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Career and Technical Education (CTE): A Primer

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Summary

Career and Technical Education (CTE), often referred to as vocational education, provides occupational and non-occupational preparation at the secondary, postsecondary, and adult education levels. CTE is an element of the nation's workforce development system. As such, CTE plays a role in reducing unemployment and the associated economic and social ills. This report provides a primer on CTE to support congressional discussion of initiatives designed to rationalize the workforce development system.

CTE prepares students for roles outside the paid labor market, teaches general employment skills, and teaches skills required in specific occupations or careers. In order to focus and structure programs, curricula, and resources, practitioners at the local, state, and federal levels often organize CTE into 16 career clusters and various career pathways for each career cluster. CTE career clusters include several occupational areas, such as health science and manufacturing. Career pathways generally refer to a series of connected education and training strategies and support services that enable individuals to secure industry-recognized credentials and obtain employment within an occupational area and to advance to higher levels of future education and employment in that area.

At the secondary level, CTE is offered in high schools, area CTE centers, community colleges, and detention centers. Nearly all 2009 public high school graduates (88%) earned at least one CTE credit, and 19% earned at least three CTE credits in a single occupational area. Four issues confound the offering of CTE at the secondary level. The first is whether CTE courses should be offered to (1) broaden the students' education and provide early exposure to several career options or (2) ensure students are prepared to enter the workforce immediately with an industry-recognized credential after completion of a career pathway in high school or after one to two additional years of postsecondary education or training. The second issue is the expense of maintaining and updating the instructional resources and equipment for a single career cluster or pathway, particularly at the secondary level. The third issue is whether CTE adds value to a college preparatory high school curriculum. For example, U.S. Department of Education statistics of 2004 public high school graduates demonstrated no significant difference in average wages between all graduates working for pay but not enrolled in postsecondary education and CTE graduates working for pay but not enrolled in postsecondary education. However, of the CTE graduates working for pay but not enrolled in postsecondary education, only 30% were in an occupation related to their high school CTE concentration. The final issue is related to state adoption in recent years of the common core standards that are termed *college- and career-ready standards*, although the standards do not define career-ready and thus may not provide immediate career preparation.

At the postsecondary level, CTE is offered by community colleges, vocational schools, and employers through apprenticeships and on-the-job training. Some CTE programs are terminal (few courses are transferable for credit toward a more advanced credential), while others may lead to stackable credentials (a sequence of credentials leading to more advanced qualifications). The ability or inability to transfer CTE credits toward a credential with higher earning potential or a bachelor's degree highlights one conflict among policymakers. The difficulty in structuring every postsecondary CTE program to include the first one to two years of general bachelor's degree requirements is that the CTE program will likely require more time to accomplish and may be of less interest to the CTE student.

CTE for adults is work-related course-taking that may incorporate adult basic education (ABE). At the adult level, CTE is offered by secondary and postsecondary CTE providers, employers, and community and government organizations. The rates at which adults engage in work-related course-taking increases with age, labor market engagement, and education.

The Bureau of Census collects earnings data for the adult population with various educational credentials. The most recent data available on subbaccalaureate populations suggests that alternative credentials (such educational certificates or professional certification and licenses) are associated with a statistically significant wage premium for populations with no postsecondary degree when compared to others with comparable levels of formal education. In addition, vocational certificates and associate's degrees in more technical CTE fields like computer and information services are associated with substantially higher earnings than vocational certificates and associate's degree in less technical CTE fields like business.

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Introduction

Career and technical education (CTE), sometimes referred to as vocational education,[1] provides occupational and non-occupational preparation at the secondary, postsecondary, and adult education levels. As defined in a publication by the U.S. Department of Education's (ED's) National Center for Education Statistics (NCES), CTE prepares students for roles outside the paid labor market, teaches general employment skills, and teaches skills required in specific occupations or careers.[2] The definition distinguishes CTE from liberal arts or academic education: the fine arts, English, mathematics, science, foreign languages, and the humanities. A CTE curriculum is often designed to have a post-education practical application and develop broadly applicable skills. Academic educational courses are often designed to develop subject matter knowledge and broadly applicable skills.

Federal Support for Career and Technical Education

The federal government has a long history of supporting workforce development, which includes career and technical education (CTE). The First Morrill Act of 1862 (7 U.S.C. §301 et. seq.) supported the development of the current system of land-grant colleges to teach the agricultural and mechanical arts to the "industrial classes." Federal funding for vocational education was initiated with the passing of the Smith-Hughes Act in 1917.[3] In 1917, vocational education was termed "vital to national defense and prosperity."[4] The Manpower Development and Training Act of 1962 (MDTA; P.L. 87-415) was intended to prepare individuals for employment who could not reasonably be expected to secure full-time employment without training. MDTA was expected to address high unemployment by retraining individuals with obsolete skills to suit rapidly advancing technology.[5] The 1963 Vocational Education Act (P.L. 88-210) supported vocational education schools; vocational work-study programs; and research, training, and demonstration programs related to vocational education.

According to the Government Accountability Office (GAO), there were 34 federal programs in FY2009 that provided occupational or vocational training as a primary service.[6] These included

[1] Career and technical education is also referred to as career education, technical and vocational education (TVET), and technical education.

[2] K. Levesque, J. Laird, E. Hensley, S.P. Choy, E.F. Cataldi, and L. Hudson, *Career and Technical Education in the United States: 1990 to 2005* (NCES 2008-035), National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education, Washington, DC, 2008, p. B-2.

[3] The Smith-Hughes Act was repealed by the Balanced Budget Act of 1997 (P.L. 105-33).

[4] U.S. Congress, House of Representatives, *Annual Report of the Federal Board for Vocational Education*, 65th Cong., 2nd sess., Doc. No. 16 (Washington: GPO, 1917).

[5] U.S. Congress, Senate Committee on Agriculture and Forestry, Subcommittee on Rural Development, *Manpower Training and Employment Programs Serving Rural America*, committee print, prepared by Congressional Research Service, 65th Cong., 2nd sess., October 31, 1973 (Washington: GPO, 1973), p. 2.

[6] U.S. Government Accountability Office, *Multiple Employment and Training Programs: Providing Information on Colocating Services and Consolidating Administrative Structures Could Promote Efficiencies*, GAO-11-92, January 13, 2011, pp. 64-67.

- programs authorized by the Carl D. Perkins Career and Technical Education Improvement Act of 2006 (Perkins IV; P.L. 109-270) and administered by the Department of Education (ED);[7]
- the Trade Adjustment Assistance (TAA) program, administered by the Department of Labor (DOL);[8]
- Workforce Investment Act programs for Dislocated Workers and Youth Activities, administered by DOL;[9]
- Indian Employment Assistance programs, administered by the Department of the Interior (DOI); and
- Refugee and Entrant Assistance programs, administered by the Department of Health and Human Services (HHS).

As the unemployment rate remains higher than at the onset of the latest recession in December 2007, Congress has highlighted the need to more effectively support workforce development in order to reduce unemployment and the associated economic and social issues. This report provides a primer on CTE to support the workforce development discussion. The first section provides an overview of CTE including the methods used by practitioners to organize CTE according to the labor market's structure, the role of business and student organizations, and the intended outcomes of CTE. The subsequent sections describe the nature of CTE at the secondary, postsecondary, and adult education levels. The final section presents data on the financial benefits of some CTE credentials for students.

Overview of Career and Technical Education

CTE is offered by a variety of institutions: high schools, area CTE centers, community colleges, vocational schools, and employers through apprenticeships and on-the-job training. Generally, CTE occupations require two years or less of postsecondary education or training. Therefore, at the two-year and less-than-two-year postsecondary education levels, CTE encompasses most fields other than the liberal arts.[10] CTE integrates various aspects of knowledge from the liberal arts toward a practical or applied purpose. For example, CTE provides preparation in homemaking and a variety of occupations, such as nursing, business administration, culinary arts, automotive maintenance, software programming, engineering technology, and cosmetology.

The following subsections highlight key facets of CTE. The scope of CTE coursework is organized into career clusters and career pathways to facilitate educational program design and resourcing and to be consistent with the business and industry sectors. The required alignment of CTE with business and industry highlights the need for collaboration between business and

[7] For more information, see CRS Report R42863, *Carl D. Perkins Career and Technical Education Act of 2006: Background and Performance*, by (name redacted).

[8] For more information, see CRS Report R42012, *Trade Adjustment Assistance for Workers*, by (name redacted); and CRS Report R40863, *Trade Adjustment Assistance for Communities: The Law and Its Implementation*, by (name r edacted) and (name redacted).

[9] CRS Report RL33687, *The Workforce Investment Act (WIA): Program-by-Program Overview and Funding of Title I Training Programs*, by (name redacted).

[10] For the purposes of this report, "liberal arts" refers to general instructional programs and independent or individualized studies in the fine and performing arts, English, mathematics, biological and physical sciences, social and behavioral sciences, and humanities.

industry and educational providers. The goal of CTE is preparation for employment or family life, and a measure of success is the achievement of industry-recognized credentials. The final subsection describes career and technical student organizations, which serve as resources and advocates for CTE.

Career Clusters™ and Career Pathways[11]

Because of the breadth of subjects covered by CTE, practitioners have organized CTE into career clusters and career pathways to facilitate CTE program development and help students understand the related opportunities. Career clusters contain occupations that are in the same field of work and require similar skills. Thus, a broad curriculum framework for academic and technical instruction is developed around each career cluster to support the preparation of high school students for postsecondary education, employment in a career area, or both. The career clusters were developed by the U.S. Department of Education (ED) and various stakeholders. Their development was informed by state educational agencies (SEAs), secondary and postsecondary educational institutions, employers, industry groups, other stakeholders, and federal agencies.[12]

There are 16 career clusters. The **Appendix** demonstrates the scope and breadth of CTE, organized by career cluster. For example, the *agriculture, food, and natural resources* career cluster comprises the development of agricultural products, including plants, animals, food, textiles, and other consumer products. Because even a single career cluster covers several areas, they are further disaggregated into career pathways. Career pathways generally refer to a series of connected education and training strategies and support services that enable individuals to secure industry relevant certification and obtain employment within an occupational area and to advance to higher levels of future education and employment in that area. For example, the agriculture, food, and natural resources career cluster is divided into seven career pathways: food products and processing systems; power, structural, and technical systems; plant systems; natural resource systems; animal systems; environmental service systems; and agribusiness systems. The **Appendix** includes the related career pathways for each career cluster.

States use career clusters to inform education reform at the secondary and postsecondary levels and to enhance economic development. As of 2012, 94% of states and territories had either adopted career clusters or had adapted their own framework from the 16 career clusters.[13] Schools can focus on a limited number of career clusters in order to maximize resource efficiency. For example, schools and school districts use the career clusters and pathways to organize small learning communities and career academies. The requisite environment, context, resources, and equipment for a single cluster may be resource intensive. Since career clusters help convert labor market information into useable career information, career guidance and academic counseling programs use the career clusters to help students and parents understand and explore broad career

[11] The Career Clusters™ brand is a registered trademark of the National Career Technical Education Foundation—and is managed by the National Association of State Directors of Career Technical Education Consortium (NASDCTEc) on its behalf.

[12] Department of Education, "Career Clusters—Cooperative Agreements; Notice Inviting Applications for New Awards for Fiscal Year (FY) 2001; Notice," 65 *Federal Register* 76523-76543, December 6, 2000.

[13] National Association of State Directors of Career Technical Education (NASDCTEc), *A Look Inside: A Synopsis of CTE Trends: A Four-Part Series Analyzing State CTE Data and Initiatives: Focus: Career Clusters™ and Programs of Study*, September 2012, p. 2.

pathways within and among the career clusters. Students can choose a career cluster in which to explore or specialize while gaining valuable, related skills.

Federal agencies also use career clusters and pathways. The U.S. Department of Labor's (DOL's) Employment and Training Administration (ETA) categorizes occupations according to the career clusters in its O*NET database, which is the nation's primary source of occupational information. ED classifies instructional programs and courses of study according to the career clusters. In 2012, ED, DOL, and the Department of Health and Human Services (HHS) reiterated their joint commitment to promoting the use of career pathways "as a promising strategy to help adults acquire marketable skills and industry-recognized credentials through better alignment of education, training and employment, and human and social services among public agencies and with employers."[14]

Collaboration with Business and Industry

CTE providers often collaborate with industry and business to develop programs and to ensure curriculum relevance and employable graduates. For example, community colleges offer customized training to employees of a specific business based on the specific curriculum requirements of that business. Businesses lend employees to provide course instruction at educational institutions or lend equipment. Industry representatives may act as consultants or advisors in curriculum development and improvement. In addition, businesses may provide internships or other work-based learning (WBL) opportunities to CTE students.

Industry-Recognized Credentials

One result of collaboration with business and industry is the development of industry-recognized credentials (IRCs). IRCs establish a set of competencies, skills, and/or knowledge that is recognized as necessary or desired for a particular occupation by the relevant industry. "Within the context of education, workforce development, and employment and training for the labor market," DOL defines "the term credential [as] a verification of qualification or competence issued to an individual by a third party with the relevant authority or jurisdiction to issue such credentials (such as an accredited educational institution, an industry recognized association, or an occupational association or professional society)."[15] Some IRCs are required to work in an occupation, while others may increase income or employability in the occupation.

There are different types of IRCs and different requirements. IRCs include postsecondary degrees, postsecondary certificates, licenses, certifications, and Registered Apprenticeship certificates. The standards may be developed by an industry, industry association, state government, or product manufacturer. IRCs may variously require a certain amount of formal classroom instruction, hands-on experience, and/or a licensing or certification test. Some IRCs are recognized nationally, while others are recognized only regionally or locally. For example,

[14] Letter from Brenda Dann-Messier, Ed. D, Assistant Secretary, Office of Vocational and Adult Education, U.S. Department of Education, Jane Oates, Assistant Secretary, Employment and Training Administration, U.S. Department of Labor, and George Sheldon, Acting Assistant Secretary, Administration for Children and Families, U.S. Department of Health and Human Services, to states, April 4, 2012, http://www2.ed.gov/about/offices/list/ovae/ten-attachment.pdf.

[15] U.S. Department of Labor, Employment and Training Administration, *Increasing Credential, Degree, and Certificate Attainment by Participants of the Public Workforce System*, TEGL No. 15-10, Washington, DC, December 15, 2010, p. Attachment 2, http://wdr.doleta.gov/directives/attach/TEGL15-10.pdf.

Maryland licenses and regulates individuals who practice cosmetology in the state by requiring individuals to pass an exam and prove a number of hours of training or hours of apprenticeship. Another example is the nonprofit National Institute for Automotive Service Excellence (ASE), which certifies automotive repair personnel who pass an exam and prove a certain amount of experience.

Career and Technical Student Organizations (CTSOs)

CTSOs are an important aspect of CTE. These nonprofit organizations often provide co-curricular programs to give students practical experience, instruction, and opportunities to network with industry and business leaders. The organizations are generally organized by national officers through state and local chapters. Local chapters are often advised by the appropriate local CTE teacher.

In 1950, Congress chartered one of these CTSOs, the Future Farmers of America (now known as the FFA).[16] The charter recognized that the FFA was invaluable for its work in "helping train farm boys to become successful farmers, rural leaders, and good citizens."[17] The act installed the Chief of the Agricultural Education Service, Office of Education, Federal Security Agency (later known as the Secretary of Education and hereinafter referred to as the Secretary) as the national advisor to the national student officers and chairman of the board of directors. On request of the board of directors, the Secretary may make personnel, services, and facilities of ED available to administer, promote, or assist in the administration of the activities of the FFA.[18]

CTE at the Secondary Level

CTE at the secondary level prepares students for roles outside the paid labor market, teaches general employment skills such as word processing and introductory technology skills, and teaches skills required in specific occupations or occupational clusters. CTE is seldom offered at the elementary school level. ED's definition of CTE at the secondary level contrasts it from academic education and enrichment programs.[19] Academic education refers to English, mathematics, science, social studies, fine arts, and foreign languages. Enrichment programs refer to general skills; health, physical, and recreational education; religion and theology; and military science. At the secondary school level, schools often offer occupational and non-occupational CTE. Non-occupational CTE includes family and consumer sciences education and general labor market preparation. Family and consumer sciences education prepares students for roles outside the paid labor market, while general labor market preparation teaches general employment skills such as word processing and introductory technology skills. Occupational education prepares individuals for specific fields. Occupational CTE at the secondary level may prepare an individual for immediate labor market entry or, depending on the field of interest, additional

[16] P.L. 81-740.

[17] U.S. Congress, House of Representatives, *Incorporating the Future Farmers of America, and for Other Purposes*, report to accompany S. 2868, 81st Cong., 2nd sess., August 10, 1950, H.Rept. 81-2852, p. 2.

[18] 36 U.S.C. §70901 et seq.

[19] K. Levesque, J. Laird, E. Hensley, S.P. Choy, E.F. Cataldi, and L. Hudson, *Career and Technical Education in the United States: 1990 to 2005* (NCES 2008-035), National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education, Washington, DC, 2008, p. 4.

postsecondary education may be required before the individual is prepared to enter the labor market.

Secondary CTE providers include

- public and private comprehensive high schools,[20] including Bureau of Indian Education (BIE) schools;
- career academies that are within comprehensive high schools and that organize a multi-year academic and CTE curriculum around a particular career theme;
- area CTE schools, which are specialized schools or departments of secondary or postsecondary schools, used exclusively or principally for the provision of CTE;
- CTE-specific schools that teach core academics in the context of specific career pathways;
- detention centers and correctional facilities; and
- cooperative programs with technical or community colleges.

National statistics on CTE course offerings, course-taking, and student outcomes have been most recently published by ED based on several surveys conducted prior to 2010. CRS is not aware of publications based on more recent data collections.

The statistics indicate that CTE is offered by the overwhelming majority (83%) of public high schools but offered by fewer (29%) private high schools.[21] Some of the CTE courses offered by public and private schools are actually located offsite at area CTE schools, postsecondary education institutions, and other locations. The most common CTE courses offered in public high schools offering CTE were in business (97%) and computer technology (95%).[22]

Beyond the general offering of CTE in most public schools, two primary approaches are used by public schools to offer a more focused approach to CTE. Area CTE schools and CTE-specific schools, which comprise 3.7% of public high schools, are designed primarily to serve students training for occupations.[23] In addition, approximately one-quarter (27%) of public comprehensive high schools are organized into career academies.[24]

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[20] The comprehensive high school is the most common type of high school. They generally focus on academics but maintain a flexible and diverse curriculum to accommodate the needs and interests of most students.

[21] 2008 public school data from U.S. Department of Education, *Public Career and Technical Education High Schools, Principals, and Teachers in 2008*, NCES 2012-250, June 2012, p. Table 6, http://nces.ed.gov/pubs2012/2012250.pdf; and 2002 private school data from K. Levesque, J. Laird, E. Hensley, S.P. Choy, E.F. Cataldi, and L. Hudson, *Career and Technical Education in the United States: 1990 to 2005* (NCES 2008-035), National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education, Washington, DC, 2008, pp. 8-17.

[22] The public school data were based on a 2002 survey reported in K. Levesque, J. Laird, E. Hensley, S.P. Choy, E.F. Cataldi, and L. Hudson, *Career and Technical Education in the United States: 1990 to 2005* (NCES 2008-035), National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education, Washington, DC, 2008, pp. 8-17.

[23] The public school data were based on a 2007-2008 survey reported in U.S. Department of Education, *Public Career and Technical Education High Schools, Principals, and Teachers in 2008*, NCES 2012-250, June 2012, http://nces.ed.gov/pubs2012/2012250.pdf.

[24] Ibid.

CTE may be offered as a single course or as part of a career pathway. Nearly all public high school graduates (88%) earned at least one CTE credit in 2009, and 19% were CTE concentrators, earning at least three CTE credits in a single occupational area.[25] ED's National Center for Education Statistics (NCES) organizes occupational CTE into 11 (or 20 disaggregated) occupational areas. While 66% of public high school graduates were white in 2005,[26] a larger percentage (71%) of public high school graduates who were CTE concentrators were white.[27] A higher proportion of male high school graduates completed a CTE concentration (25%) than female high school graduates (17%).[28] Also in 2005, a higher proportion of high school graduates with disabilities completed a CTE concentration (26%) than high school graduates without disabilities (21%).[29] A lower proportion of high school graduates who were English language learners completed a CTE concentration (12%) than high school graduates who were not English language learners (21%) in 2005.[30]

The high proportion of high school students taking at least one CTE credit highlights the dual and often conflicting purpose of CTE at the high school level—occupational preparation or student engagement. Many stakeholders contend that the hands-on, relevant, or practical CTE courses increase student engagement, which may help to reduce dropout rates. Although "recent studies of vocational course taking provide mixed results, … the more rigorous analyses do not support the compelling anecdotal evidence" of a link between CTE and higher student engagement.[31] In some cases, students may take a CTE course with no intention of pursuing a career in that area. For example, a student may take a class on computer programming because the class is of interest to the student, not because the student is considering becoming a computer programmer or even completing a career pathway in this area. In some cases, a school may offer courses in computer programming in an effort to broaden the students' education and provide early exposure to several career options to help students make informed decisions about their futures, not as part of a career pathway. On the other hand, some students may expect practical occupational preparation. Some schools are designed to ensure students are prepared to enter the workforce immediately with an industry-recognized credential after completion of a career pathway in high school or after one to two additional years of postsecondary education or training. Thus, the strategy for offering CTE

[25] Occupational CTE is organized into 11 (or 20 disaggregated) occupational areas. U.S. Department of Education, National Center for Education Statistics, "Career/Technical Education (CTE) Statistics, Table H123. Percentage of public high school graduates who earned any credits and various minimum numbers of credits, by career/technical education (CTE) area: 2009," downloaded from http://nces.ed.gov/surveys/ctes/tables/h123.asp on February 16, 2012; and Table H124, "Percentage of public high school graduates who earned at least 2.0 credits or at least 3.0 credits in the occupational area, by career/technical education (CTE) occupational area: 2009," downloaded from http://nces.ed.gov/surveys/ctes/tables/h124.asp on April 20, 2012.

[26] T.D. Snyder, S.A. Dillow, and C.M. Hoffman, *Digest of Education Statistics 2007*, National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education, NCES 2008-022, Washington, DC, 2008, p. 166.

[27] K. Levesque, J. Laird, E. Hensley, S.P. Choy, E.F. Cataldi, and L. Hudson, *Career and Technical Education in the United States: 1990 to 2005* (NCES 2008-035), National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education, Washington, DC, 2008, pp. 30-41.

[28] Ibid.

[29] Ibid.

[30] Ibid.

[31] U.S. Department of Education, Office of the Under Secretary, Policy and Program Studies Service, *National Assessment of Vocational Education: Final Report to Congress*, Washington, DC, 2004, pp. 102-103; and Stephen Plank, Stefanie DeLuca, and Angela Estacion, *Dropping Out of High School and the Place of Career and Technical Education: A Survival Analysis of Surviving High School*, National Research Center for Career and Technical Education, October 2005.

as a means to increase student engagement through a variety of unrelated CTE courses may conflict with the strategy to prepare students for immediate career entry following a coherent progression of courses in a single career pathway.

ED published statistics on the labor market participation and postsecondary education enrollment of 2004 public high school graduates (all graduates) and 2004 public high school graduates who were three-credit CTE occupational concentrators (CTE graduates) within two years of high school graduation. A statistically significant[32] lower percentage of CTE graduates (70%) enrolled in postsecondary education than all graduates (79%). On the other hand, a statistically significant higher percentage of CTE graduates (29%) worked for pay but did not enroll in postsecondary education within two years compared to all graduates (20%). Of the CTE graduates, 22% were in a postsecondary major or occupation related to their high school CTE concentration. Of the CTE graduates working for pay but not enrolled in postsecondary education, 30% were in an occupation related to their high school CTE concentration. There was no significant difference in average wages between all graduates working for pay but not enrolled in postsecondary education and CTE graduates working for pay but not enrolled in postsecondary education. Of CTE graduates enrolled in postsecondary education, a higher percentage (3%) majored in agriculture, natural resources, and conservation compared to all graduates (1%), and a lower percentage (16%) majored in non-CTE-related fields compared to all graduates (23%).[33]

College- and Career-Ready Standards and CTE Standards

Recent standards-based reform efforts in elementary and secondary education have incorporated CTE to varying degrees. Two of the key features of standards-based reform have been

- the development of curricular content standards based on ambitious educational goals and expectations that apply to all children, and
- the development of student performance standards aligned with the content standards and measured by assessments also aligned with the standards.

Curricular content standards are designed to define what a student should know and be able to do, contain coherent and rigorous content, and encourage the teaching of advanced skills. Student performance standards express expected achievement levels that describe how well students are mastering the material in the content standards and the competencies associated with each achievement level. Typically, such standards-based reform involves the establishment of explicit and "challenging" goals for state school systems, and alignment of curricula, assessment methods, pupil performance standards, teacher professional development, instructional materials, and other school system policies in support of the goals. Specifically, states develop content and performance standards, develop state assessments, align curricula and assessments with state content and performance standards, and provide teachers with information about the state standards.

As of 2013, CTE curriculum standards have been developed by 46 states and three territories at the secondary level and 13 states and two territories at the postsecondary level. The standards are

[32] Assuming a 95% confidence interval.

[33] U.S. Department of Education, *Postsecondary and Labor Force Transitions Among Public High School Career and Technical Education Participants*, NCES 2011-234, January 2011, http://nces.ed.gov/pubs2011/2011234.pdf.

based on input from educators and business. Most of the standards include course-level standards that are related to particular occupations or job preparation. Standards alignment between secondary and postsecondary CTE standards was accomplished by only two states and one territory.[34]

In the mid-2000s, there was a considerable grassroots effort to realign high school curricula to ensure that graduates are ready to enter the workforce and attend college. In June 2009, the National Governor's Association (NGA), the Council of Chief State School Officers (CSSO), and 49 states and territories began an initiative to develop common standards for language arts and mathematics in grades K-12 that build toward college- and career-readiness. The experts serving on the Common Core State Standards Development Work Group, Feedback Group, and Validation Committee were educational stakeholders, representing Kindergarten through college. Business and industry stakeholders were not formally involved. A group of businesses has, however, supported adoption of the common core standards and indicated that they meet their expectations.[35] The standards do not define career-ready. As of 2014, 45 states, the District of Columbia, three territories, and the Department of Defense have adopted the college- and career-ready standards.[36] However, implementation has become contentious in some states.[37]

In June 2012, the National Association of State Directors of Career Technical Education Consortium/ National Career Technical Education Foundation published the Common Career Technical Core (CCTC), which is based on career ready practices. The CCTC was developed by a state-led initiative, with 42 states, the District of Columbia, Palau, business and industry representatives, educators, and other stakeholders. The CCTC provides standards for each of the 16 career clusters and their career pathways.

CTE in Postsecondary Education

CTE at the postsecondary level is subbaccalaureate postsecondary programs designed to impart relevant knowledge and skills that relate to the requirements of specific occupations or careers. ED's definition of CTE at the postsecondary level contrasts it from the liberal arts (academic education), which imparts the knowledge and skills representing the accumulated knowledge base in a subject area.[38] The liberal arts refer to general instructional programs and independent or individualized studies in the fine and performing arts, English, mathematics, biological and physical sciences, social and behavioral sciences, and humanities.[39] Students pursuing two-year or less-than-two-year credentials, certificates, or degrees in non-liberal arts programs are generally termed CTE students. CTE students may pursue an associate's degree; an industry

[34] National Association of State Directors of Career Technical Education Consortium., *The State of Career Technical Education: An Analysis of State CTE Standards*, 2013.

[35] Letter from several businesses, http://www.corestandards.org/about-the-standards/statements-of-support.

[36] For more information, see http://www.corestandards.org/.

[37] Andrew Ujifusa, "State Lawmakers Face Tough Choices on Common Core," *Education Week*, vol. 13, no. 15 (January 8, 2014).

[38] K. Levesque, J. Laird, E. Hensley, S.P. Choy, E.F. Cataldi, and L. Hudson, *Career and Technical Education in the United States: 1990 to 2005* (NCES 2008-035), National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education, Washington, DC, 2008, p. B-2.

[39] U.S. Department of Education, National Center for Education Statistics, "Career/Technical Education Statistics, Postsecondary Taxonomy," http://nces.ed.gov/surveys/ctes/tables/postsec_tax.asp.

recognized certificate or other certificate; noncredit courses to improve knowledge and skills or signal knowledge to employers; noncredit training customized for a particular employer; or continuing education credits to maintain licensure or certification.

Postsecondary CTE providers include

- vocational schools;
- technical colleges (public and private less-than-two-year colleges);
- community colleges (public two-year colleges) and private two-year colleges;
- public and private four-year universities;
- employers, labor organizations, and industry groups through preapprenticeships, apprenticeships, and other training programs;
- regional training centers (RTCs) that are public or nonprofit centers coordinating workforce development, education, and training;
- adult workforce education centers, which provide customizable, labor market-driven, postsecondary workforce education and training services; and
- detention centers and correctional facilities.

Some CTE programs are terminal, while others may be used as a stepping stone to obtain a more advanced credential (stackable). While a terminal CTE program is designed to lead directly to employment, many of the courses are not transferable for credit toward a more advanced credential.[40] For instance, there are few courses within an associate's degree in court reporting that transfer toward a bachelor's degree. DOL defines a *stackable credential* as "part of a sequence of credentials that can be accumulated over time to build up an individual's qualifications and help them to move along a career pathway or up a career ladder to different and potentially higher-paying jobs."[41] For example, an associate's degree in respiratory therapy can lead to employment as a respiratory therapist or be transferred toward a bachelor's degree in respiratory therapy.

The ability or inability to transfer CTE credits toward a bachelor's degree highlights the dual and often conflicting purpose of CTE at the postsecondary education level. The goal of CTE is occupational preparation; however, this raises some concerns from CTE critics that preparation for lower wage or no growth occupations may not be a long-term benefit to the CTE student's long-term economic mobility. Proponents of CTE as occupational preparation highlight the high wages and growth of some CTE occupations that exceed the wages of some bachelor's degree recipients. Proponents of CTE as occupational preparation also note that not everyone wants to or has the capacity to pursue a bachelor's degree. The difficulty in structuring every postsecondary CTE program to include the first one to two years of general bachelor's degree requirements is

[40] The ability to transfer courses is determined by the school based on curricula. Unless one school specifically states that certain courses from certain schools are transferrable within specified limits, there is no guarantee that a course can actually be transferred to another program.

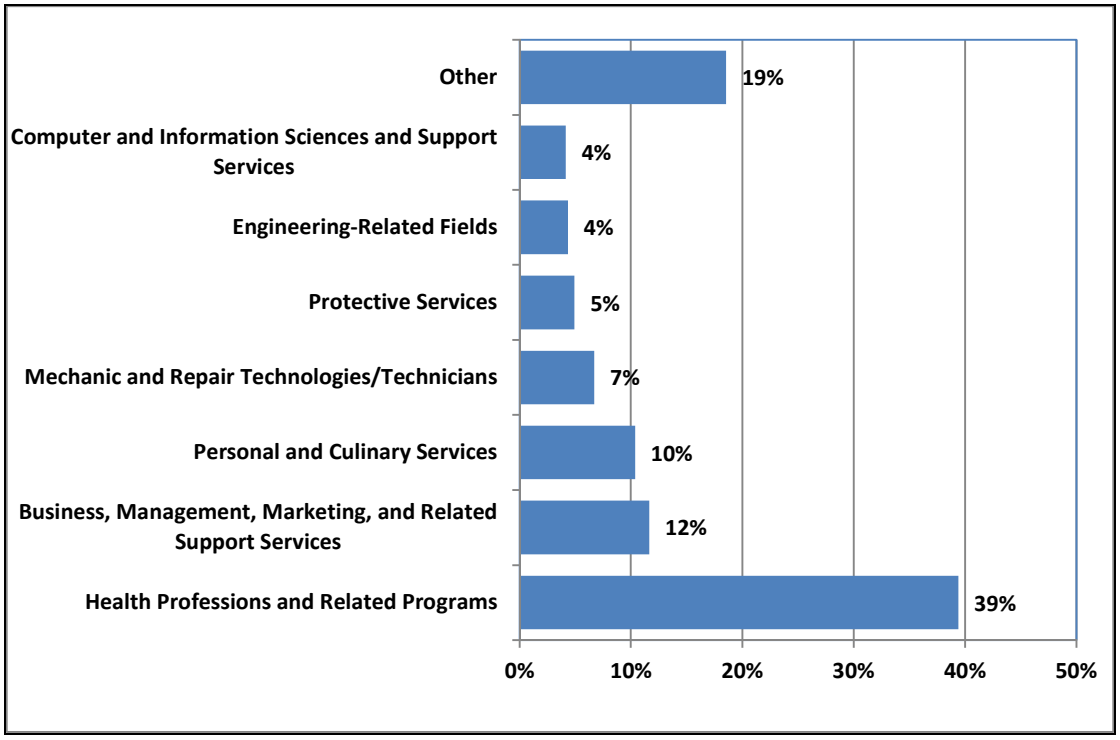
[41] Jane Oates, Assistant Secretary, *Training and Employment Guidance Letter No. 15-10*, U.S. Department of Labor, Employment and Training Administration, Advisory System, TEGL 15-10, Washington, DC, December 15, 2010, http://wdr.doleta.gov/directives/attach/TEGL15-10.pdf.

that the CTE program will likely require more time to accomplish and may be of less interest to the CTE student.

Figure 1 presents the subject areas in which academic year (AY) 2011-2012 CTE graduates received associate's degrees or subbaccalaureate certificates from institutions of higher education that participate in federal student financial aid programs.[42] The figure does not include subbaccalaureate certificates earned at other educational institutions or training establishments. The largest proportion (39%) of graduates completed programs in the health professions and related fields, followed by 12% of graduates in business management and marketing.

Figure 1. Percentage of Associate's Degrees and Subbaccalaureate Certificates by Classification of Instructional Programs (CIP)

July 1, 2011, to June 30, 2012



Source: Figure prepared by CRS based on data downloaded from the U.S. Department of Education's Integrated Postsecondary Education Data System (IPEDS) on institutions in the 50 states, the District of Columbia, and Puerto Rico that participate in the federal student aid programs authorized by Title IV of the Higher Education Act (HEA), as amended.

Notes: The following CIP codes that represent the liberal arts (non-CTE) were excluded from the analysis: Liberal Arts and Sciences—General Studies and Humanities; Social Sciences; English Language and Literature/Letters; Theology and Religious Vocations; History; Area, Ethnic, Cultural, Gender, and Group

[42] The federal student financial aid programs are authorized by Title IV of the Higher Education Act (HEA), as amended, and include such programs as federal Pell Grants and Stafford loans. For more information, see CRS Report R42446, *Federal Pell Grant Program of the Higher Education Act: How the Program Works, Recent Legislative Changes, and Current Issues*, by (name redacted); CRS Report R40122, *Federal Student Loans Made Under the Federal Family Education Loan Program and the William D. Ford Federal Direct Loan Program: Terms and Conditions for Borrowers*, by (name redacted); and CRS Report RL31618, *Campus-Based Student Financial Aid Programs Under the Higher Education Act*, by (name redacted) and (name redacted).

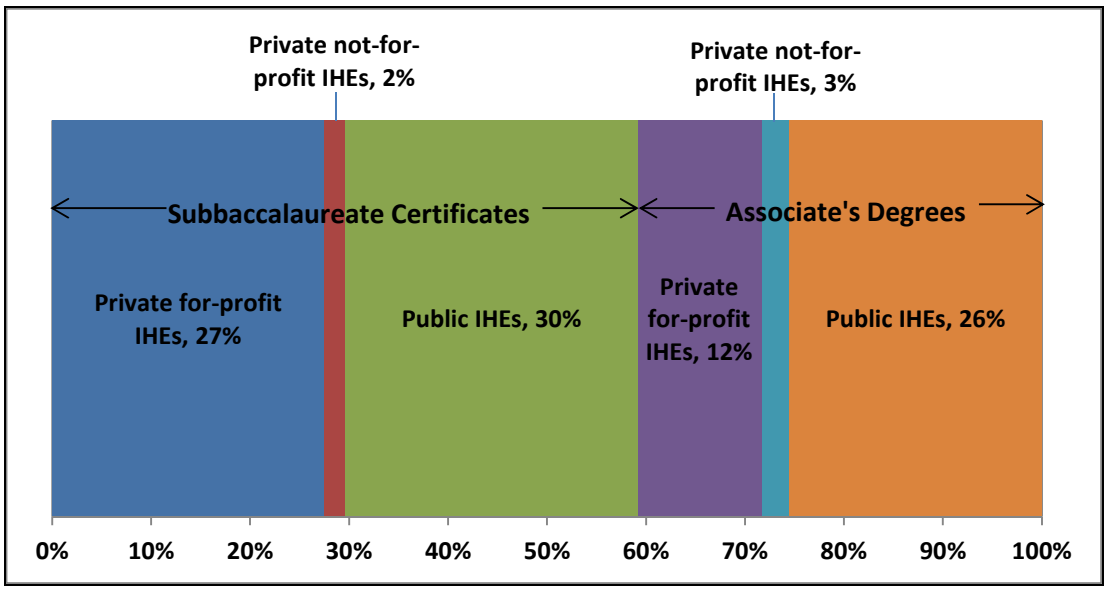
Studies; Foreign Languages, Literatures, and Linguistics; and Philosophy and Religious Studies. The data do not reflect completions at institutions that are not Title IV-participating.

Figure 2 provides a pictorial representation of the types of institutions of higher education (IHEs) at which individuals completed CTE programs in AY2011-2012. Individuals who completed programs through vocational schools, apprenticeships, RTCs, workforce education centers, correctional facilities, and other postsecondary institutions are not reflected in the figure. The vast majority (95%) of CTE associate's degrees and subbaccalaureate certificates are awarded by public and private for-profit IHEs. Only 5% are awarded by private not-for-profit IHEs. The proportional contribution of public and private for-profit IHEs to the number of CTE completions differs at the subbaccalaureate certificate level and associate's degree level:

- At the subbaccalaureate certificate level, public and private for-profit IHEs contributed almost equally to the total CTE program completions; and
- Public IHEs awarded more than twice as many CTE associate's degrees as private for-profit IHEs.

Figure 2. Percentage of CTE Program Completions by Associate's Degrees and Subbaccalaureate Certificates and by Institutional Control

July 1, 2011, to June 30, 2012



Source: Figure prepared by CRS based on data downloaded from the U.S. Department of Education's Integrated Postsecondary Education Data System (IPEDS) on institutions in the 50 states, the District of Columbia, and Puerto Rico that participate in the federal student aid programs authorized by Title IV of the Higher Education Act (HEA), as amended.

Notes: The following CIP codes that represent the liberal arts (non-CTE) were excluded from the analysis: Liberal Arts and Sciences—General Studies and Humanities; Social Sciences; English Language and Literature/Letters; Theology and Religious Vocations; History; Area, Ethnic, Cultural, Gender, and Group Studies; Foreign Languages, Literatures, and Linguistics; and Philosophy and Religious Studies. The data do not reflect completions at institutions that are not Title IV-participating. Details may not add to 100% due to rounding.

CTE in Adult Education

CTE for adults is work-related course-taking that adults participate in to acquire, maintain, and upgrade their workforce skills. CTE for adults may consist of formal postsecondary CTE as described above that does not lead to a credential, or it may incorporate adult basic education (ABE). In addition, older adults may engage in nonformal CTE to acquire, maintain, or upgrade workforce skills. Nonformal education occurs outside traditional educational institutions, sometimes through community organizations. Adult CTE providers include

- elementary schools,
- secondary schools,
- postsecondary schools,
- employers,
- professional associations,
- detention centers and correctional facilities, and
- community and government organizations.

In 2005, ED conducted the most recent national survey of recent work-related course-taking by adults aged 16 and over.[43] Overall, 27% of adults participated in work-related course-taking, and 18% of adults who worked in the past 12 months in trades and labor occupations participated in work-related learning. The rates at which adults engaged in work-related course-taking increased with age, labor market engagement, and education.

Earnings Outcomes of CTE Credentials

A recent effort to gather data on potential earnings benefits that may be associated with alternative credentials (such as educational certificates or professional certification and licenses) suggests that for individuals at subbaccalaureate levels such credentials are associated with an earnings premium in most cases. For example, for those individuals who do not have a postsecondary degree, there is a significant wage premium associated with having an alternative education credential compared to no credential. Starting in 2012, the U.S. Census Bureau (Census) began collecting data on alternative education credentials such as licenses, certifications, and educational certificates held by individuals over the age of 17. Over 90% of the alternative credentials were obtained following coursework, training, or training from an instructor. For individuals at the prebaccalaureate level, many of the alternative credentials are in CTE fields. According to Census, alternative credentials are associated with a statistically significant wage premium for populations with no postsecondary degree when compared to others with comparable levels of formal education (**Table 1**).[44]

[43] K. Levesque, J. Laird, E. Hensley, S.P. Choy, E.F. Cataldi, and L. Hudson, *Career and Technical Education in the United States: 1990 to 2005* (NCES 2008-035), National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education, Washington, DC, 2008, p. 194.

[44] Stephanie Ewert and Robert Kominski, *Measuring Alternative Educational Credentials: 2012*, U.S. Department of Commerce, Economics and Statistics Administration, U.S. Census Bureau, P70-138, January 2014.

As an example, for individuals who completed high school but did not enroll in college, the median monthly earnings were $2,500 if the individual did not have an alternative credential; whereas, the median monthly earnings were $3,053 if the individual had a professional certification or license and $2,917 if the individual had an educational certificate. For those with associate's degrees, a professional certification or license is associated with significantly higher earnings; whereas, an educational certificate is not. Individuals with an associate's degree but no educational certificate or professional certification or license have median monthly earnings of $3,240; individuals with an associate's degree and educational certificate have median monthly earnings of $3,200; and individuals with an associate's degree and professional certification or license have median monthly earnings of $3,810. The overall data, however, mask considerable differences in earnings between the various CTE fields.[45]

Table 1. Median Monthly Earnings for Individuals by Prebaccalaureate Education Level and by Alternative Credential: 2012

Education Level	No Alternative Credential	Professional Certification, License Only	Educational Certificate Only
Less than high school	1,920	2,419[a]	3,291[a]
High school completion	2,500	3,053[a]	2,917[a]
Some college, no degree	2,947	3,333[a]	3,333[a]
Associate's degree	3,240	3,810[a]	3,200

Source: Stephanie Ewert and Robert Kominski, *Measuring Alternative Educational Credentials: 2012*, U.S. Department of Commerce, Economics and Statistics Administration, U.S. Census Bureau, P70-138, January 2014, Table 5.

Notes: Earners are among the population aged 18 and older who have been employed full-time with positive earnings for the four months before the survey.

a. The earnings for individuals with an alternative credential are significantly different from those of individuals with no alternative credential at the 0.10 level.

Since 1984, Census has published earnings differences among adults by field of training and by educational credential: vocational certificates, associate's degrees, and advanced degrees. According to the Census survey definition, vocational certificates are diplomas or certificates from vocational, technical, trade, or business schools that may be earned by individuals who have not completed high school and by individuals who have completed some college. Earnings vary substantially among CTE fields (**Table 2**). Vocational certificates and associate's degrees in more technical CTE fields like computer and information services are associated with substantially higher earnings than vocational certificates and associate's degrees in less technical fields like business. As an example, in 2009, for individuals with a vocational certificate in engineering-related fields, the median monthly earnings were $3,833; whereas, the median monthly earnings were $2,800 for individuals with a vocational certificate in business/office management fields. The same pattern holds for those with associate's degrees.[46]

[45] Ibid.

[46] Stephanie Ewert, *What It's Worth: Field of Training and Economic Status in 2009*, U.S. Department of Commerce, Economics and Statistics Administration, U.S. Census Bureau, P70-129, February 2012; and Kurt J. Bauman and Camille L. Ryan, *What's It Worth? Field of Training and Economic Status*, U.S. Department of Commerce, Economics and Statistics Administration, U.S. Census Bureau, P70-72, April 2001.

Table 2. Median Monthly Earnings for Individuals with a Vocational Certificate or Associate's Degree as Their Highest Educational Credential and by Selected CTE Fields of Study: 2009

Field of Training	Median Monthly Earnings ($)	
	Vocational Certificate	Associate's Degree
Engineering	3,833	4,257
Computers	3,110	4,000
Vocational studies	3,031	3,456
Business	2,800	3,200
Education	NR[a]	2,667

Source: Stephanie Ewert, *What It's Worth: Field of Training and Economic Status in 2009*, U.S. Department of Commerce, Economics and Statistics Administration, U.S. Census Bureau, P70-129, February 2012, Table 6.

Notes: Earners are among the population aged 18 and older who have been employed full-time with earnings for the four months before the survey.

a. NR is not reported because there were not enough cases to provide a statistically reliable estimate.

Appendix. Career Clusters and Career Pathways

Table A-1. Career Clusters and Career Pathways

Career Cluster	Description	Career Pathways
Agriculture, Food & Natural Resources	The production, processing, marketing, distribution, financing, and development of agricultural commodities and resources including food, fiber, wood products, natural resources, horticulture, and other plant and animal products/resources.	Food Products and Processing Systems Plant Systems Animal Systems Power, Structural & Technical Systems Natural Resources Systems Environmental Service Systems Agribusiness Systems
Architecture & Construction	Careers in designing, planning, managing, building, and maintaining the built environment.	Design/Pre-construction Construction Maintenance/Operations
Arts, Audio/Video Technology & Communications	Designing, producing, exhibiting, performing, writing, and publishing multimedia content including visual and performing arts and design, journalism, and entertainment services.	Audio and Video Technology and Film Printing Technology Visual Arts Performing Arts Journalism and Broadcasting Telecommunications
Business Management & Administration	Careers in planning, organizing, directing, and evaluating business functions essential to efficient and productive business operations.	General Management Business Information Management Human Resources Management Operations Management Administrative Support
Education & Training	Planning, managing and providing education and training services, and related learning support services.	Administration and Administrative Support Professional Support Services Teaching/Training

Career Cluster	Description	Career Pathways
Finance	Planning, services for financial and investment planning, banking, insurance, and business financial management.	Securities & Investments Business Finance Accounting Insurance Banking Services
Government & Public Administration	Planning and performing government functions at the local, state, and federal levels, including governance, national security, foreign service, planning, revenue and taxation, and regulations.	Governance National Security Foreign Service Planning Revenue and Taxation Regulation Public Management and Administration
Health Science	Planning, managing, and providing therapeutic services, diagnostic services, health informatics, support services, and biotechnology research and development.	Therapeutic Services Diagnostic Services Health Informatics Support Services Biotechnology Research and Development
Hospitality & Tourism	Preparing individuals for employment in career pathways that relate to families and human needs such as restaurant and food/beverage services, lodging, travel and tourism, recreation, and amusement and attractions.	Restaurants and Food/Beverage Services Lodging Travel & Tourism Recreation, Amusements & Attractions
Human Services	Preparing individuals for employment in career pathways that relate to families and human needs such as counseling and mental health services, family and community services, personal care, and consumer services.	Early Childhood Development & Services Counseling & Mental Health Services Family & Community Services Personal Care Services Consumer Services
Information Technology	Building linkages in IT occupations for entry level, technical, and professional careers related to the design, development, support and management of hardware, software, multimedia, and systems integration services.	Network Systems Information Support and Services Web and Digital Communications Programming and Software Development

Career Cluster	Description	Career Pathways
Law, Public Safety, Corrections & Security	Planning, managing, and providing legal, public safety, protective services and homeland security, including professional and technical support services.	Correction Services Emergency and Fire Management Services Security & Protective Services Law Enforcement Services Legal Services
Manufacturing	Planning, managing, and performing the processing of materials into intermediate or final products and related professional and technical support activities such as production planning and control, maintenance and manufacturing/process engineering.	Production Manufacturing Production Process Development Maintenance, Installation & Repair Quality Assurance Logistics & Inventory Control Health, Safety, and Environmental Assurance
Marketing	Planning, managing, and performing marketing activities to reach organizational objectives.	Marketing Management Professional Sales Merchandising Marketing Communications Marketing Research
Science, Technology, Engineering & Mathematics	Planning, managing, and providing scientific research and professional and technical services (e.g., physical science, social science, engineering) including laboratory and testing services, and research and development services.	Engineering and Technology Science and Math
Transportation, Distribution & Logistics	Planning, management, and movement of people, materials, and goods by road, pipeline, air, rail, and water and related professional and technical support services such as transportation infrastructure planning and management, logistics services, mobile equipment and facility maintenance.	Transportation Operations Logistics Planning and Management Services Warehousing and Distribution Center Operations Facility and Mobile Equipment Maintenance Transportation Systems/Infrastructure Planning, Management, and Regulation Health, Safety, and Environmental Management Sales and Service

Source: National Association of State Directors of Career Technical Education Consortium, Career Clusters & Pathways, downloaded from http://www.careertech.org/career-clusters/clusters-occupations.html on February 15, 2012.

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