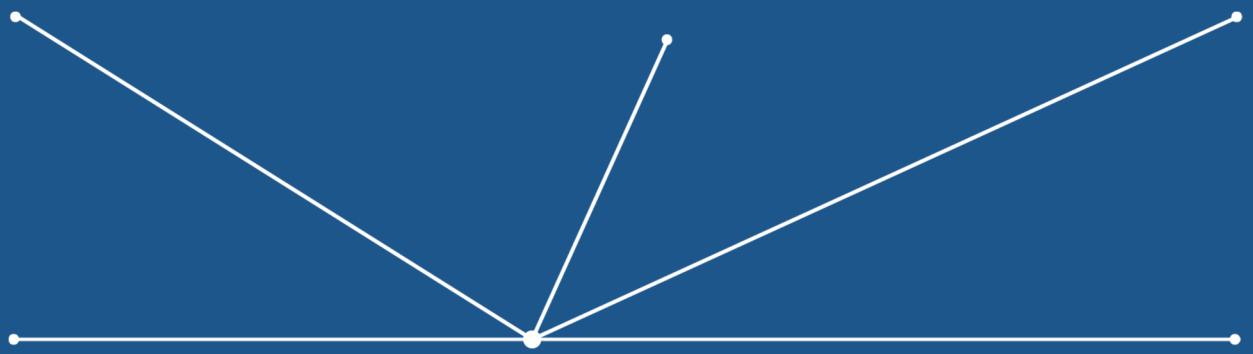
ANNUAL REPORT TO CONGRESS ON THE NATIONAL CENTER FOR INNOVATION IN CAREER AND TECHNICAL EDUCATION FOR CONTRACT PERFORMANCE AWARD YEARS 2014–15 AND 2015–16

June 2017



NCiCTE
National Center for Innovation in Career and Technical Education

Annual Report to Congress on the National Center for Innovation in Career and Technical Education for Contract Performance Award Years 2014–15 and 2015–16

Prepared for the
U.S. Department of Education
Office of Career, Technical, and Adult Education

NATIONAL CENTER FOR INNOVATION IN CAREER AND TECHNICAL EDUCATION

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This report of the National Center for Innovation in Career and Technical Education is submitted to:

U.S. Department of Education
Betsy DeVos
Secretary

Office of Career, Technical, and Adult Education
Kim R. Ford
Principal Deputy Assistant Secretary (delegated the authority to perform the functions and duties of the position of Assistant Secretary)

Relevant Committees of the U. S. Congress

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Eligible Agencies

June 2017

This report is available on the National Center for Innovation in Career and Technical Education's website at: http://ctecenter.ed.gov/index.php/page/our-research.

This report is required by Sec. 114(d)(4)(B) of *Carl D. Perkins Career and Technical Education Act of 2006*.

CONTENTS

ABBREVIATIONS

AY	academic year
CBA	community benefit agreement
CBC	community benefits coalition
CIP	Classification of Instructional Program
CSU	California State University
CTE	career and technical education
Department	U.S. Department of Education
DOL	U.S. Department of Labor
ELS:2002	Education Longitudinal Study of 2002
GPA	grade point average
HUCAP	human capital performance bonds
IHE	institution of higher education
K–12	kindergarten to grade 12
LEA	local educational agency
LLCP	Linked Learning certified pathway
LLDI	Linked Learning District Initiative
NACTE	National Assessment of Career and Technical Education
NASDCTEc	National Association of State Directors of Career Technical Education Consortium
NCICTE	National Center for Innovation in Career and Technical Education
NELS:88	National Education Longitudinal Study of 1988
OA	Office of Apprenticeship (U.S. Department of Labor)
OCTAE	Office of Career, Technical, and Adult Education

OJT	on-the-job training
PBF	performance-based funding
Perkins IV	*Carl D. Perkins Career and Technical Education Act of 2006*
PFS	pay-for-success
PPP	public-private partnership
PY	program year
RA	registered apprenticeship
SAA	state apprenticeship agency
SES	socioeconomic status
SIB	social impact bond
SIF	social innovation financing
UC	University of California
WBL	work-based learning

EXECUTIVE SUMMARY

The National Center for Innovation in Career and Technical Education (NCICTE) was established by the U.S. Department of Education to carry out research and evaluation activities related to career and technical education (CTE). NCICTE (1) performs scientifically based research and evaluation; (2) disseminates information; and (3) conducts training to expand the understanding, increase the effectiveness, and improve the implementation of CTE.

One of the requirements of the legislation authorizing the national research center, contained within the *Carl D. Perkins Career and Technical Education Act of 2006* (P.L. 109-270) (*Perkins IV*), is that the center "shall annually prepare a report of the key research findings of such center and shall submit copies of the report to the Secretary, the relevant committees of Congress, the Library of Congress, and each eligible agency" (Sec. 114(d)(4)(B) of *Perkins IV*). This Annual Report to Congress describes findings from studies completed and published by NCICTE as of December 31, 2016.

Based at RTI International in Research Triangle Park, North Carolina, NCICTE also includes the following subcontractors: Georgetown University Center on Education and the Workforce, ConnectEd: The California Center for College and Career, FHI 360, Laurium Evaluation Group, Workforce Enterprise Systems, Mercury Labs, and Windwalker Corporation. NCICTE has completed and published 10 studies (each of which is described in a chapter of this Report to Congress) on a variety of topics attracting attention in the field, including

- **Noncredit education.** Individuals can enroll in college-level coursework and/or earn industry-recognized credentials or certifications that do not result in the award of college credit but may confer labor market advantages on program completers. NCICTE researchers focused on the types of data collected at the state level on these programs and extent of student participation generally, as well as the status, benefits, and challenges of offering these programs to adults in correctional institutions, who face obstacles to employment following their release (Chapters I and II).
- **State CTE financing and consortia formation**. States are employing differing strategies to direct state and federal resources in support of CTE programming. Using data from national surveys of state CTE directors, NCICTE researchers

profiled state approaches for financing CTE and organizing consortia under *Perkins IV* to assist state legislators and state CTE agency administrators in making resource allocation decisions (Chapters III and IV).

- **Contextualized learning**. Educators are experimenting with instructional approaches that use career-themed instruction to improve the college and career readiness of high school students. One approach, Linked Learning, has drawn national attention, with several states adopting the model as an education reform strategy. To assess the potential benefits of combining strong academics with real-world experience, NCICTE researchers explored the outcomes of grade-12 students participating in Linked Learning certified pathways (LLCPs) in California, a state that has made a significant investment in the initiative (Chapter V).

- **Apprenticeship**. Registered apprenticeship (RA) is increasingly being considered an option for preparing high school students for entry into high-demand, high-wage jobs. To help clarify the association between CTE and RA, NCICTE reviewed the programmatic, administrative, and financial policies in six states that have undertaken systematic approaches for linking the two programs (Chapter VI).

- **Postsecondary outcomes**. The Education Longitudinal Study of 2002 (ELS:2002) is a nationally representative survey conducted by the National Center for Education Statistics within the Institute of Education Sciences, U.S. Department of Education, to assess the in-school experiences and post-program outcomes of high school students. To evaluate the long-term outcomes of students participating in CTE programming, NCICTE analyzed recently released coursetaking and labor-market data on a cohort of 2004 high school graduates as of 2012 (Chapter VII).

- **Leveraging public and private sector funding for CTE instruction**. A new class of financial tools is being developed to promote human capital investments that benefit society. To explore the potential for raising private capital to support promising CTE interventions, NCICTE commissioned leading experts in the field of human capital performance bonds (HUCAP), community benefit agreements (CBAs), and social innovation financing (SIF) to author a set of concept papers assessing the potential applications of these methods (Chapters VIII, IX, and X).

Complete reports for the studies described in each chapter are available at http://ctecenter.ed.gov/index.php/page/our-research. For some studies, interactive reports (browsable web versions of report summaries) are also available.

In the balance of this Executive Summary, we present a brief overview of each chapter.

Chapter I—Availability of Data on Noncredit Education and Postsecondary Certifications: An Analysis of Selected State-Level Data Systems. To better understand what data might be available to answer key policy questions on students' access to and outcomes after participation in noncredit CTE programs, the study summarized in this chapter reviewed data systems in 29 states. Each state's data system was reviewed to identify (1) data elements for noncredit education, (2) ways that states track outcomes for noncredit students, (3) whether noncredit data elements are incorporated into state longitudinal databases, and (4) the availability of certification data. NCICTE also interviewed staff at two independent associations that accredit organizations offering industry-recognized certifications and conducting research about these certifications. Findings indicated that data collection on students who enroll in noncredit education at public colleges and universities are still in the nascent stages. Comparing student enrollment across states is problematic because each state collects data differently and defines noncredit workforce education in a different way. Thus, it is challenging to draw conclusions about the extent to which students are enrolled in noncredit workforce education nationwide. Understanding the prevalence of industry-recognized credentials is also thwarted by a lack of access to award data. Recent federal efforts to collect data on certifications held by the adult population will provide important insights into the extent to which adults have these credentials.

Chapter II—Nondegree Credentials in Correctional Education: Status, Challenges, and Benefits. The study described in this chapter was designed to document information currently available on programs that prepare individuals for nondegree credentials (including certification, licenses, and educational credentials) in adult corrections facilities. It included telephone interviews with state correctional education administrators, employers, and employment placement specialists in eight states that have well-established prison-based programs that prepare individuals for nondegree credentials, as identified by the Department of Education's Office of Career, Technical, and Adult Education (OCTAE).

Researchers found that all of the states interviewed for the study regularly review their nondegree credential programs to ensure that they meet national or state accreditation standards, and typically provide for articulation with community college programs. Incarcerated adults who participate in nondegree programs are perceived by state administrators to be more motivated than those who do not, and administrators believe that motivation and maturity may positively affect student persistence in and completion of a correctional education program.

Chapter III—State Strategies for Financing Career and Technical Education. *Perkins IV* authorizes federal funding for CTE and specifies formulas for distributing those

funds at the secondary and postsecondary levels. To offset the higher cost of providing technical instruction, some states choose to earmark separate funding for CTE programs outside of their general state kindergarten-to-grade 12 or postsecondary education funding formulas. In August 2013, the National Association of State Directors of Career Technical Education Consortium (NASDCTEc)[1] surveyed CTE directors about (1) whether their states provided categorical funds for CTE during academic year (AY) 2011–12 and, if so, how they were distributed to secondary local education agencies (LEAs) and postsecondary institutions of higher education (IHEs), and (2) on their states' uses and perceptions of performance-based funding (PBF), a competitive resource distribution strategy that rewards local programs for achieving state-identified performance outcomes. The study described in this chapter drew on data collected from the NASDCTEc survey and a review of state educational agencies' websites and their statutes.

State approaches to financing CTE fall into one of three categories: (1) foundation funding only, with which local CTE programs are financed using general state funding or basic state aid formulas that do not earmark for CTE; (2) funding for area CTE centers, which deliver CTE services to part-time students; and (3) categorical funding, which may include student-, cost-, or unit-based formulas, which target state funding for the exclusive use of CTE programming. The majority of states (37) offered categorical state funding for CTE at the secondary level in AY 2011–12, though just five of the 37 states for which information was available provided such categorical funding at the postsecondary level. Two states reported using PBF to allocate secondary resources allotted through *Perkins IV*, and five states responded that they used PBF to allocate their own state CTE funds. At the postsecondary level, no state reported using PBF to allocate *Perkins IV* funds, while four states reported using PBF to allocate state funds.

Chapter IV—Consortia Formation and Characteristics Under the Carl D. Perkins Career and Technical Education Act of 2006. *Perkins IV* sets a minimum allocation requirement that secondary and postsecondary CTE eligible grant recipients must achieve to receive federal financing. In some instances, an eligible recipient with an allocation below the funding threshold may obtain a state waiver that qualifies it to participate as a stand-alone subgrantee, or an eligible recipient may enter into a consortium with other subgrantees. Congress authorized the consortia provision to enable small or rural applicants to access federal funds sufficient to support quality CTE programming.

The study summarized in this chapter described the prevalence of consortia in *Perkins IV,* examined the characteristics of these entities, and explored whether and how they promoted collaboration between and across secondary and postsecondary educational levels. Findings

[1] Now known as ADVANCE CTE.

were based on data collected for the National Assessment of Career and Technical Education, information contained within states' *Perkins IV* five-year state plans, and interviews with state CTE directors. Key findings include

- Consortia were more prevalent at the secondary than at the postsecondary level.
- Consortia were typically composed entirely of either LEAs or IHEs; only two states either required (Minnesota) or strongly encouraged (Oregon) consortia formation among subgrantees from both education levels.
- On average, secondary consortia members enrolled fewer students than did stand-alone subgrantees.
- Secondary consortia members were concentrated in rural areas and enrolled proportionately fewer students eligible for free or reduced-price lunches.
- Consortia received 22 percent of *Perkins IV Title I* grants allocated to the secondary level.

Chapter V—The Effect of Linked Learning Certified Pathways on Selected Student Outcomes. In California, LLCPs are offered in California Partnership Academies, National Academy Foundation academies, small theme-based high schools, and small learning communities housed within comprehensive high schools. This study examined outcomes for grade-12 students attending an LLCP in California in AYs 2010–11, 2011–12, and 2012–13. Outcomes reported here are suggestive, but not conclusive, because other factors not included in the models may account for both participation in an LLCP and the differences in outcomes. Key findings include

- There were mixed findings for the association between participation in an LLCP and measures for student engagement, as measured by attendance and disciplinary events in grade 12.
- Grade-12 students in all three cohorts who participated in an LLCP had a higher probability of graduating from high school than students in the matched comparison group. However, both LLCP and matched comparison groups had relatively high graduation rates (89.5 and 89.3 percent, respectively).
- Completion of the a-g admissions requirements (a set of 15 high school courses) and a related grade point average (GPA) required for admission to the University of California (UC) and California State University (CSU) public university systems were available only for the AY 2011–12 and AY 2012–13 cohorts. LLCP students in the AY 2011–12 cohort were 13 percent more likely than the comparison group to meet the CSU course and GPA requirements, but there was no difference between the

two groups in UC eligibility. Among the AY 2012–13 cohort, LLCP participants had a 6.6 percent lower probability of completing the a-g requirements for UC.

- Postsecondary enrollment data were only available for 2011 and 2012 graduates. There was no difference in the probability of enrolling in postsecondary education for AY 2010–11 LLCP graduates and matched comparison-group students. However, AY 2011–12 LLCP students were 5.4 percent more likely than comparison-group students to have enrolled in postsecondary education.

Chapter VI—Connecting Secondary Career and Technical Education and Registered Apprenticeship: A Profile of Six State Systems. CTE and RA programs have many similarities. To help clarify the association between the two, NCICTE undertook a systematic review of the programmatic, administrative, and financial policies that six states — Connecticut, Florida, Kentucky, North Carolina, Rhode Island, and Washington — have developed to link the two programs. NCICTE identified these six states based on input from the U.S. Department of Labor's Office of Apprenticeship (OA) and OCTAE.

The approaches used by the six states to align secondary CTE with RA generally fell into one of three categories: (1) RA — high school students participate directly in RA programs and are registered as apprentices with OA; (2) pre-apprenticeships — high school students participate in programs designed to prepare them for an RA program, with related technical instruction provided as part of their CTE coursework; and (3) registered CTE curriculum — high school students enroll in CTE coursework that the state has aligned to RA programs in high-demand industries, and all enrolling students earn credits toward an RA program following high school completion.

The six states in this study developed strategies to address challenges to growing programs that align CTE with RA. While these approaches have yet to be rigorously studied to assess their efficacy, they may help inform states' efforts to expand the pipeline into RA using CTE. The strategies included

- providing cross-agency support to align CTE and RA programs,
- delivering technical assistance at the regional and local levels to promote program linkages between CTE and RA programs,
- creating resource tools and guides to support program alignment,
- conducting outreach to publicize the benefits of RA programs, and
- addressing barriers to student and employer involvement.

Apprenticeship programs offered within secondary CTE give students access to high-quality, occupation-directed training that combines classroom instruction with applied and, in some cases, intensive work-based learning opportunities. If the study states' experiences connecting CTE with RA can be applied to the nation at large, then it appears that there is considerable room for expanding the pipeline from CTE to RA by increasing program options for secondary students.

Chapter VII—Eight-Year Postsecondary Outcomes of Career and Technical Education Students from the High School Class of 2004. Using nationally representative data from ELS:2002, the study summarized in this chapter analyzed data for a recent cohort of high school graduates (the class of 2004) as of 2012, eight years after they had completed high school. It also took a rare opportunity to compare the labor market outcomes of high school CTE students in two different decades by examining data from ELS:2002 and its predecessor study, the National Education Longitudinal Study of 1988 (NELS:88), whose study participants were in grade 12 in 1992 and were also surveyed eight years later, in 2000.

Characteristics of high school CTE students. For the purposes of this study, high school CTE students were divided into four groups based on the number of occupational credits they earned during high school (Dalton et al. 2013). Occupational credits refer to credits in courses designed for specific labor market preparation in a field or area of study. The study focused on the following four groups.

Nonparticipants:	Earned less than one occupational CTE credit
Samplers:	Earned one to two occupational CTE credits in one or more fields
Explorers:	Earned three or more occupational CTE credits, but no three credits in any single occupational CTE field
Concentrators:	Earned three or more occupational CTE credits in at least one occupational CTE field

The study focused on comparing CTE concentrators to nonparticipants, although results were presented for all groups.[2]

In-school and postsecondary education outcomes of high school CTE students from the class of 2004 in 2012. The study found that

[2] Only data for public school students were analyzed. The analysis sample consisted of public high school completers with complete transcript data who met minimum credit criteria. The total number of cases analyzed for the study summarized in this chapter was 6,988 for ELS:2002 and 7,046 for NELS:88.

- Eighteen percent of students from the high school class of 2004 concentrated in one or more CTE fields of study.
- The following groups were more likely to be CTE concentrators: males (57 percent versus 43 percent of females); students from the lowest socioeconomic status (SES) quartile (26 percent vs 17 percent from the highest SES quartile); and students who scored in the bottom quartile of ELS:2002's math assessment (31 percent vs. 18 percent who scored in the top quartile).
- A lower percentage of CTE concentrators earned a bachelor's degree or higher within eight years of completing high school than nonparticipants (27 percent versus 49 percent, respectively).

Employment and earnings outcomes[3] of high school CTE students from the class of 2004 in 2012. The study found that

- There were no statistically significant differences in employment status among students with different levels of high school CTE participation.
- Although results show that high school CTE concentrators had a nominally higher median income ($29,000) than nonparticipants ($26,000), the differences were not statistically significant.
- CTE concentrators who had earned an associate degree had a higher median annual income ($34,000) than nonparticipants with an associate degree ($22,000).

The class of 2004 versus the class of 1992. The high school class of 2004, surveyed in 2012, was compared to the high school class of 1992, surveyed in 2000. Overall, the study found that, despite differences in background and postsecondary education and training, high school CTE participants were remarkably similar to nonparticipants in their employment and earnings outcomes. Specifically, the study found that

- When comparing the class of 2004 to the class of 1992, there were no statistically significant differences in labor force participation rates by CTE participation level or concentrator field of study.
- Students at all CTE participation levels were more likely to be unemployed in 2012 than in 2000. Eight to 10 percent of the class of 2004 were unemployed in 2012, but only 2 to 4 percent of the class of 1992 were unemployed in 2000.

[3] Employment and earnings were reported for those not currently enrolled in college.

- As with employment status, there were no differences in median annual income or median hourly wage by CTE participation level within the class of 1992 in 2000 or within the class of 2004 in 2012.

In both cohorts studied, results clearly indicate that, despite less advantaged backgrounds, CTE students fare just as well as their nonparticipating counterparts. To the extent that higher education can help protect high school CTE participants' achievements and improve their long-term outcomes — as seen in the wage premium observed for CTE concentrators with an associate degree — policy can be geared toward ensuring access to college and building on the futures that CTE students established for themselves in high school.

Chapter VIII—Concept Paper: Applying Human Capital Performance Bonds to Career and Technical Education. This paper summarized in this chapter described a financing structure known as "human capital performance bonds" (HUCAP) and considers how it could be applied to CTE. HUCAP is a form of social impact investing, based on the idea that human service providers generate economic value to society, and that value (future cash savings) can be used to fund their services. Some of the social and financial benefits created by these providers can be measured and have actual cash value to the public sector (or other entities, such as health care organizations). These future cash savings can be used to finance the up-front services that providers deliver.

The state of Minnesota authorized a pilot of the HUCAP model, which is distinguished from other social impact investing models by the following: (1) bond funds are used for capital; and (2) payments to nonprofits that vary with their performance. To illustrate how the model might apply to CTE, two examples are given in the paper summarized in this chapter. These examples highlight the key conditions in different ways.

Chapter IX—Concept Paper: Using Community Benefit Agreements to Support Career and Technical Education. CBAs are legally binding contracts that secure private-sector funding for improvements within neighborhoods affected by proposed real estate developments. A community coalition engages area residents in identifying community needs that become the subject of negotiations between developers and community groups. In a successful CBA negotiation, developers provide concessions in exchange for the community coalition's support of the project.

This paper provided information for state and local policymakers regarding the potential use of CBAs to support the delivery of high-quality CTE services in schools and colleges serving their surrounding communities. It is organized as a series of frequently asked questions that address the distinguishing characteristics of CBAs, their potential benefits, key considerations in structuring these agreements, and "internal" and "external" impediments to successful CBA negotiations.

Chapter X—The Potential Role of Social Innovation Financing in Career and Technical Education. A new class of financial tools is being developed to promote human capital investments that benefit society. SIF entails raising private capital to support promising social interventions, with the expectation that those providing the funding will eventually be repaid. Funds are allocated based on service providers' achievement of measurable improvements in social conditions, under what is termed a pay for success (PFS) contracting model. Social impact bonds (SIBs) provide the upfront working capital for PFS contracts. This working capital is needed because a delay in payments is inherent in the PFS approach as it can take years to determine if it has achieved successful outcomes.

The paper summarized in this chapter introduces the PFS and SIB concepts, describes their applications nationwide, and explores their potential for generating resources that can be used to finance the delivery of high-quality CTE programming. State and local policymakers can use the principles presented in the paper summarized in the chapter to develop new applications for this innovative, yet still emerging, method of social service procurement.

INTRODUCTION

The National Center for Innovation in Career and Technical Education (NCICTE) was established by the U.S. Department of Education (the Department) to carry out research and evaluation activities related to career and technical education (CTE). NCICTE (1) performs scientifically based research and evaluation, (2) disseminates information, and (3) conducts training to expand the understanding, increase the effectiveness, and improve the implementation of CTE.

On February 6, 2012, the Department issued a request for contract proposals for a team of institutions or organizations to carry out the functions of the national research center that is authorized by section 114(d)(4) of the *Carl D. Perkins Career and Technical Education Act of 2006* (P.L. 109-270) (*Perkins IV*). The Department selected the proposal submitted by RTI International and the following subcontractors:

- Georgetown University Center on Education and the Workforce
- ConnectEd: The California Center for College and Career
- FHI 360
- Laurium Evaluation Group
- Workforce Enterprise Systems
- Mercury Labs
- Windwalker Corporation

On July 22, 2012, the Department signed a three-year contract with RTI to carry out the functions of the national research center. The Department subsequently approved a two-year, no-cost extension of the contract.

One of the requirements of *Perkins IV* authorizing the national research center is that it "shall annually prepare a report of the key research findings of such center and shall submit copies of the report to the Secretary, the relevant committees of Congress, the Library of Congress, and each eligible agency" (Sec. 114(d)(4)(B) of *Perkins IV*). This is NCICTE's report for contract performance award years 2014–15 and 2015–16 (years three and four of the NCICTE contract). This report also includes relevant information from contract year one when applicable.

This report describes findings from 10 studies completed and published by NCICTE as of December 31, 2016.[4] These studies, summarized in the chapters of this report to Congress, address a variety of topics attracting attention in the field, including

- **Noncredit education.** Individuals have options to enroll in college-level coursework or earn industry-recognized credentials or certifications that do not result in the award of college credit but may confer labor market advantages on program completers. NCICTE researchers focused on the types of data collected at the state level on these types of programs and the extent of student participation generally, as well as the status, benefits, and challenges of offering these programs to adults in correctional institutions who face obstacles to employment following their release. Studies on this topic include
  - Availability of Data on Noncredit Education and Postsecondary Certifications: An Analysis of Selected State-Level Data Systems (2014) (Chapter I)
  - Nondegree Credentials in Correctional Education: Status, Challenges, and Beliefs (2016) (Chapter II)
- **State CTE financing and consortia formation.** States are employing differing strategies to direct state and federal resources in support of CTE programming. Using data from national surveys of state CTE directors, NCICTE researchers profiled state approaches for financing CTE and organizing consortia under *Perkins IV* to assist state legislators and state CTE agency administrators in making resource allocation decisions. Studies on this topic include
  - State Strategies for Financing Career and Technical Education (2014) (Chapter III)
  - Consortia Formation and Characteristics Under the Carl D. Perkins Career and Technical Education Act of 2006 (2014) (Chapter IV)
- **Contextualized learning.** Educators are experimenting with instructional approaches that use career-themed instruction to improve the college and career readiness of high school students. One approach, Linked Learning, has drawn national attention, with a number of states adopting the model as an education reform strategy. To assess the potential benefits of combining strong academics with real-world experience, NCICTE researchers explored the outcomes of grade-

[4] Complete reports for the 10 studies are available at http://ctecenter.ed.gov/index.php/page/our-research. For some studies, Interactive Reports (browsable web versions of report summaries) that can be viewed online are also available.

12 students participating in Linked Learning certified pathways (LLCPs) in California, as described in

- The Effect of Linked Learning Certified Pathways on Selected Student Outcomes (2016) (Chapter V)

- **Apprenticeship.** Registered Apprenticeship (RA) is increasingly being considered as an option for preparing high school students for entry into high-demand, high-wage jobs. To help clarify the association between CTE and RA, NCICTE reviewed the programmatic, administrative, and financial policies in six states that have undertaken systematic approaches for linking the two programs, as described in

  - Connecting Secondary Career and Technical Education and Registered Apprenticeship: A Profile of Six State Systems (2016) (Chapter VI)

- **Postsecondary outcomes.** The Education Longitudinal Study (ELS:2002) is a nationally representative survey conducted by the National Center for Education Statistics within the Institute of Education Sciences, U.S. Department of Education, to assess the in-school experiences and post-program outcomes of high school students. To evaluate the long-term outcomes of students participating in CTE programming, NCICTE analyzed recently released course taking and labor market data on a cohort of 2004 high school graduates as of 2012. See

  - Eight-Year Postsecondary Outcomes of Career and Technical Education Students from the High School Class of 2004 (2015) (Chapter VII)

- **Leveraging public and private sector funding for CTE instruction.** A new class of financial tools is being developed to promote human capital investments that benefit society. To assess the potential for raising private capital to support promising CTE programs, NCICTE commissioned leading experts in the field of human capital performance bonds (HUCAP), community benefit agreements (CBAs), and social innovation financing (SIF) to author a set of concept papers assessing the potential applications of these methods. See

  - Applying Human Capital Performance Bonds to Career and Technical Education (2015) (Chapter VIII)

  - Using Community Benefit Agreements to Support Career and Technical Education (2016) (Chapter IX)

  - The Potential Role of Social Innovation Financing in Career and Technical Education (2015) (Chapter X)

CHAPTER I—AVAILABILITY OF DATA ON NONCREDIT EDUCATION AND POSTSECONDARY CERTIFICATIONS: AN ANALYSIS OF SELECTED STATE-LEVEL DATA SYSTEMS

STUDY DESCRIPTION

For the complete study report, see U.S. Department of Education, Office of Career, Technical, and Adult Education, *Availability of Data on Noncredit Education and Postsecondary Certifications: An Analysis of Selected State-Level Data Systems*, Washington, D.C., 2014, available at http://ctecenter.ed.gov/index.php/page/our-research. This study report was prepared by Andrea R. Sykes, Mary A. Szuplat, and Cynthia G. Decker.

Little research exists on CTE students enrolling in noncredit courses at public colleges and universities or earning industry-recognized certifications. To better understand what data might be available to answer key policy questions on students' access to and outcomes following participation in noncredit CTE programs, the study summarized in this chapter reviewed data systems in 29 states. Each state's data system was reviewed to identify (1) data elements for noncredit education, (2) ways that states track outcomes for noncredit students, (3) whether noncredit data elements are incorporated into state longitudinal databases, and (4) the availability of certification data.

NCICTE analysts reviewed the websites of 29 states identified in two previous research studies (Garcia and L'Orange 2012; Van Noy et al. 2008) as having data on students enrolled in noncredit education programs and colleges and universities. Researchers examined documents posted by the system-level office responsible for collecting community college or university data and contacted officials in some of the states to clarify information that was unclear or needed further discussion. NCICTE staff also interviewed staff at two independent associations—the American National Standards Institute and the Institute for Credentialing Excellence—that accredit organizations offering industry-recognized certifications and conducting research about these certifications. Through interviews with representatives from these organizations, NCICTE researchers learned about the process of accrediting certifications, the types of certifications commonly earned by individuals, and the differences between certifications and credit and noncredit courses offered at colleges and universities.

It should be noted that a number of noncredit courses and programs, including military training, apprenticeships, employer-based on-the-job training, and others, are offered outside of public colleges and universities. These offerings were not included in the review of noncredit data due to the focus on CTE at public colleges.

KEY FINDINGS

Among the 29 state systems reviewed, there were variations in (1) the breadth and depth of data elements related to noncredit education and (2) the little data collected on industry-recognized certifications. Twenty-three of the states collected data on noncredit student enrollment; however, there were differences in the units of measurement and the availability of enrollment data over time. Nine of the states collected enrollment data that included student characteristics, allowing for a description of student gender and race/ethnicity. Nineteen states collected or reported data that allowed for a description of the type of noncredit courses in which students enrolled and the extent to which students were enrolled in noncredit workforce education.

However, states took different approaches for categorizing and defining noncredit workforce education—with some states using broadly defined categories and others using the federal Classification of Instructional Program (CIP) codes,[5] making aggregation and meaningful comparisons across states challenging. Although several state data systems had data elements that could be used to describe noncredit student enrollment, there were limitations in the reliability and completeness of the data. State systems often lacked unique student identifiers for noncredit students. Moreover, colleges also offer noncredit workforce education programs directly to local businesses, and state agencies may or may not collect student enrollment data for those courses.

The state data systems reviewed collected limited data on noncredit student outcomes, such as earning certifications, obtaining employment, or experiencing wage gains. Outcomes for students who enrolled in and completed noncredit courses at public colleges and universities are not as well defined as they are for students completing credit-based courses. Although some institutions award certificates of completion for finishing a noncredit course or record noncredit course completions on student transcripts, such standards are not consistently adopted across courses or institutions. Reviews of data-reporting manuals showed that a few states had processes in place to report some outcome data for students enrolling in and completing noncredit courses; however, there were no publicly available reports using this

[5] The CIP is a federal taxonomy for categorizing programs of study and is used in reporting awards in the Integrated Postsecondary Education Data System. For more information, see http://nces.ed.gov/ipeds/cipcode/Default.aspx?y=55.

information. Only one state—California—had the potential for analysis of outcomes for students enrolling in and completing noncredit courses. In this state, the community college system collects student-level data that can be linked to other postsecondary data systems or state wage records. As part of the system's Student Success Scorecard, students who begin in noncredit courses are tracked for six years to determine what percentage earn a certificate or degree, or transfer during that timeframe.

Several states reported that statewide initiatives were underway to address data collection on noncredit courses, but these initiatives were not necessarily part of their statewide longitudinal data systems. Because data on noncredit students were limited, these states were focusing on improving systems for noncredit student data collection within the community college system before linking them to other state data systems. Two states—Florida and Iowa—incorporated noncredit course student data in their statewide longitudinal data systems.

Data on industry-recognized certifications were also limited at the state and national levels. No statewide efforts were in place to specifically link students enrolled in noncredit courses to certification exam data. While postsecondary institutions must report the certificates earned through formal credit programs to the National Center for Education Statistics and state agencies, neither they nor certification agencies are required to report industry-recognized certifications to any governmental agency. Three states—Maryland, North Carolina, and Oregon—did publish reports showing the enrollment or performance of students in credit-based programs. Officials at organizations that represent certification agencies confirmed that there are no national data systems that include the numbers or types of certifications awarded; typically, these data are collected by each certification agency.

The study summarized in this chapter indicated that data collections on students who enroll in noncredit education at public colleges and universities are still in the nascent stages. Most states that collect data on noncredit instructional activity do so in a limited manner, allowing only for headcounts of students and, for several states, a more detailed description of the characteristics of these students. However, comparing student enrollment across states is problematic because each state collects data differently and defines noncredit workforce education in a different way. Thus, it is challenging to draw conclusions about the extent to which students are enrolled in noncredit workforce education nationwide. Understanding the prevalence of earning industry-recognized credentials is also thwarted by a lack of access to data. Recent federal efforts to collect data on certifications held by the adult population will provide important insights into the extent to which adults have these credentials.

CHAPTER II—NONDEGREE CREDENTIALS IN CORRECTIONAL EDUCATION: STATUS, CHALLENGES, AND BENEFITS

STUDY DESCRIPTION

For the complete study report, see U.S. Department of Education, Office of Career, Technical, and Adult Education, *Nondegree Credentials in Correctional Education Status, Challenges, and Benefits*. Washington, D.C., 2016, available at http://ctecenter.ed.gov/index.php/page/our-research. This study report was prepared by Michelle Tolbert with support from Laura Rasmussen Foster, Matthew DeMichele, and Stacey Cataylo. An Interactive Report is also available.

The study described in this chapter was designed to document information currently available on programs that prepare individuals for nondegree credentials in adult corrections facilities. These programs include CTE programs, or vocational training,[6] which the U.S. Department of Justice, Bureau of Justice Statistics, defines as "special programs designed to train participants for a job" (Harlow 2003, 4).[7] The study focused on nondegree credentials, which the federal Interagency Working Group on Expanded Measures of Enrollment and Attainment defines as follows:

- **Certification**. A credential awarded by a certification body based on an individual demonstrating through an examination process that he or she has acquired the designated knowledge, skills, and abilities to perform a specific job. Certification is a time-limited credential that is renewed through a recertification process.
- **License**. A credential awarded by a government agency that constitutes legal authority to do a specific job. Licenses are based on some combination of degree or certificate attainment, certifications, assessments, or work experience; are time-limited; and must be renewed periodically.
- **Educational certificate**. A credential awarded by an educational institution based on completion of all requirements for a program of study, including coursework and

[6] Correctional institutions commonly use the terms "vocational training" or "vocational education" to describe job training or CTE programs.

[7] Although the U.S. Department of Justice, Bureau of Justice Statistics' definition of vocational programs does not delineate the type of credentials awarded to incarcerated students who complete these programs, the states interviewed for this study indicated that prison-based vocational programs typically result in nondegree credentials.

test or other performance evaluations. Certificates are typically awarded for life (like a degree). Certificates of attendance or participation in a short-term training (e.g., one day) are not in the definitional scope for educational certificates (U.S. Department of Education n.d.).

The study consisted of a literature review to document existing research on nondegree credentials and telephone interviews with state correctional education administrators, employers, and employment placement specialists who work with formerly incarcerated individuals. NCICTE researchers interviewed state correctional education directors or vocational program coordinators in eight states (Indiana, Kansas, Maryland, Michigan, North Carolina, Ohio, Oregon, and Vermont) that have well-established prison-based programs that prepare individuals for nondegree credentials, as identified by the Department's Office of Career, Technical, and Adult Education (OCTAE). Participating states then recommended employers or employment placement organizations that have successfully worked with formerly incarcerated adults for interviews.

KEY FINDINGS

The need for correctional education programs, including those that lead to nondegree credentials, is great. Although 40 percent of incarcerated adults lack a high school diploma, by some estimates less than one-quarter of adults incarcerated in federal and state correctional institutions participate in adult secondary education programs. Moreover, only 13 percent of federal prisoners and 10 percent of state prisoners participate in postsecondary education and training programs before release (Crayton and Neusteter 2008; Harlow 2003).

All of the states interviewed for the study regularly review their nondegree credential programs to ensure they are current and meet accreditation standards by national certification organizations or state licensing boards. They also reported that their programs typically articulate with community college programs. Across the states interviewed for the study, the most common correctional education programs that lead to nondegree credentials, among the male population, are in the construction trades and those required for in-demand jobs (e.g., heating, ventilation, and air conditioning; welding; and automotive repair). The most common programs among the female population vary because of capacity issues (e.g., the size of the female population can make it difficult to meet the class size requirements for some of the programs) but include custodial service, computer technician, cosmetology, and culinary arts.

The diversity among programs that lead to nondegree credentials offered in prison and variations in how states calculate program costs (e.g., although most states cover exam and licensing fees, some do not) make it difficult to provide a general range for the cost of

administering programs. States typically pay for programs using Department of Corrections budgets with some supplemental funding coming from CTE state grants, adult education state grants, and vocational rehabilitation grants.

According to the states interviewed for the study, incarcerated adults typically must meet several requirements related to their educational attainment (e.g., must have a high school credential) and correctional status (e.g., must have no disciplinary infractions) to participate in nondegree credential programs. Those who participate are perceived by state administrators to be more motivated than those who do not. Their motivation may be influenced by various incentive structures (e.g., time off sentence) that some state Department of Corrections offer. State administrators also believe that motivation and maturity may positively affect student persistence in, and completion of, a correctional education program. A student's prior educational level is also a factor, as are a range of environmental conditions that can positively or negatively affect persistence and completion, such as being removed from a program because of facility transfer.

Studies have been conducted to determine the post-release outcomes of correctional education; however, only a few of these studies focus on the outcomes of nondegree credential programs. Of those that do make a distinction between the different types of education programs offered in prisons, CTE programs were shown to have more positive effects on recidivism rates and prison costs than other education programs, such as adult basic education (Aos, Miller, and Drake 2006; MacKenzie 2006; Wilson, Gallagher, and MacKenzie 2000).

Obstacles that correctional facilities face in offering programs leading to a nondegree credential include competing demands for students' time, class disruptions, facility transfers, technology and other resource restrictions, space limitations, and recruitment of qualified teachers. These challenges are common across most correctional education programs, however, and are not specific to CTE programs in correctional settings. Incarcerated students also face a number of challenges with persisting in and completing nondegree credential programs and earning credentials. These include personal obstacles (e.g., low educational skills when entering the program and poor study skills), institutional obstacles (e.g., competing demands for students' time and class disruptions), and post-release obstacles (e.g., difficulty securing a job to help pay for college tuition, housing, and transportation).

CHAPTER III—STATE STRATEGIES FOR FINANCING CAREER AND TECHNICAL EDUCATION

STUDY DESCRIPTION

For the complete study report, see U.S. Department of Education, Office of Career, Technical, and Adult Education, *State Strategies for Financing Career and Technical Education*. Washington, D.C., 2014, available at http://ctecenter.ed.gov/index.php/page/our-research. This study report was prepared by Laura Rasmussen Foster, Steve Klein, and Barbara Elliott. An Interactive Report is also available.

Perkins IV authorizes federal funding for CTE and specifies a formula for distributing those funds. Allocations at the secondary level are based on the number of youth ages 5–17 who reside within the boundaries of a local educational agency (LEA) and live in poverty. Funds for institutions of higher education (IHEs) are distributed proportionally to the number of students who receive Pell grants or aid from the Bureau of Indian Affairs.

To offset the higher cost of providing technical instruction,[8] some states choose to allocate categorical funding for CTE programs outside of general state kindergarten to grade 12 (K–12) or postsecondary education funding formulas. In August 2013, the National Association of State Directors of Career Technical Education Consortium (NASDCTEc)[9] surveyed CTE directors responsible for administering their states' *Perkins IV* grants to assess the operation of state CTE resource distribution formulas. The survey asked CTE directors to report (1) whether their states provided categorical funds for CTE during academic year (AY) 2011–12 and, if so, how they were distributed to secondary local education agencies (LEAs) and institutions of higher education (IHEs); and (2) on their states' uses and perceptions of

[8] Costs are higher for CTE programs, on average, because instruction typically occurs in smaller class settings than traditional academic classes. As a result, LEAs must hire additional instructors to generate a similar number of student contact hours for CTE programs. The need for specialized equipment and supplies also increases CTE instructional costs relative to academic classrooms. While the magnitude of these added expenses has yet to be conclusively documented, it is estimated that CTE costs may be 20–40 percent higher than those for academic instruction, with expenditures varying by program area and level of training (Klein 2001).

[9] Now known as ADVANCE CTE.

performance-based funding (PBF)—a competitive resource distribution strategy that rewards local programs for achieving state-identified performance outcomes.

The study described in this chapter drew on data collected from the NASDCTEc survey (included in the study report appendix) and a review of state educational agencies' websites and their statutes to identify whether and, if so, how states distribute categorical funds for CTE programs. It also documented states' PBF strategies and their interest in integrating competitive funding into their state education resource distribution formulas.

KEY FINDINGS

State approaches for funding CTE programs. State approaches vary in their emphasis and complexity. Some states provide no dedicated funding for CTE. Others allocate state funds to area CTE centers[10] or to all service providers in the state on a formula basis. State approaches fall into one of three categories:

- **Foundational funding[11] only.** Local CTE programs are financed out of general state aid formulas that provide no earmark for CTE. Because allocations to LEAs and IHEs are independent of student participation in CTE, local administrators must decide how funds should be distributed across instructional priorities.
- **Funding for area CTE centers.** Dedicated funds are provided to support programming at area CTE centers that deliver CTE services to part-time students. CTE services offered at other locations in these states, such as comprehensive high schools[12] or community or technical colleges, are supported through the state's foundational funding formula.
- **Categorical funding**—Dedicated funding for CTE programs is distributed to LEAs and IHEs to support career-related instructional services. These approaches— which may include student-, cost-, or unit-based formulas, — typically target state funding for the exclusive use of CTE programming and are described below.

[10] "Area CTE centers," as defined in the study described in this chapter, are stand-alone schools or facilities that deliver CTE services to part-time students — drawn from surrounding high schools or LEAs — who receive all or a majority of their academic instruction at their home school.
[11] State "foundational funding" as used in this the study described in this chapter means general state funding or basic state aid funding.
[12] "Comprehensive high schools" describes schools that typically have an academic focus but also offer CTE either on- or off-site, the latter often at an area CTE center.

Among those states that used the K–12 funding formula to support CTE programs, eight states did not provide categorical funding for CTE, and seven states allocated categorical funding to area CTE centers in AY 2011–12. The majority of states (37) did earmark state funds for CTE in AY 2011–12, using the following methods to distribute funds to local programs:[13]

- **Student-based formulas (21 states).** Funds are distributed relative to the number of CTE students enrolled in an LEA. States typically use one of three approaches: (1) proportional allocations, in which LEAs or programs receive funding allocations relative to the number of students enrolled; (2) weighted student funding, which provides supplemental funding for CTE students in state basic aid formulas; or (3) differential weighting, which allocates funding for CTE students based on the type of program in which they participate or to align with state instructional priorities.
- **Unit-based formulas (7 states).** Allocations are based on a set of educational inputs used to deliver CTE services, such as the number of instructors or administrators employed by an LEA or the equipment used to deliver instruction.
- **Cost-based formulas (9 states).** LEAs are compensated for CTE services based on their actual reported costs from the prior AY. States may cap or limit the rate at which eligible expenses are reimbursed, meaning that only a portion of an LEA's expenditures may be covered.

Survey results indicate that just five of the 37 states for which information was available provided categorical funding at the postsecondary level in AY 2011–12, with the majority (30 states) relying on foundational funding to support instructional programming at IHEs. Two states reported directing some categorical funds to area CTE centers.[14] The absence of categorical funding for CTE does not mean that technical training is not valued within states; rather, it simply means that funding for CTE at the postsecondary level is not differentiated from the state's basic aid for community and technical colleges. Within the categorical

[13] Information on K–12 allocations (primarily from the survey, augmented by online research) was available for 50 states, the District of Columbia, and the outlying area of the Republic of Palau.
[14] Information on postsecondary allocations was available for the following 37 states based on survey data and online research: Alaska, Arizona, Arkansas, California, Colorado, Connecticut, Georgia, Hawaii, Idaho, Illinois, Indiana, Iowa, Kansas, Maine, Maryland, Michigan, Minnesota, Mississippi, Missouri, Nebraska, New Jersey, New Mexico, New York, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, West Virginia, and Wisconsin. Postsecondary allocation data were unavailable for 15 states or territories: Alabama, Delaware, District of Columbia, Florida, Kentucky, Louisiana, Massachusetts, Montana, Nevada, New Hampshire, North Carolina, Republic of Palau, Vermont, Washington, and Wyoming.

funding group, states used one of two approaches at the postsecondary level to distribute funds:

- **Student-based formulas (2 states).** As in secondary education, states use this approach to distribute funds based on the number of students enrolled in CTE programs. Both states weight CTE student participation according to program type.
- **Unit-based formulas (3 states).** Three states tie state funding to CTE instructional units as a way to fund the differential costs of course delivery. An instructional unit is defined as the ratio of CTE instructors to student credit hours.

STATES' USES AND PERCEPTIONS OF PERFORMANCE-BASED FUNDING. Two states reported using PBF to allocate *Perkins IV* funds, with five states using PBF to allocate *state* CTE funds. These seven states condition funding for CTE programs based on LEA performance on federal or other performance measures, such as placement of CTE students into postsecondary education or employment, attainment of industry-recognized credentials, or CTE completion rates.

At the postsecondary level, no state reported using PBF to allocate *Perkins IV* funds, while four states reported using PBF to allocate *state* funds. Some states that used PBF reported its application to the performance of the entire community or technical college system rather than tying it specifically to CTE participation rates or outcomes. Instead, they used PBF at the system level as a strategy for improving community or technical college performance. Examples of the performance measures used to distribute postsecondary PBF funds include graduation rates and credential or degree attainment.

The NASDCTEc survey collected additional information from states on their interest in adopting PBF and related training needs. Findings included the following:

- States' reasons for not adopting PBF varied, with a lack of interest among state leaders being the most common reason reported by secondary respondents.[15] Postsecondary respondents also selected this as the most common reason for not adopting PBF to allocate their *federal Perkins IV* funds.[16] However, postsecondary respondents selected "other" as the most common reason for not adopting PBF to allocate their *state* funds, with their write-in responses indicating that many states were currently exploring the use of PBF.

[15] There were 38 respondents at the secondary level.
[16] There were 35 respondents at the postsecondary level.

- Forty-six percent of the state respondents at the secondary level and 43 percent of the state respondents at the postsecondary level expressed interest in adopting PBF to allocate a portion of their federal *Perkins IV* funds. Sixty-eight percent of the secondary respondents and 65 percent of the postsecondary respondents expressed a need for training on PBF formula development and implementation if PBF were to be required by the legislation.
- Pay-for-success (PFS) or social impact bond (SIB) programs are intended to provide an incentive for private investment in public programs. States have limited to no experience with PFS or SIB programs. While no state reported currently using a PFS model for CTE, two state respondents from the secondary level and one from the postsecondary level were aware of PFS models in other educational contexts within their states. No states are currently using PFS to promote investment in CTE programs, although about one-third of respondents at both the secondary and postsecondary educational levels expressed interest in learning more about the potential applications of PFS and SIB models.

CHAPTER IV—CONSORTIA FORMATION AND CHARACTERISTICS UNDER THE *CARL D. PERKINS CAREER AND TECHNICAL EDUCATION ACT OF 2006*

STUDY DESCRIPTION

For the complete study report, see U.S. Department of Education, Office of Career, Technical, and Adult Education, *Consortia Formation and Characteristics Under the Carl D. Perkins Career and Technical Education Act of 2006.* Washington, D.C., 2014, available at http://ctecenter.ed.gov/index.php/page/our-research. This study report was prepared by Sandra Staklis and Steve Klein. An Interactive Report is also available.

Perkins IV sets a minimum allocation requirement that secondary and postsecondary CTE subgrantees must achieve to receive federal financing. In some instances, an eligible recipient with an allocation below the funding threshold may obtain a state waiver that qualifies it to participate as a stand-alone subgrantee, or an eligible recipient may enter into a consortium with other subgrantees.[17] A consortium's funds must be used for purposes and programs that are mutually beneficial to all of its members; *Perkins IV* prohibits the reallocation of funds for uses benefiting only one member (see Sec. 131(f)(2) and Sec. 132(a)(3)(B) of *Perkins IV*). Congress authorized the consortia provision to enable small or rural applicants to access federal funds sufficient to support quality CTE programming.[18]

The study summarized in this chapter described the prevalence of consortia under *Title I* of *Perkins IV,* examined the characteristics of these entities, and explored whether and how they promote collaboration between and across secondary and postsecondary educational levels. Findings were based on data collected for the National Assessment of Career and Technical Education (NACTE), information contained within states' *Perkins IV* five-year state plans, and interviews with state CTE directors. The study provided information about

[17] "Funding threshold" or "minimum funding threshold" in the study summarized in this chapter mean the minimum allocation requirement of $15,000 for secondary subgrantees, referenced in Sec. 131(c) of *Perkins IV*, and the minimum grant amount for postsecondary subgrantees of $50,000, referenced in Sec. 132(c) of *Perkins IV*.

[18] The provision also provides the option for subgrantees located in rural or sparsely populated areas and public charter schools that demonstrate an inability to enter a consortium to apply for waivers. See Sec. 132(a)(4) of *Perkins IV*.

the scale of consortia formation and states' approaches to consortia formation. Examples of consortia organization and operations illustrated in the text should not be generalized to all of the states and consortia included in the analytical categories presented.

KEY FINDINGS

The analysis of consortia formation revealed the following information about the prevalence of consortia nationwide and the configuration and financing of these entities within states (Klein et al. 2014).[19]

- **Consortia were more prevalent at the secondary than at the postsecondary level.** This was due in part to the smaller size of secondary subgrantees, the need for an LEA and an area CTE school or an educational service agency to fund such an entity that serves the LEA (see Sec. 131(c) of *Perkins IV*), and the comparatively larger number of secondary entities applying for funding. At the secondary level, nearly three-fifths (59 percent) or 5,570 of the 9,385 subgrantees that received funding in program year (PY) 2009–10 participated in *Perkins IV* as consortia members. Nationwide, 32 states provided funds to at least one secondary consortium, compared to just 10 states that reported funding postsecondary consortia. At the postsecondary level, the 191 consortia members accounted for roughly 16 percent of the 1,197 postsecondary *Perkins IV* subgrantees in that year (Klein et al. 2014).

- **On average, secondary consortia members enrolled fewer students than did stand-alone subgrantees.** For grades eight to 12, consortia members enrolled an average of 708 students, compared with an average of 3,110 students in stand-alone subgrantees. The difference in enrollments between the two groups suggests that the consortia provision, in accordance with legislative intent, is largely applied to small secondary subgrantees with allocations below the minimum requirement.

- **Secondary consortia members were concentrated in rural areas.** Rural secondary subgrantees tended to be located in areas with smaller populations than suburban and urban subgrantees, which affected their ability to achieve the minimum allocation requirement. Rural secondary subgrantees accounted for just over one-half (55 percent) of 9,385 *Perkins IV* subgrantees, but nearly two-thirds (66 percent) of 5,570 consortia members in PY 2009–10.

[19] The study summarized in this chapter (Staklis and Klein 2014) and the findings cited in this section draw on secondary data collected for the NACTE study (Klein et al. 2014) for 49 states and the District of Columbia. Data for Delaware and postsecondary consortia allocation data for Indiana and New York were not submitted.

- **Secondary consortia members enrolled proportionately fewer students eligible for free or reduced-price lunches.** Some 40 percent of the 9,460,800 students who attended subgrantees in consortia were eligible for a free or reduced-price lunch, compared with 51 percent of the 30,865,600 students enrolled in stand-alone subgrantees.[20]

- **Not all consortia members had allocations below the minimum allocation requirement.** In all of the states with 10 or more consortia, consortia included a mix of secondary subgrantees with grants under and over the minimum allocation requirement.

- **Consortia received 22 percent of *Perkins IV Title I* grants allocated to the secondary level.** In PY 2009–10, consortia grants accounted for about 22 percent of the total reported *Perkins IV* subgrantee allocations at the secondary level (or about $129 million of the $580 million allocated to secondary subgrantees). Rural subgrantees accounted for 29 percent of the $129 million that was allocated to consortia members but 17 percent of the $450 million allocated to subgrantees that were not consortia members.

The composition, operation, and financing of consortia varied across and within states. Some states had few locally directed consortia that operate with minimal state guidance, whereas in other states all or nearly all *Perkins IV* subgrantees were consortia members. States with *Perkins IV* consortia fell into one of four categories:

- **Category 1: Cross-Level Consortia.** Four percent, or two of the 49 states included in this study, either required (Minnesota) or encouraged (Oregon) consortia to include both secondary and postsecondary subgrantees. Consortia members collaborated on the development and implementation of joint local plans that detailed how funds would be used to support and improve CTE programs offered at both the secondary and postsecondary educational levels.

- ***Category 2: Near-Universal Consortia.*** Ten percent, or five, of the 49 states in this study allocated virtually all secondary grant funds to regional consortia made up of secondary subgrantees. These included Indiana, New Hampshire, and Rhode Island, which required consortia engagement for all secondary subgrantees, and Illinois and Michigan, which funded consortia for all but two large urban districts located in the Chicago area and Detroit, respectively. (The "Chicago area" for the purpose of the study summarized in this chapter refers to the J. Sterling Morton High School District and the Chicago Public Schools.)

[20] Percentages represent the number of students who were eligible for a free or reduced-price lunch at any grade level attending school districts in the areas of the subgrantees.

- **Category 3: Majority Consortia.** Consortia in 13 states, which comprise roughly 27 percent of the states in this study, accounted for at least 59 percent but not more than 94 percent of their states' secondary subgrantees in PY 2009–10. Consortia in these states were composed exclusively of either secondary or postsecondary subgrantees.
- **Category 4: Limited Consortia.** Twelve states, or roughly 24 percent of the states included in this study, had secondary consortia that engaged 1 to 40 percent of secondary subgrantees.

The formation of consortia composed exclusively of secondary or postsecondary subgrantees may be a function of the *Perkins IV* statutory scheme. Grant allocation formulas are contained within different sections of *Perkins IV* (see Sec. 131(a)(1) and Sec. 132(a)(2) of *Perkins IV*) and offer no explicit options for distributing combined funding. States must allocate the majority of funds based on the student populations served by the subgrantees, which may contribute to a perception that funds are intended only for those enrolling within a given educational level.

While consortia formation itself does not guarantee connections among members, engaging secondary and postsecondary CTE subgrantees in joint planning ensures that some communication will take place across educational levels. Input from state directors suggests that when states provide opportunities for secondary and postsecondary consortia members to meet, they also enable members to connect with other stakeholders, such as representatives from business and industry. State directors noted that these opportunities particularly benefit rural and small secondary subgrantees with limited staff and remote locations that can impede connections with employers.

Encouraging and supporting collaboration among CTE providers and stakeholders need not occur through the formation of consortia alone. Although study activities focused on consortia formed to allocate federal funds under *Title I* of *Perkins IV*, states and stakeholder organizations also developed other networks that encouraged collaboration in CTE. These included systems for cooperation between and among educational levels that were organized through regional CTE service providers, community college efforts for adult learners, and employer-led initiatives to connect CTE with industry needs. In contrast to the consortia discussed in the study summarized in this chapter, these arrangements reflect the varied ways that CTE is organized across states, rather than the *Perkins IV* requirements.

CHAPTER V—THE EFFECT OF LINKED LEARNING CERTIFIED PATHWAYS ON SELECTED STUDENT OUTCOMES

STUDY DESCRIPTION

For the complete study report, see U.S. Department of Education, Office of Career, Technical, and Adult Education, *The Effect of Linked Learning Certified Pathways on Selected Student Outcomes*. Washington, D.C., 2016, available at http://ctecenter.ed.gov/index.php/page/our-research. This study report was prepared by Robert Fitzgerald, Randolph Ottem, and Justine Hufford.

In California, LLCPs are offered in California Partnership Academies, National Academy Foundation academies, small theme-based high schools, and small learning communities within comprehensive high schools. LLCP programs may elect to undergo a certification process that involves the submission of documentation on program implementation, staff characteristics and practices, student selection, and program outcomes as well as on-site classroom observations and interviews with students and their parents, staff, and local business partners. Outcomes for students attending an LLCP in California were the focus of the study summarized in this chapter.

Specifically, the study summarized in this chapter examined outcomes for grade-12 students in AYs 2010–11, 2011–12, and 2012–13. Outcomes included student engagement in learning, measured by high school attendance and discipline events, as well as college readiness and postsecondary enrollment. The analyses were conducted using observational data. Therefore, quasi-experimental statistical methods and crosstabular analysis were used to compare outcomes for these students with outcomes for similar students who did not participate in an LLCP program.

Data for the analyses were drawn from the Linked Learning District Initiative (LLDI), which provides grants to nine California school districts for the development and implementation of LLCPs.[21] The LLDI collects data about student academic and demographic characteristics and a variety of high school and postsecondary outcomes. These student-level data were supplemented by school-level information from the California

[21] Data for six of the nine LLDI districts were used in the analyses conducted for the study summarized in this chapter.

Department of Education on school enrollment, the percentage of students eligible to participate in the National School Lunch Program (an indicator of family poverty), the percentage of English language learner enrollment, the percentage of racial and ethnic minority students, and teachers' average number of years of experience. The federal Common Core of Data provided information on the urbanicity of the schools.

Because student participation in an LLCP is voluntary, the characteristics of the students who participate are likely different from the characteristics of those who do not. Propensity score matching, a quasi-experimental statistical method, was used to correct for these differences by matching intervention participants to students who did not participate in the intervention, based on the probability of participation.[22] Propensity scores (i.e., the probability of participating in an LLCP) were estimated for all students and then used to match LLCP students with other students with similar propensities for participation. The result of this matching process was a group of LLCP students who were similar on observable characteristics, such as pre-high school academic achievement and demographic characteristics.

Outcomes reported here are suggestive, but not conclusive, because other factors not included in the models may account for both participation in an LLCP and the differences in outcomes. Readers should keep this limitation in mind when evaluating the evidence of the efficacy of the LLCPs reported here. Gaps resulting from missing data may affect some of the results. In addition, students in the LLCPs and the matched comparison group were not necessarily enrolled in the same high schools, so participation in an LLCP may be confounded with school quality. Further, three of the LLCPs may use grade eight grade point average (GPA) as an admissions requirement, so the results for these LLCPs may be confounded with students' preexisting academic ability.

KEY FINDINGS

Propensity score matching and regression adjustment[13] for differences in baseline characteristics between the LLCP and the matched comparison group that fell between .05 and .25 standard deviations were used to compare the two groups of grade-12 students (those in an LLCP and those who were not) in three AY cohorts. Among the highlights of the analyses conducted for the study summarized in this chapter are the following:

- There were mixed findings for the association between participation in an LLCP and measures for student engagement as measured by attendance and disciplinary

[22] PSM was described by Rosenbaum and Rubin in their 1983 article, "The Central Role of the Propensity Score in Observational Studies for Causal Effects." *Biometrika,* 70: 41–55.

events in grade 12. LLCP students had better attendance in AY 2011–12, but there was no difference between these students and the matched comparison group of students in 2010–11 or 2012–13. In AY 2011–12, LLCP students were less likely to be suspended during their senior year. Although LLCP students appeared to be less likely to be suspended compared to their matched comparison group peers in AY 2012–13, the difference was not statistically significant at the .05 level (but was at the .08 level).

- Grade-12 students in all three cohorts who participated in an LLCP had a higher probability of graduating from high school than students in the matched comparison group. However, both LLCP and matched comparison groups had relatively high graduation rates (89.5 and 89.3 percent, respectively).
- Completion of the a-g admissions requirements (a set of 15 high school courses) and a related GPA required for admission to the University of California (UC) and California State University (CSU) public university systems were available only for the AY 2011–12 and AY 2012–13 cohorts. Analyses including two districts with large proportions of missing information showed that grade 12 LLCP students in the AY 2011–12 cohort were more likely to complete the course work and GPA requirements for admission to both UC and CSU than matched comparison-group students; among AY 2012–13 students, LLCP participants were more likely to complete these requirements for admission to a CSU than the comparison group. Excluding these two districts showed that LLCP students in the AY 2011–12 cohort were still more likely than the comparison group to meet the CSU course and GPA requirements, but there was no difference between the two groups in UC eligibility. Among the AY 2012–13 cohort, LLCP participants had a lower probability of completing the a-g requirements for UC.
- There were contradictory findings for UC and CSU GPAs calculated without respect to whether a student completed the 15 courses necessary for admission. Though the differences were small, the UC and CSU GPAs for the AY 2011–12 LLCP senior cohort were higher than those of the matched comparison-group students, regardless of whether the two districts with large proportions of missing information were included or excluded from the analyses. This relationship was reversed for students in the AY 2012–13 cohort. Again, regardless of whether the districts with large proportions of missing information were included or excluded, LLCP participants had lower GPAs than students in the comparison group.
- Postsecondary enrollment data were only available for 2011 and 2012 graduates. There was no difference in the probability of enrolling in postsecondary education for AY 2010–11 LLCP graduates and matched comparison-group students.

However, AY 2011–12 LLCP students were more likely than comparison-group students to have enrolled in postsecondary education. There were no differences between the two groups in immediate enrollment after high school graduation, a factor associated with successful postsecondary degree completion, nor was there any difference in short-term (one-year) persistence.

LLCPs provide an alternative to the traditional high school experience by allowing students to focus their coursework around a specific career field. LLCPs in California have broad support from policymakers, educators, and businesses as a means of focusing students' education in specific fields. Linked Learning also has a well-developed infrastructure to support its growth and development. Because these pathways are certified, districts in other states may use the LLCPs in the study summarized in this chapter as templates to implement pathways.

Although the study summarized in this chapter demonstrated that the LLCPs in the LLDI had some positive effects on student outcomes, the data used were collected during the early stages of LLCPs in California, and the number of students included in this study did not allow for analyses of individual LLCPs by CTE field. As the number of pathways, student awareness of pathways, and support among policymakers and businesses for pathways increase, future research should examine the effects of individual types of LLCPs on student outcomes.

CHAPTER VI—CONNECTING SECONDARY CAREER AND TECHNICAL EDUCATION AND REGISTERED APPRENTICESHIP: A PROFILE OF SIX STATE SYSTEMS

STUDY DESCRIPTION

For the complete study report, see U.S. Department of Education, Office of Career, Technical, and Adult Education, *Connecting Secondary Career and Technical Education and Registered Apprenticeship: A Profile of Six State Systems.* Washington, D.C., 2016, available at http://ctecenter.ed.gov/index.php/page/our-research. This study report was prepared by Olivia Rice, Jordan Hudson, Laura Rasmussen Foster, and Steven Klein. An Interactive Report is also available.

Secondary CTE programs support high school students in gaining the academic, technical, and employability skills necessary to pursue entry-level employment and to enroll in postsecondary education or advanced workforce training. Students typically begin to concentrate their CTE studies late in their junior or senior year, with some completing three or more courses in a specific program area. Instructional content begins with career exploration and becomes progressively more occupation-directed as students specialize in their coursework. Some have the opportunity to participate in a work-based learning (WBL) placement, where they learn and apply skills in an industry setting.

By connecting students seeking new skills with employers seeking qualified workers, Registered Apprenticeship (RA)[23] programs provide individuals with advanced technical skills and the training needed to find employment in a specific occupation. The U.S. Department of Labor's (DOL's) Office of Apprenticeship (OA), working in conjunction with State Apprenticeship Agencies (SAAs), is responsible for administering the system nationwide.[24] Programs recognized by OA must meet stringent guidelines that ensure that they are of high quality and conform to national industry standards. RA programs are sponsored by an employer, employer association, labor organization, or intermediary, such as

[23] The study summarized in this chapter used the term "RA" to describe RA programs officially recognized by OA. The term "apprenticeship" refers to all types of apprenticeship programs, including non-federally recognized training programs similar to RA programs.
[24] For a description of the role of OA and SAAs, see http://www.doleta.gov/OA/apprenticeship.cfm.

a community-based organization or community college. The sponsor registers the program with the SAA or OA (depending on how the state administers its RA programs) to ensure that it adheres to federal and state standards and then manages its day-to-day operation. Apprentices generally are employed from the first day of their apprenticeship and receive technical instruction in combination with on-the-job training (OJT). There are other models where apprentices may take courses before starting OJT or even stagger coursework and OJT for several months at a time. This latter model is more prevalent among high school students. At the end of training, apprentices receive a nationally recognized, portable industry credential from DOL.

CTE and RA programs have many similarities. Each is structured to include classroom-based instruction and work experiences, with technical training becoming progressively more advanced to prepare individuals for career entry. Experiential learning in CTE programs comes in the form of WBL placements that, although generally less time intensive than the OJT required of an apprentice, expose them to the real-world applications of technical skills. The two programs also have overlapping content, with CTE coursework at the secondary level tending toward career exploration, and RA programs providing more specialized and intensive training to prepare individuals for a specific occupation.

To help clarify the association between CTE and RA, NCICTE undertook a systematic review of the programmatic, administrative, and financial policies that six states—Connecticut, Florida, Kentucky, North Carolina, Rhode Island, and Washington—have developed to link the two programs. NCICTE identified these six states based on input from OA and OCTAE. Study activities were directed at answering the following questions:

- What are the *program features* that define states' efforts to align secondary CTE programs with RA, including information related to curriculum development and delivery, options for WBL participation, student recruitment, transition to postsecondary education and employment, and the scale and scope of program offerings?
- What *program supports* exist at the state and local levels to promote system coordination between secondary CTE and RA programs, including the roles of state agencies and other key partners, state legislation and administrative policies governing program operations, employer and parental engagement, financing, and the collection of data?

KEY FINDINGS

The six states profiled in this study used a range of approaches to align secondary CTE with RA and differing terminology to describe their efforts. While programmatic components varied, states' approaches generally fell into one of three categories:

- **RA.** High school students participate directly in RA programs and are registered as apprentices with OA. Accommodations may be made for students' age and ability to work in some industry settings, with CTE coursework applied toward RA requirements and RA participation applied toward high school graduation requirements (North Carolina).
- **Pre-apprenticeships.** High school students participate in programs designed to prepare them for an RA program, with related technical instruction provided as part of their CTE coursework. Students often participate in WBL placements with an RA sponsor and receive preferred or enhanced entry with credits earned toward RA program requirements (Connecticut, Florida, Kentucky, North Carolina,[25] and Washington).
- **Registered CTE curriculum.** High school students enroll in CTE coursework that the state has aligned to RA programs in high-demand industries. All enrolling students earn credits toward an RA program following high school completion (Rhode Island).

The state CTE and RA administrators interviewed in the study states identified several challenges to growing programs that align CTE with RA. Insufficient resources and limited opportunities for cross-agency collaboration made it difficult for state staff to coordinate efforts and effectively market programs. A lack of awareness about RA programs within schools also adversely affected enrollments. Students and parents frequently associate RA with manual jobs in traditionally male-dominated careers that do not require a postsecondary credential or degree. Employers have their own misperceptions, with many lacking information on how high school linkages might be developed or the potential payback that sponsorship might offer. Finally, liability concerns affected employers' willingness to participate in RA programs. Insurance programs in many states are unwilling to write policies to allow youths under the age of 18 to engage in physically demanding work on a job site, and policies that are available can be cost prohibitive.

The six states in this study developed strategies to address these identified challenges. While these approaches have yet to be rigorously studied to assess their efficacy, they may help inform states' efforts to expand the pipeline into RA through the alignment of CTE and RA

[25] North Carolina offers both RA and pre-apprenticeship programs at the secondary level.

programs and increase the career options of high school students. The strategies included the following:

1. **Provide cross-agency support to align CTE and RA programs.** Improving programmatic linkages requires building strong partnerships across state agencies, with state policies and legislation providing an effective way to promote RA as an option for students.

1. **Deliver technical assistance at the regional and local levels to promote program linkages between CTE and RA programs.** Connections between CTE and RA programs in most of the six study states were initiated at the local or regional levels by motivated employers, who approached secondary CTE programs with the goals of expanding their existing RA program or creating new training opportunities. Because employers and educators often lack information about one another's capacities and needs, each of the study states developed strategies to coordinate program development, often by leveraging existing state or regional staff from both CTE and RA to market program options and assist in program startups and sustainability.

2. **Create resource tools and guides to support program alignment.** Aligning CTE with RA programs requires that educators and employers work together in new ways. For example, employer sponsors must work with secondary CTE educators to identify where programs overlap and how CTE course credits and WBL experiences can be applied toward meeting RA requirements. Educators, in turn, must determine how RA and pre-apprenticeship can be integrated into programming and how to ensure that students are able to meet high school graduation requirements. Study states developed tools to support employers in developing programs, including how-to guides, websites, and guidebooks.

3. **Conduct outreach to publicize the benefits of RA programs.** To counter commonly held misperceptions about apprenticeships, study states created and disseminated information on how RA programs can help high school students advance their careers. These outreach efforts, which were targeted at parents, educators, and policymakers, sought to explain how these programs operate and describe the benefits that program participation offers. Engaging with parents was noted as particularly important because parental consent is required for minors to participate in some RA and pre-apprenticeship programs.

4. **Address barriers to student and employer involvement.** Bringing high school-aged youths to the workplace can create liability issues that make it difficult for employers to offer them WBL opportunities. Study states found innovative ways to reduce the risk and cost of sponsors employing youths, including partnering with third-party agencies to

serve as a student's official employer, creating tax incentives to encourage employers to sponsor RA programs in high-growth sectors, and offering tuition reduction that can apply toward the required related technical instruction.

Apprenticeship programs offered within secondary CTE give students access to high-quality, occupation-directed training that combines classroom instruction with applied and, in some cases, intensive WBL opportunities. In some states, program completers can apply the time spent in instruction toward meeting the related technical instruction and OJT requirements of an affiliated RA program. This can reduce the time required for students to complete the program, as well as ensure them entry into a well-paying, highly skilled job. If the experience of the study states' experiments with a range of approaches for connecting CTE with RA can be applied to the nation at large, then it appears that there is considerable room for expanding the pipeline from CTE to RA by increasing program options for secondary students.

CHAPTER VII—EIGHT-YEAR POSTSECONDARY OUTCOMES OF CAREER AND TECHNICAL EDUCATION STUDENTS FROM THE HIGH SCHOOL CLASS OF 2004

STUDY DESCRIPTION

For the complete study report, see U.S. Department of Education, Office of Career, Technical, and Adult Education, *Eight-Year Postsecondary Outcomes of Career and Technical Education Students from the High School Class of 2004*, Washington, DC, 2015, available at http://ctecenter.ed.gov/index.php/page/our-research. This study report was prepared by Ben Dalton. An Interactive Report is also available.

The study summarized in this chapter examined the labor market outcomes of high school CTE students. Using nationally representative data from the Education Longitudinal Study of 2002 (ELS:2002), the study analyzed data for a recent cohort of high school graduates (the class of 2004) as of 2012, eight years after they had completed high school. This group of students entered college and the labor force at a time of significant economic challenges — challenges that CTE has often been called upon to help address. By understanding the characteristics of these high school CTE participants and examining their employment status and earnings relative to nonparticipants, the study summarized in this chapter provided a portrait of the extent to which CTE may help high school students succeed in the workforce beyond the first few years of secondary school. It also took a rare opportunity to compare the labor market outcomes of high school CTE students in two different decades by examining data from ELS:2002 and its predecessor study, the National Education Longitudinal Study of 1988 (NELS:88), whose study participants were in grade 12 in 1992 and were also surveyed eight years later, in 2000.

The study summarized in this chapter provided national statistics about labor market outcomes of CTE participants at different levels, including those who concentrate on a particular field of study in high school, as well as detailed study results for concentrators by their specific field. Results were presented overall and were often broken down by postsecondary education attainment and background factors, such as gender, race/ethnicity, and socioeconomic status (SES).

It is important to note that the findings of the study summarized in this chapter cannot be used to draw conclusion about *Perkins IV* because the students described in the study summarized in this chapter graduated from high school two years prior to its enactment. The *Carl D. Perkins Vocational and Technical Education Act of 1998* was the law in effect at the time the class of 2004 attended high school and participated in secondary CTE courses.

KEY FINDINGS

Characteristics of high school CTE students. Students who earn CTE credits — especially students whose focus is CTE — differ from other students in terms of background and academic preparedness.

For the purposes of this study, high school CTE students were divided into four groups based on the number of occupational credits they earned during high school (Dalton et al. 2013). Occupational credits refer to credits in courses designed for specific labor market preparation in a field or area of study. Examples include business, computer and information sciences, manufacturing, and repair and transportation. The study focused on the following four groups:[26]

Nonparticipants:	Earned less than one occupational CTE credit
Samplers:	Earned one to two occupational CTE credits in one or more fields
Explorers:	Earned three or more occupational CTE credits, but no three credits in any single occupational CTE field
Concentrators:	Earned three or more occupational CTE credits in at least one occupational CTE field

The study focused on comparing CTE concentrators to nonparticipants, although results were presented for all groups.[27]

- Eighteen percent of students from the high school class of 2004 concentrated in one or more CTE fields of study. Forty-two percent earned at least three CTE credits but did not concentrate in a single area.

[26] Note that these are not official designations of the U.S. Department of Education.
[27] Only data for public school students were analyzed. The analysis sample consisted of public high school completers with complete transcript data who met minimum credit criteria. The total number of cases analyzed for the study summarized in this chapter was 6,988 for ELS:2002 and 7,046 for NELS:88.

- Among the largest groups of CTE concentrators were those focusing on business studies, composing 16 percent of all concentrators, more than all areas except agriculture and natural resources, and communications and design. Among the smallest groups of concentrators were those focusing on public services (e.g., protective services, legal studies, or teaching).
- The following groups were more likely to be CTE concentrators: males (57 percent versus 43 percent of females), students from the lowest SES quartile (26 percent versus 17 percent from the highest SES quartile), and students who scored in the bottom quartile of ELS:2002's math assessment (31 percent versus 18 percent who scored in the top quartile).
- The most heavily female field of study was consumer and culinary services, with 89 percent of all concentrators being female. The most heavily male fields of study were repair and transportation, and manufacturing (both 93 percent male).
- A lower percentage of CTE concentrators earned a bachelor's degree or higher within eight years of completing high school than nonparticipants (27 percent versus 49 percent, respectively). CTE concentrators were more likely to have completed only a high school education than nonparticipants (17 percent versus 6 percent).

Employment and earnings outcomes[28] of high school CTE students from the class of 2004 in 2012. The study found that:

- There were no statistically significant differences in employment status among students with different levels of high school CTE participation. Between 75 and 77 percent of high school completers from 2004, depending on CTE participation level, were working full time in 2012; another 8 to 11 percent were either working part time or unemployed.
- Labor force participation rates (the total of working full-time, part-time, or unemployed) were also high and consistent across CTE fields of study. However, some groups were more likely than others to have a particular employment status. For example, CTE concentrators in engineering technologies were more likely (92 percent) than peers in consumer and culinary services (54 percent) to be working full time.

[28] Employment and earnings were reported for those not currently enrolled in college.

- There was little variation in the percent of the high school class of 2004 that was ever unemployed, or in the average number of months unemployed since 2009, by CTE participation level or concentrator field of study.
- Although results show that high school CTE concentrators have a nominally higher median income ($29,000) than nonparticipants ($26,000), the differences were not statistically significant. Hourly wages were also no different across CTE participation levels.
- However, CTE concentrators who had earned an associate degree had a higher median annual income ($34,000) than nonparticipants with an associate degree ($22,000).

The high school class of 2004, surveyed in 2012, was compared to the high school class of 1992, surveyed in 2000. These cohorts experienced postsecondary life in the eight years after high school under very different circumstances:

- When comparing the class of 2004 to the class of 1992, there were no statistically significant differences in labor force participation rates by CTE participation level or concentrator field of study.
- There were some differences in the percent working full time and the percent unemployed, however. In 2012, 77 percent of CTE concentrators were working full time, compared to 85 percent in 2000. Computer and information science concentrators were less likely to work full time in 2012 versus 2000 (75 percent versus 99 percent). Computer and information science concentrators were the only concentrators for whom a significant difference was observed.
- Students at all CTE participation levels were more likely to be unemployed in 2012 than in 2000. Eight to 10 percent of the class of 2004 were unemployed in 2012, but only 2 to 4 percent of the class of 1992 were unemployed in 2000.
- As with employment status, there were no differences in median annual income or median hourly wage by CTE participation level within the class of 1992 in 2000 or within the class of 2004 in 2012. All CTE groups—nonparticipants and participants alike—saw a decline in their median annual income.

The class of 2004 versus the class of 1992. Overall, the study found that, despite differences in background and postsecondary education and training, high school CTE participants were remarkably similar to nonparticipants in their employment and earnings outcomes at the time the follow-up surveys were administered. There were no significant differences in employment status, experiences of unemployment, or annual earnings by level of CTE participation.

These results are encouraging but also provide sober reminders that recent high school and postsecondary graduates face challenging economic conditions. In both cohorts studied, results clearly indicate that, despite less advantaged backgrounds, CTE students fare just as well as their nonparticipating counterparts. At the same time, the findings show that recent CTE students and nonparticipants face an unfriendly economic climate that is markedly worse than that experienced by their peers a dozen years before. Further, while it is encouraging that CTE participants from 2004 were not more adversely affected than nonparticipants by the Great Recession, as their skills age, they may be at risk of falling behind due to economic restructuring that favors high-skill, nonautomated work. To the extent that higher education can help protect high school CTE participants' achievements and improve their long-term outcomes — as seen in the wage premium observed for CTE concentrators with an associate degree — policy can be geared toward ensuring access to college and building on the futures that CTE students established for themselves in high school.

CHAPTER VIII—CONCEPT PAPER: APPLYING HUMAN CAPITAL PERFORMANCE BONDS TO CAREER AND TECHNICAL EDUCATION

The concept of social impact investing is based on the idea that human service providers generate economic value to society, and that value can be used to fund their services. Some of the social and financial benefits created by these providers can be measured and have actual cash value to the public sector (or other entities, such as health care organizations). These future cash savings can be used to finance the upfront services that providers deliver.

Social impact investments, often referred to as SIBs, have two components: (1) a pay-for-performance payment system and (2) a financing mechanism. Both can be, and are, used separately. Pay-for-performance shifts the focus from paying for activities to paying for specified results, bringing about increased accountability in contracting or payment systems. The financing mechanism adds the element of time, recognizing that value of the investment often requires time to materialize. In this way, it is possible to finance high-return programs that fall outside of a normal budgeting cycle.

Most SIBs, like those in place in New York City and the United Kingdom, are not really bonds at all. Investors provide the cash for services and are repaid by the municipality or state. Because investors take most of the risk, they demand a higher return on their investment than they do for investing in municipal bonds.

The state of Minnesota authorized a pilot of a unique SIB financing structure known as HUCAP. The two key design features that distinguish HUCAP from other social impact investing models are (1) bond funds that are used for capital and (2) payments to nonprofits that vary with their performance. These design features are intended to provide a number of incentives considered important to the long-term success of HUCAP by (1) shifting the focus from cost to value; (2) paying providers for the value they create, which encourages them to continually strive to improve performance; and (3) diminishing the common problem of "cherry-picking" (choosing to serve only the easiest cases because the payment does not vary). Because providers are paid for their value added, they are compensated more for good results with harder-to-serve clients.

Although HUCAP has the potential for widespread replication and great scale, not all services are good candidates for HUCAP. At its heart, HUCAP is a set of contracts, which together comprise the deal. The deal can be transacted only if a set of key conditions are met. Those conditions are (1) a tested and proven program, (2) a sufficient stream of financial benefits, (3) the means and willingness to capture financial savings, (4) the means to collect valid and reliable data, and (5) a stream of benefits that accrue over time.

The paper summarized in this chapter described the HUCAP model and considered how it could be applied to CTE. Two hypothetical examples — contextualized math and career academies — that highlight the key conditions in different ways, were presented.

Contextualized math. This example was about a school district whose goal was to reduce its students' need for developmental education in the state's community colleges. Evidence suggests that contextualized math can help students attain this result. If a district wants to invest in the Math-in-CTE model but has no funds available to implement it, it can decide to use HUCAP. The district and community colleges would need to determine whether the expected savings were great enough to cover the implementation costs. Following this path requires developing a cooperative working relationship between the school district and the local community colleges, and also determining if the community colleges are willing to recognize, capture, and return the savings to the school district. Furthermore, because state standards may make it difficult to implement Math-in-CTE, the state may need to be a partner, perhaps through providing waivers or adopting legislation that allows Math-in-CTE to be expanded.

In this hypothetical case, the school district and community college conduct financial and data analyses. They find that savings for each student accrue in the first year of community college and that it will take about five graduating classes of high school students to yield enough savings to cover the implementation costs. The school district agrees to implement the program, and the community college agrees to capture all of the savings from the first five years and remit them to the school district. All of this assumes that they can track students (both in the experimental and control/comparison groups) from high schools into postsecondary schools. The community college may or may not have to sell bonds to realize savings.

Career academies. Career academies are defined, for the purpose of this paper, as schools-within-schools or small learning communities that provide a postsecondary-preparatory curriculum with a career-related theme. A review of the evidence of career academies suggests that students of career academies achieve higher graduation rates, better attendance and grades, more credits in high school, and higher participation and performance in postsecondary education than their peers in other types of high schools. The strongest and

most persuasive differences were found among students at the highest risk of school failure. Compared to this group, there was also evidence of lower arrest rates.

Any of these metrics could be used in a pay-for-performance scheme. Few, with the exception of the lower arrest rates, directly produce financial savings, although they lead to other outcomes, such as higher wages, that can be monetized. To fund career academies as HUCAP, alternative, measurable outcomes need to be specified. For example, one study found large, sustained, and statistically significant differences in labor market outcomes (Kemple 2008). These increased wages translate to higher income and sales tax for state governments. The question is whether they generate enough to defray any incremental costs of implementing career academies. Alternatively, the program could be restricted to at-risk students if additional savings in law enforcement or public assistance could be added to the equation.

All of these aspects of the career academies program assume that the state agencies are willing parties to the deal, including willingness to provide data. Such a deal is unlikely to come about without significant commitment and leadership from a party, such as a governor's office, that can command the engagement of potential partners. The more parties added to the contractual structure, the more tracking and data collection are needed, making the evaluation more complex and costly. But, ostensibly, all of the students could be tracked in state data systems using their social security numbers and student identification numbers. However, a major challenge is time lags. If income gains occur eight years after high school graduation, at what point should monitoring for results start and for how long? At what point might it be assumed that the data that are captured today will carry forward into the future (i.e., that it is reasonable to project future results from today's data)? Answers to these questions, based on the capacity for evaluation and the willingness to take on risk, will determine the structure of the contracts and indeed the appetite for structuring the deal in the first place.

CHAPTER IX—CONCEPT PAPER: USING COMMUNITY BENEFIT AGREEMENTS TO SUPPORT CAREER AND TECHNICAL EDUCATION

For the complete concept paper, see U.S. Department of Education, Office of Career, Technical, and Adult Education, *Using Community Benefit Agreements to Support Career and Technical Education.* Washington, D.C., 2016, available at http://ctecenter.ed.gov/index.php/page/our-research. This concept paper was prepared by David A. Marcello.

Community benefit agreements (CBAs) are legally binding contracts that secure private-sector funding for improvements within neighborhoods affected by proposed real estate developments. A community coalition engages area residents in identifying community needs that become the subject of negotiations between developers and community groups. In a successful CBA negotiation, developers provide concessions in exchange for the community coalition's support of the project.

The paper summarized in this chapter provided information for state and local policymakers regarding the potential use of CBAs to support the delivery of high-quality CTE services in schools and colleges serving their surrounding communities. CBAs can serve as a potent tool for delivering comprehensive CTE programs that benefit a broad population of resident youths and adults. This desired outcome can be accomplished only if those charged with negotiating CBAs understand the benefits of well-designed CTE programs and the importance of engaging CTE educators from the secondary and postsecondary levels in planning discussions.

The paper is organized as a series of FAQs about CBAs and their corresponding answers. FAQs address the distinguishing characteristics of CBAs, their potential benefits, key considerations in structuring these agreements, and internal and external impediments to successful CBA negotiations.

What types of benefits do CBAs provide? CBAs can support CTE programs that offer great value to community members, enabling young people and adults to engage in

workplace learning where academic and technical skills may be applied in context.[29] One of the most obvious links between CBAs and CTE may be the potential for money from developers to fund CTE programs. CBAs can foster CTE by providing an income stream of supporting revenue that extends the benefits of CTE courses of study to under-resourced neighborhood residents. CBA funding can also be used to purchase CTE instructional equipment and supplies. Money need not be the only benefit, however; institutional arrangements between businesses and CTE providers afford another rich opportunity for community gains.

How are CBAs negotiated? The first step in a CBA negotiation is to establish a community benefits coalition (CBC) that incorporates the broadest possible representation from the affected community and that is authorized to speak on behalf of the community.[30] CBA negotiations are carried out between a developer and a community coalition and may involve business executives, community members, and lawyers. The public sector often plays no role at all.[31] When cities negotiate directly with a developer, the negotiations result in a public-private partnership (PPP) that embodies in an enforceable agreement of the public and private parties' commitments to each other.[32]

What do developers get out of a CBA? Developers seek to minimize risk. CBAs help developers by diminishing their exposure to one type of risk — a lack of community support for their proposed development or even, potentially, outright opposition to it. CBAs create a shared interest between the developer and the community in seeing that the proposed project will come to fruition. Introducing CTE into a CBA negotiation may appeal to developers who want to serve the educational needs of the community and assist in developing a better-prepared workforce.

What are the obstacles to a successful CBA negotiation? Potential pitfalls are plentiful in the path toward a successful CBA negotiation. Conflict of interest is one of the most predictable (and perhaps inevitable) challenges faced by CBCs at some point in their negotiations. These conflicts may be either internal to the coalition or external among key

[29] To date, however, most CBA concessions for apprenticeships or on-the-job training programs have not been structured as part of a comprehensive CTE program or more rigorous CTE program of study that aligns secondary and postsecondary educational programming to prepare youths and adults for college entry and career readiness.

[30] See The Public Law Center's website for a rudimentary draft: http://www.law.tulane.edu/tlscenters/PublicLawCenter/index.aspx (accessed November 15, 2014).

[31] In most instances, the "public sector" will be municipal government, and it will play no role at the table in negotiations between community members and the developer. Exceptions to this rule do exist, however.

[32] The PPP may become a public document when it is presented to the City Council for approval, but negotiations are usually conducted "off the radar screen" between a developer and executive branch officials, leaving no room for the public to observe or participate (Bezdek 2006). See also Marcello (2007), 660–63.

public officials, who often hold the power to facilitate or subvert CBA negotiations. CBCs can establish prohibitions and procedures to deal effectively with the former type of conflict. Regarding the latter, they can be vigilant but not omniscient, as hard experience has demonstrated.

What is the link between CBAs and CTE? CBA negotiations typically involve businesses within the community. The proximity of these businesses to educational facilities in the community opens the possibility for student WBL placements structured as part of regular school programming. Working with educators, businesses may be able to create a range of workplace experiences for students and instructors that provide authentic learning experiences aligned with the school curriculum. A well-formulated CBA would connect workplace opportunities with classroom curriculum to provide a more robust learning experience, where work experiences complement or reinforce CTE programming.

What can CTE do for CBAs? CTE experts can help the parties to a CBA secure the most "bang for their buck" in designing and delivering an important community benefit — CTE for community residents. The typical actors in a CBA negotiation are poorly equipped to design or deliver CTE; they need the guidance of CTE professionals. The most efficient use of resources in designing and delivering CBA-based educational benefits would be to tap into existing expertise among CTE professionals. Their track record of educational outcomes will lend credence to CBC requests for a commitment of resources from the developer during the front-end negotiations. Providing in the CBA for collection of valid and reliable data on the implementation of CTE programs will give both the developer-investor and the community-beneficiaries comfort after the fact that the money is being well spent, based on quantifiable results.

CHAPTER X—CONCEPT PAPER: THE POTENTIAL ROLE OF SOCIAL INNOVATION FINANCING IN CAREER AND TECHNICAL EDUCATION

A new class of financial tools is being developed to promote human capital investments that benefit society. SIF entails raising private capital to support promising social interventions, with the expectation that those providing the funding will eventually be repaid. Funds are allocated based on service providers' achievement of measurable improvements in social conditions, under what is termed a PFS contracting model. SIBs provide the upfront working capital for PFS contracts. This working capital is needed because a delay in payments is inherent in the PFS approach because it can take years to determine if it has achieved successful outcomes.

For the complete concept paper, see U.S. Department of Education, Office of Career, Technical, and Adult Education, *The Potential Role of Social Innovation Financing in Career and Technical Education*. Washington, D.C., 2015, available at http://ctecenter.ed.gov/index.php/page/our-research. This concept paper was prepared by George Overholser and Steven Klein.

The paper summarized in this chapter introduced the PFS and SIB concepts, described their applications nationwide, and explored their potential for generating resources that can be used to finance the delivery of high-quality CTE programming. State and local policymakers can use the principles presented in the paper summarized in this chapter to develop new applications for this innovative, yet still emerging, method of social service procurement.

The PFS and SIB concepts. PFS and SIBs operate by changing the way that government agencies at the federal, state, and local levels allocate and invest resources — shifting the focus from process to results. This new approach to financing human capital investment, termed SIF, entails raising private capital to support promising social interventions, with the expectation that those providing the funding will eventually be repaid.

PFS describes an approach in which government pays for services based on the achievement of measurable improvements in social conditions. Service providers develop evidence-based interventions that are designed to address a pressing societal issue, then enter into a multiyear contract in which an oversight body, typically a state or local government, agrees

to make payments for success to the extent that measurable outcomes are achieved.[33] SIBs are a means of providing private upfront working capital for PFS contracts. This working capital is needed because a delay in payments is inherent in the PFS approach because it can take years to determine if it has achieved successful outcomes. Typically SIBs weave philanthropic grants or loans, or for-profit loans, into an integrated working capital structure that is offered in exchange for a share of the government payments if performance targets are met.

Performance funding offers a number of unique benefits that make it particularly well suited for financing public services or interventions that offer a positive *return on investment* but might not otherwise be launched due to a lack of resources. Potential benefits fall into three broad categories:

- *Performance advantages,* including the incentive to innovate, impetus to improve administrative data systems, and access to private talent
- *Fiscal advantages,* including improved allocation of social spending resources, transfer of financial risk, and access to private capital
- *Political advantages,* including projects that are both fiscally conservative and socially progressive, and that outlast typical political time frames

Applying social innovation funding to CTE. CTE may be particularly well suited for PFS-SIB financing. First, CTE efforts are often associated with educational and workforce outcomes that generate the "cashable" savings for governments that make for economically attractive PFS arrangements. Second, because there are hundreds of testable innovations and providers serving millions of students, CTE is well suited for an outcomes-driven reward system. Third, with several large-scale databases already well established, CTE is positioned to take advantage of available data to gauge key outcomes.

At the high school level, SIF could create greater incentives for CTE programs to focus on aligning secondary school and postsecondary course work within broadly defined career pathways that expose youths to a range of professions. It could be used to confirm the value of rigorous standards-based academic instruction that is anchored within industry-recognized technical content or to reward CTE programs that allow students to earn college credit while still enrolled in high school, thereby accelerating the path to employment. If the inclusion of CTE instruction in such programs of study[34] can be shown through rigorous evaluation to bring about a measurable educational benefit to students, then there may be

[33] See http://www.thirdsectorcap.org/pay-for-success/what-is-pay-for-success/.
[34] The content areas to be included in as program of study are described in Sec. 122(c)(1)(A) of *Perkins IV*.

value in using PFS-SIB offerings to expand student access to CTE programs. In lieu of investing in CTE as a stand-alone program, investments could be made in programs that seek to harness CTE as an instructional design strategy for the delivery of academic content. This could include investing in career academies, which operate as schools-within-schools offering college-prep studies organized around an industry specialty, such as health or computer technologies. Options also exist for financing occupationally focused training. For example, a PFS-SIB could be developed by expanding work-based job placements or providing for competency-based learning that engages students in real-world applications.

As CTE programs weigh the benefits of PFS-SIB funding, the programs must consider several potential challenges, including the relative absence of:

- *High-quality, valid, and reliable data* to allow for a comprehensive assessment of project outcomes
- *Methodologically rigorous evaluation protocols* to ensure that outcomes can be accurately quantified
- *Knowledge of CTE program benefits among transaction coordinators*, who need to understand how CTE programs function if they are to provide technical advising to help structure grant programs
- *Compelling cost-benefit analyses* that can be used to show the economic return on an investment in CTE programs.

Despite these challenges, PFS projects present great potential for CTE programs and may help pave the way for successful and sustainable educational impacts and funding streams.

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