploration into their curricula. The most prevalent challenges cited were logistics and transportation issues for off-campus activities along with lack of time available for students for off-campus activities, and lack of time for CTE instructors to coordinate off-campus activities. Additional challenges include lack of funding; lack of administrative support; lack of time for staff development on career exploration topics; and difficulties getting permission from academic teachers to release students from class in order to attend off-campus career-related activities.

Effective strategies. Recommendations for improving career guidance services included:

- bringing career-awareness activities into lower grade levels, in order to set clear expectations about the academic preparation required for a variety of career options;
- creating opportunities for current students to make sustained contact with peers and mentors who have achieved career success;
- encouraging student participation in CTE student organizations;
- providing exposure to employment-related information; and
- ensuring personalization and flexibility in the design and provision of career guidance services, in recognition of the wide array of circumstances and needs of students within CTE programs.

Improving transitions to postsecondary education/training and employment

Current practice. The participants in this study described a variety of techniques that are currently used to facilitate transitions to postsecondary education and employment, both for students at large as well as students belonging to special population groups. These included campus tours, peer-to-peer outreach, Career Technical Student Organizations (CTSOs), and work-based learning, as elaborated further below.

Effective strategies. With regard to transitions to postsecondary education, participants emphasized that providing opportunities for high school students to directly observe campus life — such as through on-campus information fairs or peer-to-peer campus tours — are the most effective means of creating awareness and cultivating realistic, well-informed expectations about postsecondary education. Participants also proposed increased use of multiple techniques for developing student leadership skills, including student organizations in which special populations are valued participants. Peer-to-peer mentoring and outreach are useful in motivating CTE students to seek post-secondary education and training, as well as services needed to succeed in postsecondary education.

Several ideas were proposed regarding ways to improve transitions to employment. The most prevalent suggestion was enhancing access to work-based learning opportunities, such as job shadowing and internships. Within the special populations focus group, participants also discussed strategies for emphasizing career awareness about higher-wage/higher-skill occupations, supplemented by enhanced linkages between academic programs and industry partners, including take-a-student-to-lunch, mentoring, job shadowing, and internships.

Career Technical Student Organizations (CTSOs)

Career Technical Student Organizations (CTSOs) were identified by many focus group participants as a valuable component of high-quality CTE programs. Focus group discussions revealed specific ways in which CTSOs enhance student engagement, raise career and academic aspirations, and cultivate the communication skills, critical thinking capabilities, and leadership potential of the students who belong to those organizations. Participants noted that CTSO-sponsored student competitions also serve to strengthen the involvement of members of the business community in CTE, through their participation as event and scholarship sponsors, as well as by serving as judges in these competitions.

Services to special populations

Barriers faced by students. The study identified specific types of challenges that special populations typically encounter at different phases during their enrollment in CTE programs. Barriers that students face in *learning about and enrolling in* CTE included: lack of information or awareness; lack of role models; lack of English proficiency; and lack of adequate child care and/or transportation (which can lead to higher rates of student attrition from programs).

When respondents were asked to describe barriers to *staying enrolled* in CTE programs and challenges encountered in *mastering course content*, similar themes emerged regarding inadequate information, logistical challenges, and lack of English proficiency/lack of bilingual instruction. These concerns were supplemented by several additional challenges identified on this topic in the survey: competing demands of work and family obligations; lack of training and professional development for CTE program staff in the appropriate strategies for serving special population students; insufficient number of classroom aides; and insufficient time to cover occupational course content due to time spent on academic content. The primary challenges to *employment* faced by students include: lack of information about career options (especially information about new trends and emerging occupations, and requirements for entry into various careers); lack of confidence; lack of work readiness; and lack of employment placements.

Current status. A large percent of administrators (88%) and instructors (86%) feel they are meeting the needs of special populations at least "to some extent"; of these, 41% of administrators and 45% of CTE instructors feel they are meeting the needs of these students "to a great extent." When asked for detail about how their institutions were responding to the needs of special populations, the two most frequently selected strategies were "providing aides or interpreters" and "providing alternative methods of instruction." "Offering childcare" and "subsidizing transportation" are two responses that were chosen least often in the surveys. However, members of the focus groups mentioned both as needs of special populations.

Challenges. In the survey as well as in focus group discussions, educators were asked what challenges they encounter in ensuring that all students can benefit from CTE programs. Administrators and instructors both indicated that their programs were lacking in time/resources to offer CTE materials in other languages, echoing a comment emphasized strongly by focus group participants. Other challenges cited included: "Lack of time/resources or counseling staff to ensure outreach and enrollment;" "lack of resources to offer a broad array of courses;" "lack of time/resources to provide the necessary support services;" "lack of time/resources to provide the necessary remediation;" and "lack of time/resources to sufficiently differentiate instruction."

Discussions within focus groups also highlighted several types of barriers related to program design, data collection, and administration. One issue mentioned by nearly all participants was that of "missed opportunities" for intervention on behalf of special populations because students are not identified early enough in the educational pipeline to catch potential problems before these problems worsened. If CTE programs lack formal, systematic procedures for identifying students' needs early in the enrollment process, students may experience problems completing assignments and making a successful transition to employment. This problem may be exacerbated due to students' resistance to self-identify.

Data collection poses another challenge to program improvement efforts. Challenges include insufficient data to document program successes, particularly in comparison to programs serving students who are not designated as special populations; lack of longitudinal and follow-up data; lack of knowledge about how to collect and report data; and lack of coordination among program staff in sharing data and in using those data to support changes in program design and implementation.

Effective strategies. Information shared in focus groups settings, in combination with data gleaned from survey questions, revealed a spectrum of strategies for improving CTE programs for special populations. These include:

- Curriculum and program design
  - Introduce CTE curricula and career technical awareness activities earlier in the educational pipeline, so that students in the middle school grades can begin to develop knowledge and skill sets in these areas at a younger age.
  - Seek and incorporate input from industry partners into CTE curricula, especially with regard to challenges and opportunities specific to special populations.
  - Develop more professional development opportunities for program staff (administrators, instructors, counselors, and aides) so that staff gain more expertise in assessing and responding to the needs faced by special populations.
  - Create "vocational ESL" programs and detailed curricular materials in languages other than English.
  - Re-design existing programs to allow for more open-entry/open-exit options for students; create career-ladders to dovetail with the non-academic demands faced by all students, including those designated as members of special populations.

- Support services
  - Cultivate early-identification of potential problems for students with special needs; improve coordination and communication among programs staff regarding strategies to meet those needs.
  - Link students with resources devoted to remediation and tutoring-support services, including remediation provided in languages other than English. Increase the use of project-based and applied learning strategies; use cooperative learning and peer-tutoring when appropriate.

- Improving transitions to employment
  - Emphasize career awareness about higher-wage/higher-skill occupations. Bolster that awareness by creating closer linkages between academic programs and industry partners, including take-a-student-to-lunch, mentoring, job shadowing, and internships. Expand the type and number of student placements.
  - Create recognition programs for employers that are leaders in offering employment placements (and in providing scholarship assistance) for special populations students.
  - Identify and use multiple techniques for developing student leadership skills, including student organizations in which special populations are valued participants and developing community service and leadership opportunities.
  - Expand the frequency with which special populations have opportunities to practice job-readiness skills, such as networking and interviewing.
  - Demonstrate to employers that special population students can succeed in the workplace; create a track record that is supportable and visible.
  - Establish a liaison position between instructors and members of the business community, to reduce the dual challenge faced by instructors of simultaneously teaching and developing employment placements.

- Measurement/accountability
  - Collect quantitative data to document the effectiveness and success of programs that serve special populations. Train staff about the appropriate ways to collect, interpret and communicate these data.
  - Create systems to gather data on student progress within programs; use those data to inform curriculum design and support services. Keep track of reported data in a timely fashion so that the information gathered can be used to target dropout prevention and reduce program attrition.

Availability of skilled faculty, professional development, and collaboration

Teacher supply

Current status and challenges. Our study revealed that substantial challenges exist in recruiting skilled teachers who also have industry knowledge and technological expertise. The major barriers to recruiting and retaining staff are: low pay compared to the private sector; an inadequate supply of qualified teachers; inadequate supply of credentialing programs, exacerbated by the cumbersome and extensive credentialing process that deters otherwise skilled professionals from becoming teachers; difficulties in retaining faculty for part-time positions;

challenges in recruiting staff for positions in rural areas; and the pressures on staff due to a continual need to re-train to keep pace with trends in industry.

When asked to document the challenges they had experienced in retaining instructors, "teacher burn-out" (due to low pay and stressful working conditions) was the common response. Other concerns related to retention included inadequate professional development opportunities, especially for new teachers, and enrollment-related concerns, arising from program terminations due to low levels of course and program enrollment.

Effective strategies. Two approaches emerged to address recruitment challenges, but respondents acknowledged that both are difficult to implement:

- Look for teachers with experience in industry or provide industry-based training to teachers.
- Recruit from industry and facilitate individuals' becoming credentialed. Explore alternative pathways for credentialing these industry representatives.

Professional development

Current practice. Administrators, CTE instructors, and community-based counselors/advisors were asked to list the forms of professional development that they provide to (or coordinate for) CTE instructors, or, for the instructors themselves, that they participate in. Virtually all of the respondents in each of the three groups indicated that they participated in industry conferences, and this was the most common response. Teacher externship and job shadowing opportunities were highly valued by most focus group participants and survey respondents, but there was a much higher demand for these opportunities than there were opportunities available.

Effective strategies. Other types of professional development sought by respondents included: direct instruction on curriculum development and standards implementation; opportunities to learn through peer collaboration with other teachers (encompassing "learning from other teachers' best practices;" "mentoring of new teachers by their CTE colleagues;" "opportunities to conduct team-teaching;" "mentoring, collaborating, and networking with other teachers," and "[attending] joint planning sessions with CTE instructors, academic instructors, counselors and administrators"); and, particularly among instructors and counselors, "opportunities to learn or receive training in the workplace," in order to stay current with industry skills and knowledge.

The two primary *content* areas of professional development requested included: staying current on industry skill requirements (preferably learned through direct connection with industry) and effective instructional strategies (preferably learned through collaboration).

Counseling/guidance staff also requested professional development to learn more about CTE and the needs of industry.

Collaboration

Collaboration among faculty was an important issue to many of the individuals who participated in our focus groups. Focus group members perceived a variety of benefits associated with

opportunities for collaboration; it is an important strategy for professional development and it facilitates integration of CTE with academics. Collaborative work was also seen as a means for communicating the value of CTE to a wider audience, thereby enabling academic faculty and others outside the CTE community to gain greater understanding and respect for the benefits of CTE as a way of teaching and learning.

CTE faculty sought additional opportunities to mentor (and be mentored by) their faculty colleagues. Focus group participants emphasized that these mentor linkages were useful for helping faculty develop new instructional tools and ideas, but were also instrumental in motivating and inspiring new teachers.

In sum, despite the challenges, efforts are underway to strengthen CTE programs, integrate programs, and create seamless pathways from secondary to postsecondary education and into the workplace, to better serve the workforce and economic development needs of communities and promote individuals' economic security and career fulfillment.

RECOMMENDATIONS FOR SYSTEM DEVELOPMENT

- *What resources and system improvements are essential at the state and local levels to ensure that CTE meets the current and evolving needs of students, communities, and the economy?*

In answer to this question, offered below are recommendations clustered into four key themes that recurred throughout both the literature review and the surveys and focus groups. While clustered, many of the recommendations are interrelated, reflecting the systemic nature of CTE and highlighting the pervasiveness of the some of the key issues that impact CTE implementation. These categories include:

1) Strategies for creating stronger ties between CTE and academic instruction, and with counseling and guidance functions, with opportunities for ongoing collaboration and learning among all staff

2) Practices to ensure meaningful input from industry regarding skills needed in the workplace, standards and curriculum, as well as direct mentoring of students and educators

3) Mechanisms to promote stronger linkages among institutions to ensure system coherence and flexibility

4) Opportunities and strategies for making the offerings and benefits of CTE more visible to all, while promoting continuous improvement and accountability

The needs assessments surfaced some issues that have no easy answers. In these cases, recommendations for further inquiry are provided.

1) Create stronger ties between CTE and "academic" instruction and with counseling and guidance functions; create opportunities for ongoing collaboration and learning among all staff.

The literature reviewed for this study discusses industry's need for employees who not only have basic academic skills and workplace habits, but who are critical thinkers and problem solvers, who adapt readily to change, and who know "how to learn." This requires an education system that can foster these qualities — one that promotes "rigor, relevance and relationships." This also requires an environment where educators themselves have the opportunity to work together and grow professionally.

a) Promote complementarity between CTE and academic/non-CTE programs, ensuring that CTE courses foster the achievement of academic standards and meet high industry standards, while leveraging the strength of CTE: hands-on, career-focused learning.

CTE can benefit more students. Respondents expressed the view that CTE should prepare students for both postsecondary education and careers and decried what they saw as a two-tiered system: one for the "college bound" and one for those going "straight to work." In the current scenario, "college bound" students sometimes miss opportunities to take CTE courses that could be of great interest and benefit.

Both the literature and the data collection suggested that integration of CTE and "academic" curricula can help shift the "either/or" paradigm. Integrated curricula and project-based, career-focused opportunities are reported to enhance students' motivation and engagement with school. This was supported by the substantial majority of educators and administrators who stated that integrated curricula provide opportunities for students to learn in multiple ways, enabling students to gain a more concrete mastery of academic concepts. The challenge is to promote high quality programs — both "academic" and career technical — in ways that leverage the strengths of each. Through complementary strategies and the leveraging of resources, CTE and "academic" curricula can reinforce one another to provide both academic skills and the relevance that promotes learning.

The National Assessment of Vocational Education (NAVE) reported that lack of clarity in the definition of "integration" had hampered implementation. Therefore effective implementation requires a definition of "integration" that encompasses various strategies, yet one that also describes specific alternatives to address different goals. Strategies may include the infusion of academic skills into CTE programs, adding career context to "academic" classes, or both, as is often done in career academies or career-themed learning communities. Strategies may also include expanding opportunities for experiential and work-based learning, and for meaningful career exploration. No matter how a school, college, or program chooses to proceed, opportunities for coordination, development of complementary curricula, and even team teaching should be considered so that, in the aggregate, across the curriculum, students have the opportunity to be challenged, solve problems, exercise their academic and technical skills, and explore career options in multiple ways. The goal of meeting workforce needs must also be addressed, particularly at the postsecondary level. Irrespective of the integration strategies employed, both the current study and the literature suggest that collaboration among faculty is paramount.

Resources required to promote integration include:

- Time for CTE and academic/non-CTE instructors to collaborate in curriculum development
- Professional development for secondary CTE instructors on integration of the content standards as well as the California CTE Model Curriculum Standards
- Professional development for "academic only/non-CTE instructors" on CTE and the needs of the workplace
- Externships or faculty job shadowing in industry — preferably in teams — to allow for observation of the skills required in the workplace and exploration of learning opportunities for students, with follow up time for joint curriculum development

b) Offer an array of career guidance and exploration activities, beginning in middle school; allow students sufficient time with counseling or other guidance staff; provide professional development to counseling staff on the needs of the workplace — through externships in industry or other direct industry contact.

Bringing career awareness activities into lower grade levels will expose students to a wide variety of career possibilities and help them form clearer expectations about the academic preparation required for various options. Further, ensuring that students have the opportunity to speak with either counselors or guidance staff *before* they select CTE courses and pathways can facilitate appropriate decisions. The literature as well as survey and focus group respondents suggested that the career guidance function can be performed by a variety of individuals: counseling and guidance staff, instructors, or community-based mentors. In distributing this function, the provision of professional development for staff on the National Model for School Counseling Programs would help to ensure high quality guidance.

Given the well-documented need for students to develop self-knowledge and career management skills, the identification of transferable skills in CTE coursework and activities, as well as reflection on interests and experiences, will facilitate students' decision-making about course selections and career options at all levels. Further, counseling and guidance staff reported that CTE offers valuable career exposure for students and expressed interest in learning more about CTE in order to refer students to services more effectively. The study revealed that participation in industry-sponsored externships and job shadowing is one of the most effective strategies for exposing educators to the needs of the workplace. The participation of counselors in these opportunities would also be valuable.

Finally, some counselors expressed conflict between their desire to refer students to CTE courses and the need to help students structure their schedules to enable UC/CSU admission. The fact that many CTE courses are not A-G approved was reported by many to be a barrier to student enrollment in CTE. Increased emphasis on strengthening the academic content of CTE overall, and the sharing of effective processes among practitioners will continue to result in more course approvals. However, short of all CTE courses being A-G approved, further investigation is required to explore options that will enable a wider range of secondary students to benefit from at least some key CTE strategies, such as experiential learning, career exploration, and exposure to the workplace, and still have access to UC/CSU admission. Further, many participants in this

needs assessment asserted that enrollment in the California university system directly after high school is not the only path to success. A "longer view" of success would encompass more diverse postsecondary choices, including, among others, enrollment in community college with transfer to the university, and would shift the focus from "university admission" to "attainment of goals."

c) Ensure that students receive the support services they need to succeed, especially as CTE courses become more rigorous; develop more systematic approaches to identify needs early.

Support services, including mechanisms to promote early identification of potential problems, can be essential in helping students persist in their course work. Participants in focus groups noted that for students who belong to one or more "special populations", the availability of support services may spell the difference between persistence and attrition from an educational program. The literature on education reform and the creation of viable career pathways posit that support systems are necessary to ensure student success.

Recommended strategies include tutoring, the creation of "vocational ESL" programs, and workplace preparation activities and work-based learning to build confidence. Many students in special populations also require logistical support.

d) Foster greater collaboration for curriculum integration and joint professional development of CTE and non-CTE instructors, to promote mutual understanding and learning.

The importance of faculty and staff collaboration emerged so pervasively throughout the literature and data collection that it warrants a separate recommendation. Collaboration is vital for ensuring ongoing professional development and appropriate student services. Participants also saw collaboration on curriculum and instructional methods as essential. In addition, one specific form of faculty collaboration — the mentoring of new teachers by more experienced faculty — was seen as a particularly effective means of conveying practical information, support, and encouragement to new teachers. Participants also spoke highly of learning communities and the collaborative opportunities that those designs could provide.

Because of the reported gulf between CTE and non-CTE instructors, many participants also recommended closer working relationships to promote mutual understanding and reinforce the strengths that each brings to student learning. CTE instructors want support in integrating academic content into their courses, while non-CTE instructors want a better understanding of careers and how career themes can provide context to their instruction. At the same time, instructors reported that lack of time is a significant barrier to collaboration. While the pool of non-CTE instructor respondents to the survey probably represents those who are more favorably inclined to CTE than perhaps other non-CTE instructors, the responses suggest that funds targeted to collaborative activities would both serve expressed needs and demonstrate the value of collaboration to other faculty.

e) Promote learning communities when possible, both to enhance personalization and the foster collaboration among faculty; promote student organizations that can offer needed personalization and workplace experiences, especially in the absence of learning communities.

In the literature as well as in the surveys and focus groups, learning communities are cited as an important vehicle for promoting faculty collaboration to develop integrated programs. In addition, learning communities create environments where students are seen and known as individuals.

CTE Student Organizations (CTSOs) were also reported to offer personalization and individualized attention. Further, they were reported to foster student engagement, promote critical thinking and communication skills, prompt leadership development, raise career aspirations, and increase self-confidence. CTSO competitions were cited as especially valuable, drawing upon the contributions of both faculty and members of the business community in assessing student performance, in a supportive environment. These competitions couple high expectations with meaningful activity and caring relationships, thus facilitating risk-taking and growth.

2) Ensure ongoing meaningful input from industry on skills needed in the workplace, standards, and curriculum, as well as direct mentoring of students and educators.

Employer engagement is fundamental to the quality of CTE programs. The recommendations below focus on effectively engaging employers to provide both advisory services and to work directly with faculty and students.

a) Invest in the strengthening and maintenance of relationships with employers; consider the use of liaisons or intermediaries to provide a "single point of contact" for employers and to facilitate transactions.

Across the board, the results of the study underscore the vital role that members of the business community play in the content and implementation of CTE programs. Although industry partners may take a leading role in sponsoring internships and job-shadowing opportunities and in securing employment placements for CTE students, they may also be instrumental in a host of other roles. These roles include: curriculum development, program design, the development and application of standards, technical and financial support for student leadership, and scholarship programs. Although substantial investments of time (bilaterally) are required to cultivate high-quality linkages with industry partners, the products of these linkages are vital to ensuring that programs stay current with economic trends and that program graduates remain competitive with the demands of the labor market.

Focus group participants indicated that formal as well as informal linkages with industry representatives were important to ensuring the adequate flow of information and collaboration between educators and business partners. They also proposed the idea of designating an intermediary party (individual or organization) to build and maintain relationships with employers. The literature reviewed indicated that the use of intermediaries has been a successful

strategy in some youth and adult workforce development programs throughout the country for brokering information and opportunities between employers and service providers. Strategies should be explored to more effectively use intermediaries, such as economic development agencies, in ways that promote efficiencies for both educators and employers, while still allowing for the personal contact that educators value.

b) Create alliances with industry for recruitment and professional development of faculty and for placement of students in work-based learning opportunities and jobs.

In order to address ongoing challenges with the recruitment of teachers who are both skilled in teaching and skilled in a given career technical area, more flexible means of recruiting staff from industry are needed. Alternative credentialing of professionals from industry, "guest teacher" programs, and other means to bring industry representatives into classrooms and training programs merit exploration.

Further, focus group comments and survey results indicated that instructors would prefer more frequent opportunities to gain first-hand experience in their area of career focus; there appears to be a much higher demand for job-shadowing and externship placements than there are opportunities available. To the extent that schools and colleges can forge alliances with employers in key industries of interest, as many already do, placement of instructors in workplaces and other exchanges will be greatly facilitated.

Finally, employers in the industry survey reported that for entry-level employment, "a high school diploma" and "experience in the workplace" were the most important requirements. For many students, these experiences must be paid jobs. A concern that arose frequently in survey comments and focus groups was that many students face economic conditions that require them to work while studying. This prevents some students from participating in unpaid internships. In some community college programs, students are required to find a job in the career area of study, and longstanding relationships with local employers in the industry make this possible. Such relationships with industry should be cultivated whenever possible. When this is not possible, efforts should be made to help ensure that when students are in the workplace, experiences are rich and meaningful. Many examples are available and should be explored to ensure that students have work experiences that are linked to their coursework and contribute to further career development.

3) Promote stronger linkages among public institutions to ensure system coherence and flexibility.

The literature reviewed emphasized the importance of creating "seamless" career pathways to promote both individual student success and to ensure that CTE is aligned with the economic development needs of the state. These "pathways" are defined differently throughout the literature — some definitions focus on secondary programs that offer close-knit career-focused learning environments for students, and some focus on statewide systems for organizing curricula and coordinating education, workforce preparation and economic development initiatives. Different emphases notwithstanding, all of these argue for innovative approaches to promote coherence and flexibility.

Surveys and focus groups corroborated these arguments. Participants provided recommendations for each component of a "coherent system." They also provided overarching recommendations across system components that called for another shift, from a supply-driven system to a demand-driven system — one that can respond flexibly both to the needs of the workplace and to the needs of students over multiple career transitions.

a) Address barriers to course enrollment to provide greater student access to CTE; create complete course sequences and pathways to ensure successive skill building and career exploration within a given area.

Focus groups and surveys suggested that the primary barriers to the implementation of complete course sequences and pathways at the secondary level were not curricular, but rather low enrollment of students and challenges with master scheduling. Respondents provided several interrelated reasons to explain low enrollment figures, some of which have already been mentioned:

- University admission criteria that favor A-G courses, coupled with the challenges in obtaining A-G approval for CTE courses
- Testing and school accountability requirements that result in student placement in remediation courses, eliminating room in students' schedules for CTE courses
- The perception that CTE courses are not appropriate for "college bound" students, whether or not they are in fact rigorous
- Poor visibility of CTE courses resulting in lower referrals
- Lack of educators' awareness of the needs of the workplace, resulting in a low priority placed on career exploration
- Inadequate or non-systematic recruitment of students into CTE programs, including both "special populations," who may face language and other barriers to enrollment, and students at large

Respondents recommended a variety of strategies to increase enrollment, including creating greater visibility for the programs and more systematic outreach to students. In addition, as further discussed below, closer collaboration between secondary and postsecondary programs would facilitate dual enrollment, enabling students to access successive class levels across institutions.

b) Investigate articulation issues more fully and explore alternatives to course-to-course articulation as appropriate; expand dual enrollment and "Middle College High School" programs.

The creation of a fully functional articulated CTE system requires the balancing of state and local priorities, while serving the needs of students as well as meeting workforce demands of current and emerging industries. According to the SB 70 Implementation Plan, "California's CTE system has several weak — or missing — links"; current curriculum alignment and program articulation is characterized as "spotty and provincial." Survey data and focus groups revealed a number of challenges to articulation, including misalignment of feeder courses, "turf" issues, and lack of time to develop articulation agreements. The NAVE report cited several

factors that have limited the impact of articulation, including a focus on course-to-course instead of program-to-program articulation, and few students availing themselves of opportunities for articulated college credit. As was the case in this needs assessment, the report suggested that some students construct their own career paths instead of conforming to the course sequences offered by their local CTE systems. Our students may be more visionary and flexible than our systems.

The NAVE report recommended both expanded articulation and dual enrollment opportunities for high school students. In addition, the California Community Colleges have implemented a "Middle College High School" option, similar to the Early College High School concept supported by the Bill and Melinda Gates Foundation. These schools offer high school students an opportunity to more easily access community college curricula by locating the high schools on college campuses. This also allows for the leveraging of CTE resources, including use of laboratories and equipment. Further integration and expansion of the "Middle College High School" and other dual or concurrent enrollment strategies should be investigated.

c) Promote system flexibility, to both address the changing needs of the workplace and to address the needs of students with multiple demands in their lives.

Participants from a variety of different focus groups concurred that flexibility in program design and in curriculum approach were central to helping CTE programs keep pace with the evolving needs of industry. Program design flexibility — in particular, the availability of multiple entry and exit points — was also deemed crucial to facilitating the participation of special populations in CTE programs, given students' competing family and employment obligations. As suggested by respondents, technology-assisted learning, including distance learning and web-based curricula, also provide students greater flexibility.

Flexibility for students requires a shift in perspective from "seat time" to *skill mastery.* Focus group participants proposed the creation of flexible courses, structured in ways similar to supervised independent study, driven by students' achievement of industry standards. In such a system, curriculum would be developed using performance-based instructional design approaches. A number of challenges to making this shift were reported. This issue requires further attention if CTE is to become a truly "demand-driven" system.

d) Further strengthen alignment between education, workforce preparation and economic development.

The community colleges have forged strong linkages between economic development efforts and CTE. These must be ensured to strengthen programs, connect them with the changing needs of the workplace, and provide the quality career pathways that can maintain a skilled workforce and support emerging industries.

While the community colleges have created organizational strategies to align economic development with CTE, CTE at the secondary level is not fully integrated into these strategies. As mentioned, implementation of linkages between secondary and postsecondary programs,

including career pathways, as called for in SB 70, will promote this kind of integration. Visibility for these efforts can encourage replication of successful models.

4) Demonstrate how CTE promotes student success; align data collection and reporting systems to track system performance; make the benefits of CTE more visible.

This final set of recommendations focuses on promoting CTE through demonstration of its benefits, particularly with regard to student achievement and success**.**

a) Demonstrate how CTE promotes student success.

In this era of accountability, and given the new requirements of the Perkins Act, there will be increasing attention placed on CTE's role in improving student achievement and other outcomes. A pervasive theme echoed by administrators, instructors, and counselors at the secondary level is that the focus on high-stakes testing and accountability in California schools has detracted from support for CTE at the secondary level. In community colleges, focus on transfer to four-year universities can also detract from CTE. As reported in surveys, many administrators and staff want evidence that CTE can support student achievement and promote other positive outcomes. This calls for a well-articulated vision of CTE and its significance to both immediate and long-term student success that is persuasive to administrators, faculty, and staff.

With the adoption of the California CTE Model Curriculum Standards that are linked to the academic content standards as well as workplace competencies, California is poised to develop assessments that measure student progress against standards that promote student achievement in alignment with CTE curricula. Similarly, at the postsecondary level, industry standards drive performance measures and certification processes to ensure skill mastery. In addition, respondents in this needs assessment, corroborating the literature, reported that CTE promotes other positive outcomes, including higher levels of engagement, as measured by better attendance, persistence in school, and other means, as well as by many career- and employment-related outcomes. Demonstrating performance in these areas can also enhance the view of CTE as contributing to student success.

Employers can also contribute to the assessment process directly, as they do in many community college and ROCP programs, as well as in many high school project-based and work-based learning programs. In doing so, they provide feedback to educators on the success of students in the workplace and expand the focus of assessment to include authentic measures of performance. Not only can these assessments provide a more complete view of student learning, but employer involvement in the assessment process can contribute significantly to discussions related to multi-faceted assessment systems.

b) Align data collection and reporting systems between K-12 and community colleges.

There is an added need for improved data collection and dissemination in general. Quantitative data about the effectiveness and success of particular features of CTE can be instrumental in helping educators shape program characteristics to enhance achievement and reduce attrition. Further, the literature described seamless career pathways spanning both K-12 and postsecondary

segments, but currently, data collection and reporting systems do not reflect the needs of a coherent K-14 system; each educational segment currently uses separate data management systems and categorizes CTE programs in different ways. Alignment of data collection systems can facilitate planning and system-wide reporting.

c) Make CTE and its benefits more visible to students, to parents, to other educators, including non-CTE faculty and counselors, and to the community at large.

Across the board, participants from each of the stakeholder groups included in this study emphasized the need for better communication about the availability, features, and benefits of CTE. Enhancing CTE visibility is highlighted here as a separate recommendation due to the pervasiveness of this issue. Survey and focus group responses underscored the importance of enhanced communication among educators and between educators and other stakeholder groups, such as parents, industry representatives, members of the community, and legislators. Lack of awareness was cited as one factor underlying low enrollment in some CTE programs, which in turn disrupts course sequences and pathways; this lack of awareness may also lead to low rates of participation in support services that help students persist in their academic studies. Finally, the importance of more effectively communicating the benefits of CTE was strongly emphasized by students, who, above all, wanted their peers to know about the availability of these opportunities.

CONCLUSION

Career technical education in California incorporates many components of a coherent CTE system, spanning from early career exposure and experiential learning opportunities to focused career preparation for adults in transition. Recently enacted state legislation has strengthened the role of CTE in the public education system. The Governor's 2006-07 budget called for expanded career technical education opportunities and improved linkages between public schools and community colleges. Efforts are underway to link the state's investment in economic development with its investments in public education and other programs. Carl D. Perkins Career and Technical Education Improvement Act funds will further strengthen the implementation of key strategies. While surfacing challenges to be addressed, this study suggests strong support from educators, industry, students, and parents for these and other efforts to create a world-class CTE system — one that promotes student engagement, success, and lifelong learning and that affords all individuals the opportunity to achieve productive and rewarding careers, contribute to the state's diverse and evolving economy, and enhance and sustain the quality of life in their communities.