U.S. Department of Education

Connecting Secondary Career and Technical Education and Registered Apprenticeship

A Profile of Six State Systems

Connecting Secondary Career and Technical Education and Registered Apprenticeship

A Profile of Six State Systems

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

National Center for Innovation in Career and Technical Education

BY
Olivia Rice
Jordan Hudson
Laura Rasmussen Foster
Steven Klein

RTI INTERNATIONAL

JULY 2016

This report was produced under U.S. Department of Education Contract No. ED-VAE-12-C0051 with RTI International, which administers the Department of Education's National Center for Innovation in Career and Technical Education. Carolyn Lee served as the contractor's officer representative. The views expressed herein do not necessarily represent the positions or policies of the Department of Education. No official endorsement by the U.S. Department of Education of any product, commodity, service or enterprise mentioned in this publication is intended or should be inferred.

U.S. Department of Education
John B. King, Jr.
Secretary

Office of Career, Technical, and Adult Education
Johan E. Uvin
Deputy Assistant Secretary, Delegated the Duties of Assistant Secretary

July 2016

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

Availability of Alternate Formats

Requests for documents in alternative formats such as Braille or large print should be submitted to the Alternate Format Center by calling 202-260-0852 or by contacting the 504 coordinator via email at om_eeos@ed.gov.

Notice to Limited English Proficient Persons

If you have difficulty understanding English, you may request language assistance services for Department information that is available to the public. These language assistance services are available free of charge. If you need more information about interpretation or translation services, please call 1-800-USA-LEARN (1-800-872-5327) (TTY: 1-800-437-0833), email us at Ed.Language.Assistance@ed.gov, or write to U.S. Department of Education, Information Resource Center, 400 Maryland Ave. SW, Washington, DC 20202.

Content contact: Carolyn Lee at Carolyn.Lee@ed.gov.

CONTENTS

PAGE

List of Exhibits v

Acknowledgments vii

Abbreviations ix

Executive Summary xi

State Approaches to Linking Career and Technical Education and Registered Apprenticeship xii

Expanding Career and Technical Education and Registered Apprenticeship Alignment xv

In Summary xvii

Introduction 1

Methodology 2

What Is Career and Technical Education? 4

Programmatic Features 4

Administration 6

Financing 7

What Is Registered Apprenticeship? 9

Programmatic Features 9

Administration 10

Financing 11

Data 13

State Approaches to Linking Secondary Career and Technical Education and Registered Apprenticeship Programs 15

North Carolina 17

Connecticut 21

Florida 24

Kentucky 28

Washington 33
Rhode Island 37

Conclusion 40

Expanding Alignment Between Career and Technical Education and Registered Apprenticeship 41
In Summary 47

References 48

Appendix A: Interview Protocols A-1
Connecting CTE and Apprenticeship Interview Protocols A-1

Appendix B: Overview of Career and Technical Education and Registered Apprenticeship in Study States B-1

Appendix C: Example State Tools & Resources C-1

LIST OF EXHIBITS

PAGE

Summary of State Approaches for Aligning Secondary Career and Technical Education and Registered Apprenticeship xiv

Exhibit 1: Federal Programs That Provide Apprenticeship Incentives, by Department 12

Exhibit 2: North Carolina High School Apprenticeship Programs and Sponsors 19

Exhibit B-1: Secondary Career and Technical Education in the Study States B-1

Exhibit B-2: Registered Apprenticeship in Study States B-3

This page intentionally left blank

ACKNOWLEDGMENTS

National Center for Innovation in Career and Technical Education (NCICTE) researchers would like to thank the following individuals who provided information for use in the development of this report:

Connecticut

Pat Ciarleglio, education consultant, Connecticut State Department of Education, Connecticut Technical High School System Central Office

Ray Mencio, construction trades consultant, Connecticut State Department of Education, Connecticut Technical High School System Central Office

Bernie Treml, supervisor of apprenticeship, Connecticut State Department of Education, Connecticut Technical High School System Central Office

Vinnie Valente, program manager, Connecticut Department of Labor, Office of Apprenticeship Training

Florida

Rod Duckworth, chancellor, Florida Department of Education, Division of Career and Adult Education

Bill Lauver, regional coordinator, Florida Department of Education, Career and Technical Education, Apprenticeship Programs

Jeff McGinley, president, Florida Training Services, Inc.

Ken Olsen, senior educational program director, Florida Department of Education, Career and Technical Education, Apprenticeship Programs

Stephen Seville, regional coordinator, Florida Department of Education, Career and Technical Education, Apprenticeship Programs

Kathleen Taylor, bureau chief, Florida Department of Education, Division of Career and Adult Education

Kentucky

Michael C. Donta, deputy commissioner, Kentucky Department of Labor, Division of Employment Standards

Mary Taylor, program manager, Kentucky Department of Education, Office of Career and Technical Education

North Carolina

Kathryn Castelloes, executive director for apprenticeship, North Carolina Department of Labor, Apprenticeship and Training Bureau

Jo Anne Honeycutt, director, North Carolina State Board of Education, Department of Public Instruction

Rhode Island

Vanessa Cooley, administrator career technical education, Rhode Island Department of Education, Office of Multiple Pathways

Paul McConnell, education specialist career and technical education, Rhode Island Department of Education, Career and Technical Education

Washington

Betty Klattenhoff, state career and technical education director, Washington Office of Superintendent of Public Instruction, Career and Technical Education

Kathleen Loop, assistant superintendent, Washington Office of Superintendent of Public Instruction, Career and College Readiness

Eleni Papadakis, executive director, Washington State Workforce Training and Education Coordinating Board

Dennis Wallace, program supervisor, Washington Office of Superintendent of Public Instruction, Skilled and Technical Sciences

Tim Wilson, apprenticeship program manager, Washington State Department of Labor and Industries

ABBREVIATIONS

ACTE	Association for Career and Technical Education
AY	academic year
CTAE	career, technical, and agricultural education
CTE	career and technical education
CTHSS	Connecticut Technical High School System
CTSO	career technical student organization
DOL	U.S. Department of Labor
ECAAP	Early Childhood Associate Apprenticeship Program
FY	fiscal year
NASDCTEc	National Association of State Directors of Career Technical Education Consortium
NCICTE	National Center for Innovation in Career and Technical Education
OA	Office of Apprenticeship
OAT	Office of Apprenticeship Training
OCTAE	Office of Career, Technical, and Adult Education
OECD	Organization for Economic Cooperation and Development
OJT	on-the-job training
Perkins IV	*Carl D. Perkins Career and Technical Education Act of 2006*
POS	programs of study
RA	registered apprenticeship
RAPIDS	Registered Apprenticeship Partners Information Data System
SAA	State Apprentice Agency
SAC	State Apprenticeship Council

STRA	State-to-Registered Apprenticeship program
TRACK	Tech Ready Apprentices for Careers in Kentucky
WBL	work-based learning
WIA	*Workforce Investment Act of 1998*
WIOA	*Workforce Innovation and Opportunity Act*
YES	Youth Employment Solutions

EXECUTIVE SUMMARY

Career and technical education (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 may learn and apply skills in an industry setting.

Registered apprenticeship (RA)[1] 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.[2] 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 a community-based organization or community college. The sponsor registers the program with the SAA or OA (depending on how the state administers their 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. Employed full-time, apprentices receive a paycheck and very often complete an associate degree at the employer's expense. Apprenticeships last between one and five years, depending on the occupation. At the end of training, apprentices receive a nationally recognized, portable industry credential from DOL. Some RA programs are connected to a related pre-apprenticeship program that is designed to prepare participants for entry into RA.

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

[1] This report uses the term "RA" to describe Registered Apprenticeship programs officially recognized by OA. The term "apprenticeship" refers to all types of apprenticeship programs, including non-federally recognized training programs similar to those of RA programs.
[2] For a description of the role of OA and SSAs, see http://www.doleta.gov/OA/apprenticeship.cfm.

of WBL placements that, although generally less time intensive than the OJT required of an apprentice, exposes 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, the National Center for Innovation in Career and Technical Education (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. Researchers identified these states based on input from OA and the U.S. Department of Education's Office of Career, Technical, and Adult Education (OCTAE). Study activities were directed at answering the following research 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?

STATE APPROACHES TO LINKING CAREER AND TECHNICAL EDUCATION AND REGISTERED APPRENTICESHIP

States profiled in this report are using a range of approaches to align secondary CTE with RA and are using differing terminology to describe their efforts. While programmatic components vary, states' approaches generally fall into one of three categories:

- **Registered Apprenticeship**—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 and/or enhanced entry with credits earned toward RA program requirements (Connecticut, Florida, Kentucky, North Carolina,[3] 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 following exhibit summarizes the study states' approaches to connecting secondary CTE coursework with RA and a brief description of program characteristics and components.

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

Types of Approaches for Aligning Secondary Career and Technical Education and Registered Apprenticeship, by State, Program Name, Year Created, Top Fields, Number of Participants (AY 2014–15), and Program Description

Type	State	Program Name	Year Created	Top Fields	Number of Partici-pants	Program Description
Registered Apprenticeship	North Carolina*	*High School Apprenticeship*	1994	Primarily advanced manufacturing fields, such as mechatronics, robotics, machining, electronics, and welding	155	• Participants registered with the U.S. Department of Labor's Office of Apprenticeship • Programs locally/regionally developed • Secondary students dually enrolled in CTE and RA programs
Pre-Apprenticeship	Connecticut	*Pre-apprenticeship*	1981	Primarily construction trades, including green energy, solar energy, and photovoltaics	100	• Programs available to youths and adults through the Connecticut Technical High School System • Participants earn related instruction credits in RA programs.
	Florida	*Youth Pre-apprenticeship*	2000s	Primarily construction and manufacturing	153	• Programs locally/regionally developed • Students may receive OJT with an active RA sponsor. • Related instruction delivered via area technology centers
	Kentucky	*Tech Ready Apprentices for Careers in Kentucky*	2013	Manufacturing and construction	140	• Programs developed at the state-level • Students engage in OJT with an RA sponsor, depending on field. • Related instruction delivered in traditional high schools
	North Carolina*	*High School Apprenticeship*	1994	Primarily advanced manufacturing fields, such as mechatronics, robotics, machining, electronics, and welding	45	• Programs locally/regionally developed • Secondary students earn credit towards RA programs.
	Washington	*Apprenticeship Preparation*	2006	Construction, culinary arts, aerospace, and early child care education	~ 350–500	• Locally-developed apprenticeship-preparation programs that link high school students to an RA program • Provide WBL and related instruction through CTE coursework.
Registered CTE Curriculum	Rhode Island	*Registered School-To-Apprenticeship*	1990s	Primarily construction trades, as well as medical fields and information technology	~ 3,000	• State initiative to help develop and promote the pathway from secondary CTE programs to the RA system • Secondary CTE curriculum is aligned and approved for credit toward RA programs.

*North Carolina operates RA and pre-apprenticeships programs for high school students.
Abbreviations: registered apprenticeship (RA); career and technical education (CTE); on-the-job training (OJT); work-based learning (WBL); academic year (AY)

EXPANDING CAREER AND TECHNICAL EDUCATION AND REGISTERED APPRENTICESHIP ALIGNMENT

The state CTE and RA administrators interviewed in the study states[4] 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 providers 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 states in this study have developed strategies to address these identified challenges. While these approaches, identified below, 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 programs. In so doing, it may increase the career options of high school students.

1. Provide cross-agency support to align career and technical education and registered apprenticeship programs.

Improving programmatic linkages requires building strong partnerships across state agencies, with state policies and legislation proving an effective way to promote RA as an option for students. In Florida, which co-located CTE and RA program oversight within the same office, staff reported success in coordinating program linkages, in part because administrators had a better understanding of program elements and opportunities to collaborate. Staff in the study states also described state legislation (Rhode Island and Washington) and state policies (Connecticut, Kentucky, and North Carolina) that established linkages between secondary CTE programs and RA, as well as helped clarify options for student participation.

[4] See Acknowledgments for the names and titles of the individuals interviewed from each state.

2. Deliver technical assistance at the regional and local levels to promote program linkages between career and technical education and registered apprenticeship programs.

Connections between CTE and RA programs in most 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, study states have 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 start-ups and sustainability. For example, Florida, North Carolina, and Connecticut fund regional representatives who work to promote program opportunities and provide technical assistance to develop programs. Local program staffs also share responsibility for program operations.

3. 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 programs can be integrated into programming and how to ensure that students are able to meet high school graduation requirements. Study states have developed tools to support employers in developing programs. For example, Washington state has created "how-to guides" that describe the process and regulations for developing programs. Additionally, some study states have created tools to assist educators in aligning CTE with RA, such as North Carolina's WBL website and guidebooks that describe how secondary programs are to be established and the responsibilities of each party to the agreement.

4. Conduct outreach to publicize the benefits of registered apprenticeship programs.

To counter commonly held misperceptions about apprenticeships, study states are creating and disseminating information on how RA programs can help high school students advance their careers. These outreach efforts, which are targeted at parents, educators, and policymakers, seek 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. Nearly all states maintained websites devoted to describing the benefits that RA offers, with some states, such as Kentucky, cobranding CTE and RA materials for use in promoting programs. The state of Washington created a student-focused website that promotes RA and helps guide students in their career decisions.

5. 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 are finding innovative ways to reduce the risk and cost of sponsors employing youths. In Kentucky, this includes partnering with third-party agencies to serve as a student's official "employer," thereby removing the need for participating businesses to cover workers' compensation liability insurance for high school students. Other states, such as Connecticut and Rhode Island, have created tax incentives to encourage employers to sponsor RA programs in high-growth sectors with projected workforce shortages and are seeking to make these incentives available for secondary apprenticeship programs. Finally, some states, such as Florida, offer tuition reduction that can apply toward the related technical instruction required as part of an RA program. While these employer and tuition incentives do not generally apply to the secondary pre-apprenticeship programs profiled in this report, study states reported their use as a potential strategy for growing these programs.

IN SUMMARY

Study findings suggest that states profiled in this report are using differing approaches to prepare high school students for RA participation. In some instances, such as in North Carolina, high school students participate directly in an RA program. In other cases, secondary CTE programs may be designed to feed into RA programs, for example, by structuring CTE as a pre-apprenticeship program that gives students course credits and workplace hours that may be applied toward meeting the requirements of an affiliated RA program, as well as an advantage in the application process. The study states employing this approach, Connecticut, Florida, Kentucky, North Carolina, and Washington, also provide students with the information they need to decide whether entry into an RA program will help them achieve their career goals. Within Rhode Island, it is the CTE curriculum, and not individual students, that is aligned with RA programs, enabling all CTE students taking the coursework to earn credits towards the aligned RA program.

Recent federal initiatives are paving the way for an expanded pipeline from CTE to RA. Recognizing the need to increase the supply of skilled workers in high-growth industries, the federal government has embarked on a groundbreaking initiative to expand RA into new fields. In December 2014, DOL announced the American Apprenticeship Initiative, a $175-million grant program to catalyze the creation of innovative postsecondary and work-based learning models to meet America's economic, industrial, and workforce needs.[5] Over time, DOL-funded pilots will lead to new apprenticeship opportunities in high-growth occupations and industries,

[5] http://www.dol.gov/apprenticeship/grants.htm

while expanding options for women and underrepresented populations. This effort may have implications at the secondary level, given the range of CTE training options currently offered within states for which no viable RA option currently exists.

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 addition to providing students with firsthand knowledge about their career options, program completers in some states may 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 assure them entry into a well-paying, highly skilled job. If the experiences of the study states' experiments with a range of approaches for connecting CTE with RA can be applied to 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.

INTRODUCTION

Career and technical education (CTE) has long been favored as a means for preparing youths to enter skilled professions. Instructional programs offered at the secondary education level seek to provide students with the academic, technical, and employability skills necessary to graduate from high school and succeed in the workforce. Designed to introduce students to a range of career options, technical content in these programs becomes progressively more specialized for those who choose to concentrate[6] in a specific field and may include work-based learning (WBL) opportunities. CTE concentrators who complete a program may enter employment immediately following graduation or choose to pursue advanced training or postsecondary education, often in conjunction with employment.

Registered apprenticeship (RA) has also been proven as a promising pathway to careers, one that can raise the wages of young adults while increasing economic productivity (Lerman 2014). Upon entering an RA program, individuals participate in classroom and on-the-job training (OJT) experiences that are technically focused and increasingly specialized. Roughly one-third attend a community or technical college concurrently to obtain job-related skills, with some qualifying for an associate degree (Lerman 2009). Upon completing their training, registered apprentices are awarded a nationally portable, industry-recognized certificate or license that enables them to practice in their fields. Recognizing the benefits that RA offers, the U.S. Department of Labor (DOL) is investing $175 million, through its American Apprenticeship Initiative, to help expand RA opportunities domestically and to promote the creation of new and innovative programs, and the scaling of effective ones, in high-growth fields.[7]

Given the instructional rigor and time commitment that RA entails, individuals seeking to enter a program must have the technical abilities and academic aptitude to succeed in their studies, along with a clear understanding of the work entailed in a given occupation. High school students completing advanced CTE coursework may be uniquely qualified to succeed in RA programs, in part because they have demonstrated both an aptitude for applied learning and interest in a particular career field. Consequently, many states and local educational agency providers have developed programs and policies that enable high school students to begin preparing for RA enrollment prior to graduating. The more purposeful alignment of CTE and RA programs may

[6] For federal accountability purposes, a secondary CTE *concentrator* is defined as a student who has earned at least three credits in a single CTE program area, or two credits if the program area is limited to a two-credit sequence. See https://s3.amazonaws.com/PCRN/uploads/studentdef.pdf.
[7] http://www.dol.gov/apprenticeship/grants.htm.

offer possibilities for expanding career options for high school students while helping to ensure that America is able to meet its future marketplace demand for skilled workers.

Indeed, apprenticeship has long been used internationally to help reduce youth unemployment rates and improve high school students' transition into the workplace.[8] In Switzerland, roughly two-thirds of teenagers participate in apprenticeship programs, working part-time for pay in conjunction with their educational coursework (Hoffman 2013). While a variety of factors are at play, it appears that early and structured career exposure may help these young adults prepare for careers. Unemployment rates for young adults in Switzerland (i.e., those ages 15–24) were estimated at 7.5 percent in the first quarter of 2015, roughly half the 14.3 percent average unemployment rate recorded for similarly aged youths across all other countries reporting data to the Organization for Economic Cooperation and Development (OECD 2015). Other countries, including Australia, Austria, and Germany, also rely on apprenticeships to help prepare youths for workforce entry (Steedman 2010). While there are important distinctions between how international and U.S. education and workforce development systems operate, findings from other countries suggest that secondary CTE programming may play an important role in expanding the pipeline to RA and, in so doing, improving career transitions for American youths.

To document state approaches to linking secondary CTE programs with RA, the National Center for Innovation in Career and Technical Education (NCICTE) reviewed programmatic features and supports connecting the two programs in selected states. This report opens with an overview of CTE and RA programs, followed by profiles of six states—Connecticut, Florida, Kentucky, North Carolina, Rhode Island, and Washington—that have established programs to assist high school students' in transitioning into RA and/or the workforce. It concludes with a synthesis of state practices, challenges, and lessons learned to help states explore options for strengthening linkages between the two programs.

METHODOLOGY

The objective of this study was to profile strategies for connecting secondary CTE and RA programs within selected study states, generally addressing the following research questions:

- What are the **program features** that define states' efforts to align secondary CTE programs with RA programs—including information related to curriculum development and delivery, options for WBL participation, student recruitment, transition to

[8] This report uses the term "RA" to describe domestic apprenticeship programs recognized by DOL. The more generic term "apprenticeship" refers to all career training programs that are designed to prepare youth for career entry and includes those not federally recognized.

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?

Researchers identified states for study inclusion based on input from DOL's Office of Apprenticeship (OA) and the U.S. Department of Education's Office of Career, Technical, and Adult Education (OCTAE). States were selected based on their having established programmatic linkages between CTE and RA programs at the secondary level. Other selection criteria included the consideration of state approaches to administering programs, use of federal and state funds in support of RA, engagement of employer and labor organizations in providing training, the scale and scope of apprenticeship offerings, and state geographic and demographic characteristics.

Once study states were identified, NCICTE researchers conducted structured telephone interviews with state CTE directors and state apprenticeship directors, using a standardized protocol developed in consultation with OA and OCTAE staff. A copy of the interview protocol is included in Appendix A. Online research also was conducted to collect additional information on CTE and RA offerings in each participating state.

Profiles for the six study states were developed based on findings from the stakeholder interviews and secondary research. Each profile includes a brief summary of the state's approach to linking secondary CTE and RA and a description of key programmatic features and supports. Local examples are included for select states as "Spotlight Programs" to illustrate these features and supports in more detail. Draft profiles were shared with the state contacts named in the Acknowledgements and revised to incorporate their feedback.

WHAT IS CAREER AND TECHNICAL EDUCATION?

In the past, vocational education was primarily reserved for youths who were considered more likely to enter employment than to enroll in postsecondary education immediately following high school graduation. To differentiate the mission of contemporary CTE instruction from that of the past, the field has largely discontinued the use of the term *vocational* in favor of *career and technical education*.[9] At the secondary level, the emphasis on preparing students to enter jobs has shifted to promoting both college and career readiness. Spurred in part by federal legislative provisions, CTE instructors have been encouraged to integrate rigorous academic knowledge into their technical course work. Expectations for secondary and postsecondary CTE program alignment have been established to mitigate course duplication across levels, reduce the need for postsecondary remediation, and ensure that programs terminate in the award of an industry-recognized credential or certificate, or an associate's or bachelor's degree.

PROGRAMMATIC FEATURES

The majority of high school students earn one or more CTE credits prior to graduating. National data indicate that in the 2009 academic year, the most current year for which data are available, over three-quarters (76 percent) of high school graduates completed at least one credit in an occupationally focused course (U.S. Department of Education 2009). This instruction may be offered in a variety of settings, including

- comprehensive high schools, which primarily emphasize academic instruction;
- full-time CTE high schools, which offer both academic and technical coursework integrated with technical content; or
- area or regional CTE centers, which deliver technical coursework to part-time students who receive their academic coursework at their home high schools (U.S. Department of Education 2014).

[9] In 1998, the American Vocational Association, the nation's largest CTE association, with more than 27,000 members at all levels of the field, changed its name to the Association for Career and Technical Education (ACTE). Similarly, in 2002, the national professional association for state directors dropped the term "vocational" from its title, renaming itself the National Association of State Directors of Career Technical Education Consortium (NASDCTEc). While use of the term *vocational* has fallen from favor in the United States, the international community continues to use "vocational education and training" to describe national workforce development programs that prepare youth and adults for employment.

While most students limit their participation in CTE to introductory coursework, roughly one-fifth of public high school graduates (19 percent) choose to specialize—or concentrate—in a CTE subject (U.S. Department of Education 2014). These youths, termed CTE concentrators, complete three or more sequential courses in a single occupational field. In some instances, programs may culminate with a student earning an industry-recognized certificate or credential. Programming also is designed to prepare high school students to pursue advanced skill training at the postsecondary level, which may include instruction offered at a public or private two-year college or four-year college or university. Transitions into other training options, including RA and the military, also are supported.

While states offer a range of CTE coursework, instructional programs are organized into broad industry fields, often referred to as "career clusters." The U.S. Department of Education recognizes 16 career clusters in the National Career Clusters Framework. Within each cluster are a subset of "career pathways" that describe a range of related occupations. There are currently 79 career pathways associated with the 16 career clusters, with the number differing by cluster area. For example, the information technology career cluster contains four related career pathways: network systems, information support and services, web and digital communications, and programming and software development. Each pathway has a plan of study that describes the academic and technical coursework that students will need to complete and specifies a related set of knowledge and skills statements.[10]

Federal support for CTE is offered through the *Carl D. Perkins Career and Technical Education Act of 2006* (*Perkins IV*). The dedicated financing and policy guidelines provided by *Perkins IV* help maintain state and local CTE programming, shape the administration of state CTE services, and the organization and delivery of local programs. One of the more noteworthy changes introduced in the reauthorization of *Perkins IV* was the requirement that all local grant recipients offer one or more CTE programs of study (POS).[11] A POS describes a coherent sequence of technical as well as academic courses that prepare students for further education and career success. Curriculum and instruction are rigorous and standards-based, aligned across the secondary and postsecondary education levels, and lead to the award of an industry-recognized credential or certificate or an associate or bachelor's degree. Where approved, high school students may earn college credits that may be applied toward a postsecondary credential, certificate, or degree.

[10] http://www.careertech.org/career-clusters.
[11] See Sec. 135(b)(2) of *Perkins IV*.

ADMINISTRATION

Oversight of state CTE programming is generally provided by different agencies at the secondary and postsecondary education levels. To comply with federal *Perkins IV* grant requirements, states designate a single board, termed an *eligible state agency,* to serve as the fiscal agent for its federal grant. This agency typically is housed with a state's department of education: 40 of the 55 states that receive *Perkins IV* financing[12] named their secondary K–12 education agency to serve in this role. Nine states chose a postsecondary system office, and the remainder chose another agency within the state. States also are required to name a state director of CTE who is responsible for overall grant management.[13]

Administration of the federal grant and state programs is provided by staff housed within a CTE unit or department within a state secondary or postsecondary education agency. These staffs are charged with a variety of responsibilities, which include reviewing and approving local grant applications for federal *Perkins IV* financing, collecting data on student participation and program performance, and providing technical assistance and professional development to support instructional improvement. Staff also may be responsible for a portfolio of education services in addition to their CTE responsibilities. The number of CTE staffs differs across states due to a number of factors, including states' commitment to offering CTE programming, availability of state financing, and department organization. State secondary and postsecondary CTE education agency staffs are typically housed in different agencies, which may limit day-to-day interactions among staff members.

Local CTE program providers receiving a *Perkins IV* allocation must comply with grant conditions specified in the federal legislation and must report data to the state on their levels of student participation and the program outcomes achieved.[14] These data are compiled by state administrators and reported to the federal government. States may also have their own reporting requirements associated with state funding for CTE, such as data on student participation, CTE expenditures, CTE staffing, and other factors used to allocate state funds. Local programs also may be required to report information on program performance and student outcomes to comply with state legislative requirements.

[12] This includes the 50 states, the District of Columbia, and the territories and outlying areas (American Samoa, Northern Mariana Islands, Guam, and Palau) eligible for grant participation.
[13] A listing of state CTE directors can be found at https://careertech.org/state-director-list.
[14] For a list of federal accountability indicators at the secondary education level, see Sec. 113(b)(2)(A) of *Perkins IV*.

FINANCING

State financing of CTE programs flows from a variety of sources. Federal investment in CTE programming is provided through *Perkins IV,* which articulates the requirements Congress has established for extending federal support to states and localities. Federal investment in CTE amounts to nearly $1.1 billion annually, with the majority of these funds (85 percent) required by law to be allocated among secondary and postsecondary program providers.[15] States have considerable discretion as to how these funds are split across education levels. The majority of states choose to direct their *Perkins IV* funding in support of secondary CTE programming. On average in fiscal year (FY) 2010, states directed roughly two-thirds (64 percent) of their local program funding to the secondary level (U.S. Department of Education 2014). Allocations within education levels are made using a statutory formula, with secondary distributions based on the number of youths ages 5–17 residing within a grantee's boundaries and the number living in poverty.[16]

While federal *Perkins* funding for CTE is significant and constitutes the largest single investment of federal resources directed at the high school level, it is estimated that federal support for CTE accounts for only a fraction of total national expenditures. Although current data on levels of federal investment are not available, statistics contained within the 2004 *National Assessment of Vocational Education* suggest that the federal share of funding for CTE amounted to roughly 5 percent in FY 2000 (Silverberg et al. 2004). This is because state and local communities provide the bulk of financing for CTE programming, while nearly all states provide some form of dedicated (or categorical) funding for CTE at the secondary level.[17] During academic year (AY) 2011–12, a majority of states (37) offered categorical funding of CTE programming, with state distribution approaches encompassing student-based formulas that allocated funds based on the number of students participating in coursework (21 states); unit-based formulas that distributed resources based on a set of educational inputs used to offer services (7 states); or cost reimbursement formulas that compensated states for all or a percentage of their total annual spending (9 states) (Foster, Klein, and Elliott 2014).

In addition to federal *Perkins* funding, CTE financing at the local level flows from a variety of sources, including the local tax base. In addition, some local CTE programs may generate program income. Monetary donations may come from local businesses, parents, and community groups, or through creative means, such as student fundraisers (Klein 2001). More often, schools

[15] This funding level was distributed to states in FY 2014, with a similar amount estimated to be distributed in FY 2015. See http://cte.ed.gov/grants/grant-program-guidance.
[16] See Sec. 131 of *Perkins IV*.
[17] During AY 2011–12, eight states provided no categorical resources for CTE, and seven earmarked state funding solely for use in area CTE centers that provide instructional services to part-time students drawn from surrounding high schools and districts (Foster, Klein, and Elliott 2014).

are given equipment, tools, and supplies by local business and industry groups. Schools also benefit from in-kind donations of time from business, industry, and labor representatives. It is virtually impossible to quantify local donations to CTE programming, in part due to the difficulty in placing a value on people's time and material gifts and because education providers are not typically asked to record or report such donations to the state.

Summary information about CTE offered in the study states is provided in Appendix B.

WHAT IS REGISTERED APPRENTICESHIP?

The RA system is an employer-driven approach to employment and job training that combines OJT with related technical instruction. Apprentices are generally employed on their first day of the apprenticeship, although there may be some occupations that require coursework before starting the apprenticeship. This flexible training strategy has historically been used to prepare individuals for employment in highly skilled jobs in high-demand fields that offer above-average compensation. Program graduates receive a nationally recognized, portable credential and, in some instances, may apply their training experiences and credits earned toward an associate or bachelor's degree offered at a postsecondary institution.

PROGRAMMATIC FEATURES

To qualify for federal recognition and registration, an RA program must include the following five key components:

1. employer involvement;
2. structured OJT;
3. related technical instruction;
4. paid work experience for apprentices, with incremental wage increases; and
5. alignment with an industry-recognized credential.[18]

RA programs are offered by "sponsors," which may include individual employers, employer associations, labor/management organizations, or intermediaries, such as community-based organizations or community colleges that operate programs on a voluntary basis and provide the administrative functions. Sponsors work closely with OA or state apprenticeship agencies (SAAs) to develop a set of program standards and register their programs and apprentices. Sponsors operate their programs on-site, providing paid OJT and workplace mentors who monitor and assist apprentices throughout their training. Additionally, sponsors contribute to the development of curriculum used to teach related technical content. This instruction, which is intended to provide apprentices with the academic, technical, and employability skills needed for success in the workplace, may be provided at a partnering postsecondary institution, training center, sponsor-owned or -operated facility, or proprietary trade school (Lerman, Eyster, and Chambers 2009).

[18] http://www.doleta.gov/oa/employers/apprenticeship_toolkit.pdf.

Program lengths can vary from one to five years, depending on the requirements of an occupation. Training expectations vary by occupation, with the minimum time for completing an RA program set at 2,000 hours of OJT and 144 hours of related instruction per year. With the 2008 federal revision to apprenticeship regulations (Title 29 *CFR* part 29[19]), sponsors have increased flexibility in setting completion requirements, with many moving toward a competency-based approach (Title 29.5(b)(2)[20]). This allows apprentices to advance in their individual programs by demonstrating competency within their field, for example, by performing a set of observable and measureable tasks. A third, hybrid approach allows individuals to combine time-based and competency-based instruction, meaning that they must complete either a minimum or maximum amount of time for each identified job requirement (DOL 2014).

In an effort to attract and qualify more people to enter RA programs, DOL established a framework for pre-apprenticeship programs, which prepare participants for success in an RA program.[21] While program structures may vary, pre-apprenticeship programs are intended to assist individuals in reaching the threshold for RA entry. Curriculum is developed in coordination with RA program sponsors and may emphasize remedial math, reading comprehension, and employability skills; information on potential careers; and occupation-specific training to help individuals meet the entry prerequisites of an RA program. Many pre-apprenticeship programs also have a formal written agreement with employers that allows participants to apply time or credits earned toward the requirements of an RA program, as well as to receive preference in securing program entry. Some pre-apprenticeship programs also may lead to industry certification and/or the award of postsecondary credit.

ADMINISTRATION

The *National Apprenticeship Act* (also known as the *Fitzgerald Act*), passed in 1937 and updated in 2008, established the RA system at the federal level and designated DOL as its oversight agency.[22] Programs that achieve registration status are officially sanctioned at the national level,[23] with program administration and supervision provided by federal staff housed within OA or by staff in SAAs that are recognized by DOL.[24] While apprenticeship programs operated by an SAA have historically been administered through states' departments of labor, in 2008, DOL revised

[19] http://www.doleta.gov/oa/regulations.cfm
[20] http://www.doleta.gov/oa/pdf/Three_Approaches_Apprenticeship_Program_Completion.pdf
[21] http://www.doleta.gov/OA/preapprentice.cfm
[22] http://uscode.house.gov/view.xhtml?req=granuleid:USC-prelim-title29-section50&num=0&edition=prelim
[23] http://oa.doleta.gov/bat.cfm
[24] OA administers RA programs in about half of all states, while 25 states, the District of Columbia, Guam, Puerto Rico, and the Virgin Islands operate and fund SAAs, which are authorized by DOL to register and administer apprenticeship programs for federal purposes. The study states operate their RA programs as SAAs.

the regulations of the National Apprenticeship System to allow states the flexibility to determine where to house their SAAs within their own governmental structures.[25] Most of the study states continue to locate their SAAs within state labor agencies, although some have transferred responsibility to their departments of commerce or education (see Exhibit 2). The rationale for locating RA programs in agencies other than labor may relate to states' attempts to align various workforce training programs in a central location.

DOL regulations (Title 29.13(a)[26]) stipulate that SAAs must establish a state apprenticeship council (SAC) that operates under the direction of the SAA in a regulatory or advisory capacity. An advisory SAC provides advice and guidance to the SAA on the operation of the state's apprenticeship system. The responsibilities of a regulatory SAC may be established through state law or regulation. A regulatory SAC may promulgate apprenticeship law at the direction of the SAA and also provide advice and guidance to the SAA on the operation of a state's apprenticeship system.

Programs may be further enhanced through strategic partnerships, consisting of community-based organizations, educational institutions, the workforce system, and other stakeholders who contribute to the training experience. While union participation has been an important part of the RA history (Olinsky and Ayres 2013),[27] employers do not have to be a union shop or hire labor union members to participate in the RA system.

FINANCING

Businesses that sponsor apprentices cover the majority of the costs associated with RA programs, including paying apprentices' wages and workers' compensation insurance, purchasing training equipment and materials, and providing skilled employees to train and mentor apprentices. Apprentices in some programs are responsible for their instructional costs at the postsecondary level, which include tuition and fees associated with their coursework; however, in many cases, sponsors cover some or all of the costs associated with this training. Findings from a 2009 survey of sponsors indicated that roughly 70 percent of employers provided the funds for related instruction (Lerman 2009).

Funding for apprenticeship programs also is contained within various federal workforce and postsecondary education legislation. For example, within the *Workforce Innovation and Opportunity*

[25] For a description of regulations governing "Labor Standards for the Registration of Apprenticeship Programs" (Title 29 *CFR* part 29), see http://www.doleta.gov/OA/regulations.cfm.
[26] http://www.doleta.gov/OA/pdf/Recognition_of_State_Apprenticeship_Agencies_SAAs.pdf
[27] According to Olinsky and Ayres, there is a 0.87 correlation between the decline in union and apprenticeship participation (2013).

Act (*WIOA*), resources are directed toward supporting apprenticeship opportunities for in-school and out-of-school youths (i.e., high school dropouts) who are economically disadvantaged and/or who face personal challenges that may hinder their educational progress.[28] As of July 1, 2015, *WIOA* workforce funds can be used to cover costs associated with apprenticeship and job-related training programs. These resources allow for a higher reimbursement rate for OJT expenses—paying for a maximum employee wage rate of up to 75 percent of wages for up to six months. Additionally, all RA programs are automatically eligible for states' eligible training provider lists. This means that apprentices who meet *WIOA* eligibility requirements can receive funds to support tuition, books, lab fees, and other items associated with instruction.

Other federal support comes from the *Higher Education Opportunity Act*, which allows Federal Student Aid grants and Federal Work Study funds to be applied toward the costs apprentices face in attending postsecondary institutions. For example, federal Pell Grants may be used to pay for all or most of the costs associated with the technical instruction portion of an apprenticeship, including tuition, fees, books, and supplies ($3,000 on average per apprentice). Programs operated by the U.S. Department of Veterans Affairs, U.S. Department of Agriculture, U.S. Department of Transportation, and U.S. Department of Housing and Urban Development also provide financing that may be used for individuals participating in apprenticeship programs.[29] See Exhibit 1 for the specific federal programs.

Exhibit 1: Federal Programs That Provide Apprenticeship Incentives, by Department

Department	Program
Agriculture	Supplemental Nutrition Assistance Program
Housing and Urban Development	Housing and Urban Development financial assistance
Transportation	Federal Highway Administration On-the-Job Training and Supportive Services Program
Veterans Affairs	GI Bill, Vocational Rehabilitation and Employment, and Special Employer Incentive

Additionally, states have created financial incentives to encourage both student and employer participation in apprenticeship programs. For example, 11 states offer tuition reductions for RA-related training, including two study states (Florida and Washington).[30] Other incentives take the

[28] *WIOA* identifies apprenticeship opportunities in two programs targeted at young adults. See the youth workforce investment activities identified in Sec. 129(a) and the YouthBuild Program in Sec. 171(c).
[29] http://www.doleta.gov/oa/federalresources/playbook.pdf
[30] See http://www.doleta.gov/OA/data_statistics.cfm for information on tuition credits in Florida and Washington.

form of a tax credit or subsidy to encourage business involvement. Currently, 10 states offer tax credits to participating employers, including two study states (Connecticut and Rhode Island).[31]

The federal government has also earmarked resources to expand apprenticeship opportunities nationwide. In 2015, DOL launched the American Apprenticeship Grants initiative to support the creation of 34,000 new apprenticeships in high-growth, high-tech industries. This $175-million initiative has resulted in the award of 46 grants to public–private partnerships—comprised of employers, organized labor, nonprofits, local governments, and education institutions—dedicated to introducing high-quality apprenticeships in new fields, including health care, IT, and advanced manufacturing.[32] The *Consolidated Appropriations Act of 2016* (P.L. 114-113) extends this federal commitment, providing $90 million in competitive grants to support states and other entities in expanding apprenticeship opportunities, with financing available in April 2016.[33]

DATA

The OA and SAAs collect annual data on the number of RA programs operating and the number of apprentices participating in nationally recognized programs. Data are maintained within the OA's Registered Apprenticeship Partners Information Data System (RAPIDS), which combines individual record-level data and aggregate state reports. Information contained within RAPIDS is used to track the status of apprenticeship programs within the United States.[34] The system includes information on the number and type of programs offered, as well as the characteristics of apprentices (e.g., new and active apprentices, program completers, and demographic characteristics).

According to OA data, more than 150,000 employers in the United States currently participate in the RA system, with the business they operate employing more than 450,000 apprentices in 1,000 occupations.[35] Top occupations include able seaman, carpenter, chef, child care development specialist, construction craft laborer, dental assistant, electrician, elevator constructor, fire medic, law enforcement agent, over-the-road truck driver, and pipefitter.[36] A report from the Center for

[31] http://www.doleta.gov/OA/data_statistics.cfm
[32] http://www.doleta.gov/oa/aag.cfm
[33] https://www.gpo.gov/fdsys/pkg/BILLS-114hr2029enr/pdf/BILLS-114hr2029enr.pdf
[34] Under the new *WIOA*, core programs, such as the youth workforce investment activities, must report on common performance indicators that provide key employment information, such as how many workers entered and retained employment, their median wages, whether they attained credentials, and their measurable skill gains. It is as yet unclear how these data will be used in conjunction with RAPIDS to provide a broader and more nuanced picture of the experiences of apprentices.
[35] http://www.doleta.gov/OA/apprenticeship.cfm and http://www.dol.gov/apprenticeship/shareables.htm
[36] http://www.dol.gov/apprenticeship/faqs.htm

American Progress found that 30 percent of active apprentices and 46 percent of new programs focused on high-growth industries, such as advanced manufacturing, health care, geospatial technology, information technology, and biotechnology (Olinsky and Ayres 2013).

The characteristics and status of RA systems in each of the study states are summarized in Appendix B.

STATE APPROACHES TO LINKING SECONDARY CAREER AND TECHNICAL EDUCATION AND REGISTERED APPRENTICESHIP PROGRAMS

CTE and RA programs are structured to provide career-focused instruction and authentic work experience and training, with many concluding with the award of an industry-recognized certificate or credential. Recognizing the natural relationship that exists between CTE and RA, many states have developed programmatic connections between the two. At the most basic level, this entails drawing students' attention to the linkages between CTE coursework and RA programs, for example, by listing RA as a postsecondary option in CTE students' POS course-planning templates.

Another more direct approach to linking CTE and RA programs occurs through the adoption of policies and/or development of initiatives that directly engage secondary students in RA programs or prepare them to enter an RA program immediately after graduation. While the breadth, depth, and scale of these options vary, programs typically are created at the local level by employers seeking to address an identified workforce need. Related technical instruction is usually provided by secondary CTE instructors, which means that states can offer these programs at no additional cost. In some cases, states have provided additional grant funds or state resources to support program development and administration.

States use varying terminology to describe secondary CTE programs that align with RA, even among those that operate in similar ways. Commonly used terms include school-to-registered apprenticeship, tech-ready apprentices, high school apprenticeships, youth pre-apprenticeships, and apprenticeship preparation programs. Broadly speaking, the programs within the study states fall into three categories:[37]

- **Registered Apprenticeship**—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

[37] Youth apprenticeships, in which high school students participate in RA-like programs that combine technical instruction and WBL experiences with employers and lead to industry-recognized credentials, may exist in some states. Georgia's Youth Apprenticeship Program, for example, is administered by the state's CTE office and enrolled 1,998 students in 2015. However, because these programs are not typically designed to connect to an RA program, they are not included in the state profiles for this report.

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 and/or enhanced entry with credits earned toward RA program requirements (Connecticut, Florida, Kentucky, North Carolina[38], 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).

Information on these state approaches is provided in the profiles that follow.[39] Profiles are ordered by program type, with North Carolina's RA program appearing first. States using the pre-apprenticeship approach are profiled in alphabetical order (Connecticut, Florida, Kentucky, and Washington), followed by the registered CTE curriculum example (Rhode Island).

[38] North Carolina offers both RA and pre-apprenticeship programs at the secondary level.
[39] General information on CTE and RA in the study states is included in Appendix B.

NORTH CAROLINA

HIGH SCHOOL APPRENTICESHIP

High school apprenticeship programs in North Carolina enable secondary students to dually enroll in CTE and RA programs (or state-registered pre-apprenticeship programs that are associated with an RA program), earning credits for both their CTE coursework and OJT with an RA sponsor. The state's current model of high school apprenticeship programs originated in 1995 with Apprenticeship 2000,[40] a locally developed, industry-driven initiative with ties to the German Skills Initiative.[41] Today, high school apprenticeship programs in North Carolina, including both RA and pre-apprenticeship programs, are supported at the state level through policy and administration but remain locally developed, usually through a partnership between community colleges, high school districts, and businesses with shared workforce needs.

TYPES OF SECONDARY PROGRAMS

Registered Apprenticeship and Pre-apprenticeship

YEAR CREATED	NUMBER OF SECONDARY PARTICIPANTS 2015
1994	155 (45 pre-apprentices)

Top Fields

Primarily advanced manufacturing fields, such as mechatronics, robotics, machining, electronics, and welding

OVERSIGHT AGENCY

North Carolina Department of Commerce/ Department of Education

[40] http://www.apprenticeship2000.com

[41] The German Embassy launched the Skills Initiative in the United States to encourage collaboration among German and American businesses, government agencies, and local education and training providers; to improve the pipeline of skilled workers; and to apply lessons learned from the German system of education and training, which involves a four-year apprenticeship option for students. OA provides technical assistance to the German embassy and German-American companies (e.g., Siemens and Stihl) to support implementation. Read more at http://www.germany.info/skillsinitiative.

Program Features

High school apprenticeship programs in North Carolina include both RA and state-registered pre-apprenticeship options. CTE coursework fulfills the required classroom-based instruction for both programs, with many programs offering students the opportunity to take postsecondary coursework. During program development, businesses work with high school administrators and teachers, community college administrators and faculty, and state RA office staff to create customized training plans that outline the program coursework and student qualifications to enter the program.

High school apprentices work part-time for an RA sponsor, with hours worked credited to both the WBL component of their CTE program and toward the required OJT of the RA program. Starting in the junior year, students can receive one elective course credit for every 135 hours worked in an RA or pre-apprenticeship program (up to one credit for summer work and two credits for work during the school year). The first credit counts toward the completion of a CTE concentration under the state's Future-Ready Core graduation requirements.[42] Additional credits are counted as general electives. Employers are responsible for setting hours and wages in accordance with child-labor and minimum-wage laws.

CTE coordinators and RA consultants support the recruitment of high school students. Students are typically recruited during their junior year, usually with a tour of the sponsor's facility and a presentation about the program. Parents are also engaged through functions such as "Parents Night" hosted by the company. To participate, students complete a rigorous application process, which includes an employer review of their grade point average and attendance records, letters of recommendation, and an interview at the worksite. Selected students often participate in an extended orientation and/or an internship during the summer before their senior year to confirm their involvement and prepare for placement. They then typically start the program during their senior year of high school, although some students can start during their junior year.

In the 2014–15 program year, close to 200 students participated in the six programs that currently exist in North Carolina, with a quarter of the participants engaged in pre-apprenticeship programs and the remainder in RA programs. The existing programs serve different regions of the state and several high-growth occupations, such as welding, mechatronics, and computer-integrated machining.

[42] http://www.ncpublicschools.org/docs/curriculum/home/graduationrequirements.pdf

Program Supports

High school apprenticeship programs are developed and administered at the local level through collaborative partnerships between industry, labor, and education organizations. State-level support includes the joint development of policy and guidelines by the CTE and RA offices, as well as the creation and dissemination of an apprenticeship handbook and other program information. A new partnership among the North Carolina Department of Commerce, North Carolina Community College System, and Department of Public Instruction, referred to as NCWorks, seeks to improve the state's workforce system, including strengthening WBL initiatives in CTE and RA programs. Additionally, the North Carolina School Board has developed a number of policy statements that encourage local boards to offer WBL opportunities for all students and govern the assignment of credit for WBL.[43]

Employer need ultimately drives program development, and any RA sponsor is eligible to develop a high school apprenticeship program**.** Currently, 31 employers are actively engaged in these programs, as shown in Exhibit 2. Most programs are focused on the advanced manufacturing industry.

Exhibit 2: North Carolina High School Apprenticeship Programs and Sponsors

Program	Sponsors
Apprenticeship 2000	Ameritech, Blum, Chicon, Daetwyler, Pfaff, Sarstedt, Siemens, Timken
Apprenticeship Catawba	Sarstedt, Technibilt, Tenowo Inc., ZF Chassis Components
NC TAP	Allied Automation Inc., ATI Industrial Automation, Buhler Aeroglide, Captiveaire, Maden USA, Schunk, Superior Tooling
Apprenticeship Montgomery	Aberdeen, Capel Mills, Carolina & Western Railway, Grede Foundry, Jordan Lumber, Troy Lumber, Unilin Industries
Central Carolina Apprenticeship Works	Boon Edam, Godwin Manufacturing, JMK Tool and Die, Ruhl Tech Engineering
Caterpillar Youth Apprenticeship Program	Caterpillar

Employers cover the majority of costs associated with secondary apprenticeship programs, primarily in the form of apprentice wages and registration fees. While the state currently does not offer incentives for businesses to develop RA programs, the North Carolina Community College System recently agreed to cover the state's $50-per-apprentice registration fee for employers.

[43] http://www.dpi.state.nc.us/cte/curriculum/work-based/policies/

Other program components, including administration and instruction, are delivered within the existing CTE infrastructure and require no additional funds. Some federal *Perkins IV* funds may be used for advising, career coaching, and recruitment efforts.

Data on secondary apprentices and pre-apprentices are entered in both the state CTE and RA data systems. CTE programs track the high school coursework and any WBL credits earned in PowerSchool®, the state's student information management system. Students participating as RAs are included in the data reported to the federal RAPIDS system. Students participating in pre-apprenticeship programs are also registered with the state and entered into the state's pre-apprenticeship database, which does not separate high school students from other pre-apprentices.

SPOTLIGHT PROGRAM

Caterpillar Youth Apprenticeship Program

The Caterpillar Youth Apprenticeship Program was developed in 2012 based on the employer's need for more welders to work in a new fabrication facility in North Carolina. The two-year program allows high school students to enter an RA program while taking CTE coursework. Partners include Caterpillar Inc.'s Sanford Fabrication Facility, Central Carolina Community College, Lee County Schools, and the state Apprenticeship Office.

Participants take related coursework at their traditional high school, plus welding classes three days per week at the local community college. Additionally, students work at the facility two days a week during the school year and up to 32 hours per week during the summer between their junior and senior years. By the end of the program, participants can earn a high school diploma, welding certificate from the community college, and RA certificate of completion from the state. They also complete an 80-hour Caterpillar Accelerated Training program and RA on-the-job training hours. Upon program completion, students typically work for Caterpillar as entry-level welders.

Sixteen students participate each year (eight juniors and eight seniors). The first class of 16, including three females, started in September 2012. The first eight students graduated in May 2014.

Source: Caterpillar Youth Apprenticeship Program:
http://www.ncleg.net/documentsites/committees/BCCI-6630/10-22-14%20Meeting%20Handouts/Caterpillar%20Apprenticeship%20Program%20Presentation%20to%20General%20Assembly_final.pdf

CONNECTICUT

PRE-APPRENTICESHIPS

Established in 1981, pre-apprenticeship programs in Connecticut function as an extension of the state's RA system. Pre-apprenticeship programs, which are registered with the Connecticut Department of Labor's Office of Apprenticeship Training (OAT), combine classroom-based instruction with WBL training components. Participants in pre-apprenticeship programs, which include both secondary students and adults, receive their classroom-based instruction through the Connecticut Technical High School System (CTHSS), which includes 17 technical high schools and one technology education center. The CTHSS, which functions as the primary provider of CTE in the state, serves over 10,000 students annually.

TYPE OF SECONDARY PROGRAMS

Pre-apprenticeship

YEAR CREATED	NUMBER OF SECONDARY PARTICIPANTS 2015
1981	100

Top Fields

Primarily construction trades, including green energy, solar energy, and photovoltaics

OVERSIGHT AGENCY

Connecticut Department of Labor/Department of Education

Program Features

The Connecticut Department of Labor defines a pre-apprentice as "a person, student or minor employed under a written agreement with an apprenticeship program sponsor for a term of training and employment not exceeding 2,000 hours or 24 months."[44] All pre-apprenticeship programs must be formally registered with the state, and secondary students are required to

[44] https://www.ctdol.state.ct.us/progsupt/appren/appregs.htm.

obtain parent or guardian consent. Typically, students enter a pre-apprenticeship in their junior year after completing at least one year of coursework in their chosen CTE POS. The CTHSS provides classroom-based instruction for pre-apprenticeship participants, including adults and youths. The CTE curriculum has been approved by the state as counting toward the required classroom-based instruction for the related RA program.

Pre-apprentices are offered opportunities for OJT placement with RA sponsors. As a pre-apprentice, students can accumulate up to 2,000 more on-the-job hours than other CTHSS WBL opportunities allow (3,500 hours versus 1,500 hours). This increased work experience allows them to progress more quickly through an RA program upon high school graduation.

Students work part-time during the school year, with a limit of no more than 21 hours per week, and may work longer hours during the summer. Academic credit may be applied toward high school completion for their time spent employed, as well as toward a related RA program's OJT requirements. Upon high school graduation, pre-apprentices can continue with their training with advanced standing in the related RA program, which often includes additional postsecondary training.

Student recruitment for pre-apprenticeship programs primarily occurs through word-of-mouth advertising at a local CTHSS institution. The CTHSS provides a comprehensive pool of motivated students, with a waiting list to get into technical high schools and a higher graduation rate for CTHSS students than the state average.[45] State administrators believe that the success of the CTHSS has a positive effect on the pre-apprenticeship program, which helps with program recruitment efforts. Additionally, the state OAT and CTE offices actively conduct outreach to students and parents to educate them on the benefits of apprenticeships. In 2015, there were 153 secondary pre-apprentices in Connecticut, primarily in traditional construction trades, with focus on areas such as green energy, solar energy, and photovoltaics.

Program Supports

Pre-apprenticeship programs in Connecticut are administered through a collaboration between the state's CTE and RA offices. Technology education consultants, employed by the Connecticut State Department of Education, oversee the administrative duties of pre-apprenticeship programs at local schools within the CTHSS system. The Connecticut DOL's OAT registers

[45] *Connecticut Technical High School System Strategic Action Plan 2014–2017*: http://www.cttech.org/central/about-us/Strategic-Action-Plan/CTSHH_ActionPlan_V12_single%20final%209-17-2014.pdf.

programs that comply with federal and state-developed standards. Additionally, OAT employs six regional RA coordinators to provide technical assistance, monitoring, and consulting support to local businesses and labor organizations with the goal of building and sustaining pre-apprenticeship programs.

Employers play a key role in identifying local needs for pre-apprenticeships, with programs initiated when RA sponsors approach a local CTE program to discuss their training needs. Additionally, employer input is gathered through local trade technology advisory committees, which advise CTHSS schools on curriculum and program development.

Funding for the RA and pre-apprenticeship programs in Connecticut comes from sponsors and other state sources. Similar to the RA program, pre-apprenticeship sponsors cover all costs associated with OJT instruction. While RA sponsors in Connecticut are also responsible for paying 50 percent of the related classroom-based instruction costs when provided by the CTHSS, there are no expenses for the coursework associated with pre-apprenticeships because it is funded through state and federal CTE resources.

Apprenticeship data in Connecticut are collected by OAT and include information on participant demographics, employment, and educational attainment (similar to data reported to the federal RAPIDS system). The state also collects follow-up data after one, three, and five years of apprenticeship enrollment for those participants still engaged with the RA system (i.e., registered apprentices who complete an RA program and are employed in their field of study). Information about pre-apprentices are kept in a separate database, which does not include similar longitudinal data but does get transferred to the RA database should a student continue into an RA program. These data help inform state CTE and apprenticeship staff about the outcomes of pre-apprenticeship and RA programs, although they are not publicly available.

FLORIDA

YOUTH PRE-APPRENTICESHIPS

Youth pre-apprenticeship programs in Florida provide high school students the opportunity to prepare for entry into an RA program after graduation. The Florida Department of Education's Division of Career and Adult Education is responsible for administering both CTE and RA programs, which are operated separately.[46] Florida legislative statute calls for local district school boards, community college district boards of trustees, and RA sponsors to work together to develop youth pre-apprenticeship programs that include related career instruction and general education courses.[47]

TYPE OF SECONDARY PROGRAMS
Pre-apprenticeship

YEAR CREATED	NUMBER OF SECONDARY PARTICIPANTS 2015
2000s	153

Top Fields

Primarily construction and manufacturing

OVERSIGHT AGENCY
Florida Department of Education

[46] Oversight of apprenticeship programs was transferred from the state department of labor, which no longer exists, to the state department of education in 2002.
[47] http://www.leg.state.fl.us/Statutes/index.cfm?App_mode=Display_Statute&Search_String=&URL=0400-0499/0446/Sections/0446.052.html.

Program Features

Included in state statute since 1972, pre-apprenticeship programs are "organized course[s] of instruction in the public school system or elsewhere … designed to prepare a person 16 years of age or older to become an apprentice … [with coursework] … approved by and registered with the [Florida Department of Education] and sponsored by a registered apprenticeship program."[48] The state has adopted curriculum frameworks for all career-related coursework, including pre-apprenticeships. Specifically, they have established statewide course codes and defined generic standards for six pre-apprenticeship courses.[49] Local programs use these frameworks as a basis for identifying program curricula, which can be customized by an industry area to provide more specific standards based on the employer's needs during program development.

Related CTE instruction is typically delivered at district technical centers, which high school students have the option of attending full-time to receive both academic and technical coursework, or on a part-time basis, with their academic coursework provided at their sending high school. Students receive general elective credits for participation in pre-apprenticeship programs.

Criteria for student participation are determined by the sponsor during program development. Students are eligible to enter a pre-apprenticeship during their junior year, provided that their parents or guardian sign a pre-apprenticeship agreement. Programs typically last between six months to two years. Upon graduation, completers are usually granted preference for entry into a related RA program. They may also receive credits that may be applied toward the RA program's OJT and classroom-based instruction requirements, which can shorten an RA program's length by as much as a year.

Not all pre-apprenticeship programs include WBL for participants, with opportunities determined by the occupation and/or individual sponsor's need. Where placements are provided, employers must develop work process outlines that specify the skills that are to be learned at the job site. Students receive high school elective credits and RA training credits for the time spent working; some earn college credit where locally established articulation agreements are negotiated with partnering postsecondary institutions.

[48] http://www.leg.state.fl.us/Statutes/index.cfm?App_mode=Display_Statute&Search_String=&URL=0400-0499/0446/Sections/0446.021.html.
[49] http://www.fldoe.org/core/fileparse.php/10983/urlt/8000100-1516.rtf.

Promotion of the program primarily happens through word of mouth across and between program partners. The state employs five regional apprenticeship training representatives who are responsible for marketing, developing, and monitoring pre-apprenticeship and RA programs. These individuals support student recruitment by sharing information on program benefits, for example, at high school career fairs. Additionally, because technical instruction for many RA programs are delivered through district technical centers, many RA programs use school-based program coordinators. These coordinators also help establish program awareness among their business partners and recruit students into the program.

As of 2013, there were 17 youth pre-apprenticeship programs[50] in Florida, serving 153 secondary students.[51] All but one of these programs were in traditional apprenticeable occupations in the construction trades (e.g., electrician, plumber) and manufacturing sector, with one program in the child care field.

Program Supports

The Florida Department of Education administers both CTE and RA. This has positioned state administrators to develop direct linkages between programs. In addition to passing state legislation and developing curriculum frameworks, the Florida Office of Apprenticeship is responsible for administering the pre-apprenticeship program, which includes recruiting businesses, approving and registering programs, recruiting and overseeing students, and maintaining participation data. The state also hosts an annual Apprenticeship Day on the Hill event to share program information with their legislators and the general public.

Businesses, particularly those that are current RA sponsors, play a critical role in developing pre-apprenticeship programs. Typically, recruitment of businesses happens informally, through word of mouth between RA sponsors, and formally through the Regional Workforce Board, annual regional conferences, and the apprenticeship training representatives. Sponsors are responsible for paying for any wages associated with the OJT while instruction is provided by the CTE program at no additional cost.

Programs track participation locally, with the schools, sponsors, and apprenticeship training representatives supplying information. For example, sponsors keep lists of students participating at their workplace, and schools submit data for all registered students to the state. Twice a year, training representatives report on the number of pre-apprentices to the Florida Office of

[50] http://www.fldoe.org/core/fileparse.php/5626/urlt/hs-preapprenticeship.pdf.
[51] Participation numbers as of January 2015.

Apprenticeship. Currently, the state does not have a system for tracking pre-apprenticeship program participation that articulates with Florida's RA Information Management System. Therefore, no information is available on the number of students who complete pre-apprenticeships and transition to RA programs.

SPOTLIGHT PROGRAM

Academy of Construction Technologies

Established in 1992, the Academy of Construction Technologies is a nonprofit organization that administers a youth pre-apprenticeship program in the construction trades across four counties within Florida (Orange, Osceola, Seminole, and Volusia). Developed through a partnership between Central Florida construction industry contractors and trade associations that represent both union and non-union trade associations, the youth pre-apprenticeship program links RA programs to secondary CTE students. The program lasts for two years (beginning during a student's junior year of high school) and includes a blend of related technical instruction and WBL.

The state-registered standards for the pre-apprenticeship program cover five occupations/trades: bricklayer; electrician; heating and air conditioning installer-servicer; pipefitter-sprinkler fitter; and plumber. The standards outline curricular requirements for each sector, including relevant technical knowledge, as well as general employability skills. Students are required to complete 360 hours of related coursework, for which they receive credits toward their high school graduation requirements. Safety training provided by the employer is also required.

The registered standards also outline a set of work processes for each sector to be included within the WBL component of the program. Students work full-time during the summer between their junior and senior years of high school and part-time during their senior year if their course schedule allows for it. Students earn $8.50 per hour and receive an elective credit once they have completed 160 hours. The program provides a "student-learner exemption agreement" that enables students under the age of 18 to work in construction, including occupations declared hazardous by Florida child labor laws.

Students apply to participate in the WBL component in April of their junior year and interview with an employer to qualify for placement. Participating students must have regular attendance and maintain a minimum grade point average of 2.0. Those who post above-average performance are rewarded for their efforts through a state scholarship and incentive fund, which was created to encourage student participation. The scholarship can be used for postsecondary training in a construction-related field and is awarded to one student per county each year.

Sponsors benefit from the program through reduced recruiting costs and lower employee attrition, and schools through lower dropout rates and fewer disciplinary problems. As of August 2015, 72 pre-apprentices were participating in the Academy of Construction Technologies programs, including 32 minority students. Participants were drawn from three participating local educational agency partners.

Source: Academy of Construction Technologies: http://www.actcareers.com

KENTUCKY

TECH READY APPRENTICES FOR CAREERS IN KENTUCKY

Tech Ready Apprentices for Careers in Kentucky (TRACK) is an industry-driven, statewide pre-apprenticeship program that was created in 2013 through a partnership between Kentucky's CTE office in its department of education and the Apprenticeship Office in the Kentucky Labor Cabinet. The goal of TRACK is to provide a direct pipeline of secondary students into RA programs, with participants receiving related classroom-based instruction through CTE coursework and participating in WBL opportunities with RA sponsors. Students who complete the TRACK program receive an industry-recognized certificate of completion from Kentucky's Labor Cabinet and earn credits that apply to a related RA program. TRACK is also an important component of the state's accountability and finance models for education, which provide incentives for ensuring students are college and career ready.

TYPE OF SECONDARY PROGRAMS

Pre-apprenticeship

YEAR CREATED	NUMBER OF SECONDARY PARTICIPANTS 2015
2013	140

Top Fields

Manufacturing and construction

OVERSIGHT AGENCY

Kentucky Department of Labor/Department of Education

Program Features

The Kentucky Apprenticeship and Training Council adopted a statewide policy outlining criteria for formally recognizing youth pre-apprenticeship programs, including TRACK.

Criteria include

- provisions for meeting regulations on equal employment opportunities;
- student enrollment eligibility requirements;
- an outline for instructional design and content, developed in collaboration with the CTE office;
- protocols for reporting the status of participants;
- plans for safety training and compliance with child labor laws;
- details on program administration; and
- description of the linkage to an RA program.[52]

Individual sponsors work with local CTE program staff to select at least four courses that participating students will take. The program curriculum is primarily delivered through secondary area technology centers, which offer technical skill instruction to part-time students who obtain their academic coursework at their home high school, as well as through comprehensive high schools and career centers.[53] The state has also developed online safety modules that are a required part of the TRACK coursework.[54] While students can officially enter the TRACK program in their junior year, they may take related foundational coursework in grades nine and 10 as part of a CTE POS to prepare them for TRACK.

Students have considerable flexibility in the paths they may follow after high school completion. Statewide dual credit and articulation agreements established by the Kentucky Community and Technical College System enable TRACK participants to earn college credit that may be applied at any participating state postsecondary institution. Additionally, participants may earn industry-recognized TRACK certificates and can apply up to 50 percent of their classroom and lab time toward a related RA program should they choose to continue their occupational training.

The first TRACK programs were piloted in AY 2013–14 in advanced manufacturing in response to employer demands for additional skilled workers to fill open positions and to expand the pipeline into manufacturing RA programs. In AY 2013–14 and AY 2014–15, 21 students participated in the manufacturing TRACK, with 16 students enrolled in the machinist program (other programs included maintenance, mechanic; maintenance, electric; electrical technician; and mold setter). Based on the success of the manufacturing TRACK programs, employers in the skilled trades/construction industry requested a similar program for their sector. A total of 119

[52] http://education.ky.gov/CTE/cter/Documents/Kentucky%20Labor%20Cabinet%20Pre-Apprenticeship%20Policy.pdf
[53] Currently, 29 area technology centers participate in TRACK.
[54] http://www.laborcabinetetrain.ky.gov/track.html

students participated in the Skilled Trades TRACK pilot program in AY 2014–15, with 76 students enrolled in the carpentry program and 43 in the electrical program. Kentucky is currently exploring expanding TRACK into other sectors, such as health care, business services, and information technology, to align with the economic development priorities set by the state's Workforce Innovation Board.

Currently, only the manufacturing programs offer WBL due to liability issues related to employing minors in the construction trades. To expand students' WBL options, the Kentucky Department of Education partnered with the Adecco staffing agency to develop Youth Employment Solutions agreements. For students under age 18, Adecco serves as the "employer," which allows students to be covered under Adecco's workers' compensation liability insurance.[55] This creative arrangement takes the financial burden of paying for liability insurance off of TRACK sponsors and allows students under the age of 18 to participate in WBL opportunities. Students participating in WBL may work during the day and/or after school beginning in the summer prior to their senior year. These hours are credited toward the students' high school graduation requirements and the required OJT time in the related RA program.

Employers work directly with local schools to identify and select students for participation and determine program completion status. According to state administrators, TRACK enrollment is very competitive due to high student interest in the program. Most students that receive program information and tour a sponsor's facility ultimately apply to the program. While any high school student can participate, the state focuses recruitment efforts on CTE students through local CTE coordinators. It also provides information on TRACK in the state's CTE quarterly newsletter, gives monthly updates to CTE staff, and holds an annual apprenticeship conference each fall.

The state has developed a variety of promotional materials to recruit students into TRACK. These resources, cobranded by the Kentucky Office of CTE and the Kentucky Labor Cabinet, include a brochure, video, and PowerPoint presentation that describe program requirements and benefits.[56] The video, for example, features interviews with employers, state and local CTE administrators, and students to describe their experiences with TRACK and highlight partnerships between CTE programs and business and industry. The brochure and slides summarize data on the need for more skilled workers and identify the benefits of TRACK to districts, students, and employers. Parents receive similar information from the state about the benefits of TRACK and can attend open houses hosted by sponsors.

[55] http://education.ky.gov/CTE/cter/Documents/YES%20Flyer.pdf.
[56] http://education.ky.gov/cte/cter/pages/track.aspx.

Program Supports

The TRACK program is administered and overseen through a close partnership between the state CTE office and the Apprenticeship Office. The Apprenticeship Office is responsible for registering and regulating the TRACK programs, while the CTE office provides operational support by recruiting employers and students, ensuring program compliance, and developing related programs of study and career pathways. The CTE office also published a WBL manual[57] that addresses legal issues with youths in apprenticeships, including the TRACK program.

Student participation in TRACK is supported by Kentucky's unique statewide accountability model, which values college and career readiness equally. College readiness is determined by student performance on the ACT test, and career readiness is associated with completion of a CTE pathway, as measured by workforce assessments like ACT's WorkKeys system. For students demonstrating both college and career readiness, districts can receive a 0.5-point bonus per student in the state's education allocation formula.

Career technical student organizations (CTSOs) are an important source of student recruitment for TRACK, given their overlapping industry focuses and target student populations. For example, members of the SkillsUSA CTSO participate in the TRACK manufacturing and construction programs. If TRACK were to expand into health care, the state anticipates recruiting students from HOSA, a national organization of secondary and postsecondary CTE students planning to pursue health careers.

Employers that sponsor a TRACK program must have an apprenticeship program registered with the state. Apprenticeship coordinators help recruit businesses and industry to participate in RA and TRACK programs. Currently, eight employers participate in the TRACK program, and the state expects to at least triple that number for AY 2015–16.

The TRACK program is delivered within the existing CTE and RA infrastructures—and therefore there is no additional cost to the state**.** Sponsors cover the costs of the WBL component and workplace mentoring. The state does not currently provide incentives for business participation, but legislators are considering a tax credit that would go into effect in 2016 for RA and TRACK.

Data on the TRACK program are collected through the Kentucky Technical Education Database System, a web-based system that includes information on CTE student enrollment,

[57] http://education.ky.gov/cte/cter/pages/wbl.aspx.

completion, and postsecondary education placement. It does not currently track whether TRACK participants enter an RA program after high school. The system allows schools to generate reports to guide program planning and inform programmatic improvements. Employment data are obtained from state unemployment insurance wage records. However, student follow-up is required to determine their field of employment and whether it was in the area related to their training.

Because TRACK is a pre-apprenticeship program, the Kentucky Labor Cabinet collects the same types of information on TRACK participants that are required of RA programs but maintains the data in-house. Once students officially start the RA program, their data are incorporated into quarterly reports to the U.S. Department of Labor through RAPIDS. Early indicators suggest that TRACK may be a successful way of bridging CTE students into RA programs. For example, upon completion of the manufacturing pilot, the first cohort of seven students successfully transitioned into an RA program.

SPOTLIGHT PROGRAM

Dr. Schneider Automotive Systems

Dr. Schneider Automotive Systems is a Germany-based automotive parts supplier with a plant in Russell Springs, Kentucky. In October 2014, two secondary pre-apprenticeship programs were created, Industrial Maintenance Technician and Injection Mold Setter, under the TRACK program.

The new programs allow secondary CTE students starting in the 11th grade to complete up to half of their apprenticeships before graduation, and students can gain credit through their CTE classes. Students are required to complete 4,000 hours of OJT and 576 hours of classroom instruction. Dr. Schneider Automotive is looking for extremely committed students. As part of the rigorous selection process, students must submit report cards and letters of recommendation, as well as a hand-written application stating why they want to participate in the program.

Dr. Schneider Automotive Systems currently employs two high school students, one for each program (Industrial Maintenance Technician and Injection Mold Setter). The company plans to grow the programs in the future as they expand their facilities.

Source: Dr. Schneider Automotive Systems: http://education.ky.gov/comm/news/Documents/R%2015-017%20New%20Apprenticeship%20program.pdf

WASHINGTON

APPRENTICESHIP PREPARATORY PROGRAMS

In 2006, the Washington State legislature enacted a program later named Running Start for the Trades,[58] with the aim of expanding opportunities for high school students to enter RA programs. For four funding cycles, the Washington State Apprenticeship and Training Council and the Washington Office of Superintendent of Public Instruction awarded pilot grants to local districts, consortia, and community colleges to create pre-apprenticeship programs at the secondary level as a pipeline to RA. Although funding for Running Start for the Trades was discontinued in 2011 due to changes in legislative budget priorities, the initiative led to the development of pre-apprenticeship guidelines and a process for formally recognizing these programs at the state level. Today, the Washington State Department of Labor and Industries maintains a list of state-recognized local "apprenticeship preparatory programs," including those that specifically target secondary CTE students.[59]

TYPE OF SECONDARY PROGRAMS

Pre-apprenticeship

YEAR CREATED	NUMBER OF SECONDARY PARTICIPANTS 2015
2006	~ 350–500

Top Fields

Construction, culinary arts, aerospace, and early child care education

OVERSIGHT AGENCY

Department of Labor/Department of Education

[58] RCW 49.04.190 (http://app.leg.wa.gov/rcw/default.aspx?cite=49.04.190)
[59] http://www.lni.wa.gov/TradesLicensing/Apprenticeship/About/IntroProg

Program Features

As defined by state policy, apprenticeship preparatory programs are "education-based programs endorsed by one or more registered apprenticeship sponsors [that] focus on educating and training students to meet or exceed minimum qualifications for entry into apprenticeship programs upon graduation."[60] Based on the experiences of Running Start for the Trades grantees,[61] in 2012, the Washington State Apprenticeship and Training Council and its partners—the Office of Superintendent of Public Instruction, State Board for Community and Technical Colleges, and Workforce Training and Education Coordinating Board—established criteria for recognizing local apprenticeship preparatory programs. Criteria are centered on three core elements: industry knowledge, basic skill expertise, and formal partnerships with industry.

To be recognized by the state as meeting minimum standards of a quality program, apprenticeship preparatory programs must provide evidence of

- plans for communicating with an RA sponsor on key program components, such as curriculum and assessment development and instructional strategies;
- incorporation of the following topics into instruction (as relevant to the career field):
    - safety training,
    - employability skills,
    - physical fitness, and
    - applied math skills;
- student recruitment and retention strategies, with a focus on efforts to engage underrepresented populations; and
- formal agreement with an RA program.

The final criterion—formal endorsement by an RA sponsor—is considered the most important by the state as it ensures that an actual pipeline exists from secondary apprenticeship preparatory programs to RA.[62]

---

[60] http://www.lni.wa.gov/TradesLicensing/Rules/files/apprenticeship/policy/201203PrepProgRecog.pdf
[61] Lessons learned from the Running Start for the Trades program are outlined in the final report to the governor and legislature: http://www.lni.wa.gov/TradesLicensing/Apprenticeship/files/pubs/RunningStartfortheTrades2012.pdf.
[62] http://www.lni.wa.gov/TradesLicensing/Apprenticeship/files/pubs/RunningStartfortheTrades2012.pdf

Program design varies based on local needs, although all include classroom instruction and WBL experiences to prepare students to enter RA programs upon their high school graduation. The classroom instruction is generally provided by one of the 15 skills centers in the state; only one of the five currently state-recognized K–12 preparatory programs involves a comprehensive high school. For example, students enrolled in the Construction Trades program at the New Market Skills Center, a regional CTE center serving 25 high schools in 10 districts, participate in coursework and work experiences (e.g., field trips or guest speaker events) to build entry-level knowledge of the construction trades field, improve their employability skills, and understand job safety considerations. At program completion, students are eligible for direct entry into an RA program.

Tools and resources have also been created to engage employers, students, and parents on apprenticeship opportunities in the state, although not specifically for the apprenticeship preparatory programs. For example, the Washington Department of Labor and Industries created guides to explain apprenticeship options and benefits to parents and to help employers start RA programs. The Apprenticeship Washington website[63] is targeted to high school students and explains the why, what, who, and how of RA. The site includes an "apprenticeship potential quiz" that asks students to respond to a series of yes/no questions about their interests and skills and tells them if they would be a good apprentice. Hands-on construction career fairs are held throughout the state to introduce high school students to RA options and allow them to talk with employers and RA sponsors.

In July 2012, two former Running Start for the Trades grantees were recognized as the first K–12 apprenticeship preparatory programs. Currently, 10 programs have been recognized, with the following five at the K–12 level:

- New Market—Construction (recognized in 2012)
- Tri Cities Skills Centers—Construction (recognized in 2012)
- Lakeside High School—Culinary Arts (recognized in 2013)
- Yakima Valley Technical Skills Center—Green Energy/Electrical Technician (recognized in 2014)
- Tri Tech Skills Center—Fire Fighting (recognized in 2014)

Another 16 programs are included on the website as "not yet recognized" by the state but of possible interest to students. The state estimated that between 350 and 500 secondary students currently participate in these programs.

[63] http://www.exploreapprenticeship.wa.gov

Program Supports

Apprenticeship preparatory programs are developed and administered at the local level in Washington, with some administrative oversight from state agencies in the form of state policy and information dissemination. The Washington State Apprenticeship and Training Council—made up of three employer members, three employee members, and a public member, along with ex-officio representation from the State Board for Community and Technical Colleges, the Workforce Training and Education Coordinating Board, the Employment Security Department, and OA—oversees the recognition process for apprenticeship preparatory programs. The state's CTE office, located within the Office of Superintendent of Public Instruction, shares information about available apprenticeship programs through its monthly CTE news updates for students, teachers, administrators, and counselors. The office also has developed a formal "programs of study and apprenticeship alignment" crosswalk between the state's clusters, pathways, and active apprenticeships.[64]

With the discontinuation of Running Start for the Trades, dedicated state funding is no longer allocated to support these programs, so local districts must leverage existing education and workforce training resources to develop and administer apprenticeship opportunities for secondary students. Employers cover any associated OJT. Likewise, the state no longer collects data on student participation in apprenticeship preparatory programs.

[64] http://www.k12.wa.us/CareerTechEd/pubdocs/ProgramsofStudyandApprenticeshipAlignmentGrid.pdf.

RHODE ISLAND

REGISTERED CTE CURRICULUM

Rhode Island has built deliberate pathways from secondary CTE to RA as part of its overall vision for college and career readiness. To be approved by the Rhode Island Department of Education, CTE programs must offer students the chance to earn "postsecondary benefits," which are defined as industry-recognized credentials, postsecondary credit, and/or advanced standing in RA programs. While secondary students in Rhode Island do not directly participate in an apprenticeship program, their secondary CTE coursework is seen as an important step in preparing them for RA. The Rhode Island Department of Labor and Training coordinates with the state department of education to help develop and promote the pathway from secondary CTE programs to the RA system by aligning CTE curriculum to RA programs. The alignment of the curriculum enables students to earn RA credits while still in high school.

TYPE OF SECONDARY PROGRAMS

Registered CTE Curriculum

YEAR CREATED	NUMBER OF SECONDARY PARTICIPANTS 2015
1990s	~ 3,000

Top Fields

Primarily construction trades, as well as medical fields and information technology

OVERSIGHT AGENCY

Department of Labor/Department of Education

Program Features

In Rhode Island, it is the CTE curriculum that is uniquely registered at the secondary level, not students. Local businesses and high schools work together to align CTE coursework to an RA program (i.e., translate CTE coursework into an RA's related technical instructional hours). The

curriculum is then approved by the state's apprenticeship council. As part of the process, the council visits CTE programs to evaluate instructor certification and the classroom environment and determine how many credits will translate. Once this alignment is completed, all students in the identified CTE programs automatically earn credit toward the aligned RA program. Upon graduation, students can apply for entry and advanced placement in the associated RA program.

RA programs in Rhode Island have traditionally focused on the construction and skills trades, which the Governor's Workforce Board actively worked to expand following its 2009 review of the state's RA system.[65] Since then, the state has aligned and registered CTE curricula for the skills trades and information technology pathways, and state staff are currently working to align and register curriculum in the medical pathway. While WBL is an integral part of CTE programming in the state, secondary students do not participate in OJT through this initiative. Instead, their CTE coursework helps participants earn advanced standing, with the paid OJT component starting at the postsecondary level once they have become a registered apprentice.

Student recruitment into RA programs is supported by the state's approach to registering curricula. According to state staff, RA is integrated into CTE culture, language, and materials, such that students are aware of RA program opportunities as a potential postsecondary option. Staff from the Rhode Island Department of Labor and Training actively recruit students for RA programs by visiting schools, talking with instructors, and participating in career days. State staff estimate that as of August 2015, approximately 3,000 students were enrolled in the registered curriculum and earning credits toward the related RA programs.

Program Supports

CTE programs are overseen by the state department of education, which has established the following approval criteria for state funding: (1) a sequence of three CTE courses; (2) curricula aligned to state and industry standards; (3) certified and trained instructors; and (4) options for students to earn "postsecondary benefits," which may include industry-recognized credentials, postsecondary credits, and/or advanced standing in RA programs. Additionally, Rhode Island state statute authorizes CTE programs delivered at career centers or high schools to provide classroom instruction related to apprenticeships, for which students can earn RA credit.[66] In this way, while RA programs are overseen by the Rhode Island Department of Labor and Training, state CTE staff see apprenticeship as a component of CTE programming.

[65] http://www.dlt.ri.gov/apprenticeship/pdfs/ReviewofAppren910.pdf
[66] http://webserver.rilin.state.ri.us/Statutes/title28/28-45/INDEX.HTM

Employer input is gathered through the state apprenticeship council, which visits CTE programs to review curricula and instructor qualifications. Parents and CTSOs are not explicitly involved with the registered CTE coursework but are an important target audience of CTE informational materials in general, particularly with regards to students' options and postsecondary benefits.

The registered curriculum is provided at no additional cost to the state because it is part of the existing CTE infrastructure. As of FY 2013, the state allocates both federal and state categorical resources to support local CTE programs at the secondary level. State funding is distributed to offset the costs of offering high-cost programs (based on average expenditures for CTE) and to develop new programs in high-demand industries that align with the Governor's Workforce Board's priorities (e.g., information technology, medical/healthcare, and pre-engineering). These resources are used to provide CTE instruction at the secondary level, including coursework that counts toward an RA program.

The Rhode Island Department of Education is currently implementing a new CTE data collection and accountability system to align with its program approval process. In its first phase of implementation, the state collected information on student participation in CTE programs and will use these data to establish baseline program and student performance targets and new accountability measures. Given their longitudinal nature, data on student entry into RA programs have not yet been gathered but will be collected and analyzed as part of the full data and accountability system implementation.[67]

[67] Full implementation was planned for spring 2014 and longitudinal data to become available thereafter as students complete programs and enter postsecondary education. See http://www.ride.ri.gov/Portals/0/Uploads/Documents/Students-and-Families-Great-Schools/Educational-Programming/Career-and-Tech/GA2013.pdf.

CONCLUSION

Career and technical education (CTE) and registered apprenticeship (RA) have many similarities—both offer classroom-based instruction in conjunction with work experience, and each emphasizes progressively more advanced technical skill instruction to prepare individuals for career entry. Experiential learning in CTE programs comes in the form of work-based learning (WBL) placements that, although typically less time intensive than the on-the-job training (OJT) requirements of an apprentice, expose students to the real-world applications of technical skills.

States profiled in this report are using a variety of approaches to connect their high school CTE programs to the RA system. Programs within the study states fell into the following three categories:

- **Registered Apprenticeship**, in which high school students are formally enrolled in RA programs, with CTE coursework applied toward RA requirements (North Carolina)
- **Pre-apprenticeship,** in which students participate in programs that prepare them for entry into an RA program, with some or all of their CTE course credits and WBL hours applied toward an affiliated RA program (Connecticut, Florida, Kentucky, North Carolina , and Washington)
- **Registered CTE Curriculum**, in which the state approves CTE coursework that has been aligned to RA programs to allow all students to earn credits that may be applied toward an RA program (Rhode Island)

Regardless of how programs are structured, CTE students participating in aligned programs are afforded a range of benefits. Because secondary programs are established with industry oversight and are state regulated, students are assured that their instruction is rigorous and aligned with industry standards. Students also have the opportunity to earn credits that may be applied toward a postsecondary degree and RA program, should they choose to enroll, thereby reducing the time and expense associated with their training.

High school youths who complete aligned programs often are given preferential treatment when applying for RA entry, in part because they have demonstrated both a commitment and an aptitude for the occupation. And, because students have a better understanding of what work entails, they may make more informed career-entry decisions, with those choosing to enter an RA program more likely to persist. Finally, because WBL placements are typically paid experiences, students may have greater resources available to finance their postsecondary education should they choose to pursue advanced career training after graduating.

EXPANDING ALIGNMENT BETWEEN CAREER AND TECHNICAL EDUCATION AND REGISTERED APPRENTICESHIP

Each of the states profiled in this study has devised its own, somewhat unique, approach to link secondary CTE programs with RA. Irrespective of program features, states reported similar challenges in aligning programs, including a lack of agency resources and capacity to administer programs; misperceptions about pre-apprenticeship and RA programs among students, parents, and employers; and difficulty engaging with employers to sponsor programs. The following synthesizes noteworthy state practices for addressing these challenges, drawing on state approaches for illustrative purposes.[68]

[68] Web links to some of the resources and tools referenced in this section may be found in the state write-ups provided above and in Appendix C.

1. Provide cross-agency support to align career and technical education and registered apprenticeship programs.

State CTE and RA programs are generally administered by different state agencies, adding complexity to the alignment of these programs and the capacity of staff to effectively market and administer them. Improving programmatic linkages requires building strong partnerships across state agencies and leveraging existing resources and infrastructure to support system alignment efforts. Cross-agency collaboration can be further supported with state legislation and policies that promote apprenticeship as an option for students.

STATE EXAMPLES

Coordinate state CTE and RA agency efforts to align programs.

- Staff in the **Florida** Department of Education's Division of Career and Adult Education administer both CTE and RA programs, which has helped foster the program alignment efforts.

Adopt supportive state legislation.

- **Rhode Island** statute authorizes CTE programs delivered at CTE schools to provide instruction related to apprenticeships for which students can earn apprenticeship credit.
- Legislation establishing **Washington**'s Running Start for the Trades program included language linking secondary CTE programs with apprenticeship programs. Although funding has been discontinued, the legislation laid groundwork for the state's current state framework for pre-apprenticeship programs.

Provide state administrative policy guidance.

- The **Kentucky** Labor Cabinet's Apprenticeship and Training Council published a policy brief that defines program terms and outlines requirements for youth pre-apprenticeship programs to be eligible for state recognition.

2. *Deliver technical assistance at the regional and local levels to promote program linkages between career and technical education and registered apprenticeship programs.*

Apprenticeship programs in most study states were initiated at the local level, often through the efforts of a business partner with an identified workforce need. While states can provide critical vision and infrastructure to support system alignment, program start-up and day-to-day operations typically require staff involvement at the regional and local levels. To coordinate program development, study states leveraged existing state or regional staff from both CTE and RA to promote and market program options and assist in maintaining program operations. Local program staff also share responsibility for systems alignment, with study states relying on district and regional staff, including CTE WBL and apprenticeship coordinators, to conduct outreach to potential employer partners. Local staff are often best situated to build connections with employers and to design programs that link CTE with RA to address their community's unique workforce needs.

STATE EXAMPLES

Leverage local and regional CTE and apprenticeship coordinators to support program formation.

- The **Connecticut** Office of Apprenticeship Training employs six regional RA coordinators to provide support to businesses and labor organizations in building and sustaining pre-apprenticeship programs. The Connecticut State Department of Education also provides technology education consultants to oversee programs offered within the state's technical high school system.
- **Florida** employs five regional apprenticeship training representatives who are responsible for the promotion, development, and monitoring of pre-apprenticeship and RA programs.
- **North Carolina** employs 10 RA consultants who work directly with the CTE programs, employers, and community colleges in their area to promote RA and high school apprenticeships.

3. Create resource tools and guides to support program alignment.

Aligning CTE with RA programs requires that educators and employers work together in new ways. Sponsors must review secondary CTE coursework to assess whether curricula overlap with the related technical instruction and OJT offered in their RA programs and, if so, they must determine how CTE credits can be applied toward RA requirements. Educators must determine how RA and pre-apprenticeship programs can be integrated into WBL programs, and how to schedule placement to ensure that students are able to meet their high school graduation requirements. To facilitate alignment, states have developed tools to assist educators and employers in creating programs and connecting CTE with RA.

STATE EXAMPLES

Create guidebooks and resources to support educators in developing programs.

- **North Carolina**'s *High School Apprenticeship Handbook*, issued by the Public Schools of North Carolina, serves as a comprehensive guide for school districts to use when establishing high school apprenticeship programs. The state's CTE WBL web page includes additional information and sample promotional and administrative tools.

Design materials to support employers in sponsoring programs.

- The **Kentucky** Tech Ready Apprentices for Careers in Kentucky (TRACK) website contains templates for program development and administration, such as sample agreements, hourly log forms, and information on working with youth under the age of 18, which employers may download to support their alignment efforts.

4. Conduct outreach to publicize the benefits of registered apprenticeship programs.

Administrators in study states suggested that there is often a lack of awareness—among employers, school district staff, students, and parents—of the potential benefits that aligned CTE and RA programs offer. To counter commonly held misperceptions, states created marketing materials to disseminate information on program opportunities. These include resources to help employers understand how high school program sponsorship could benefit their companies, and tools to support educators in recruiting CTE students. Several study states also developed strategies to market apprenticeship opportunities to CTE students and their parents, who often lacked information on program options. Engaging with parents was particularly important, because parental consent is typically required for minors to participate in RA or pre-apprenticeship programs offered in some industry areas.

STATE EXAMPLES

Develop outreach materials promoting program opportunities.

- The state CTE and RA offices in **Kentucky** have cobranded a logo for the TRACK program and developed materials for use in promoting the program, including a brochure, video, and PowerPoint presentation that describe program requirements and benefits.

Communicate program benefits to legislators and the public

- **Florida** hosts an annual industry-sponsored Apprenticeship Day on the Hill to showcase apprenticeship programs for state legislators and their staff.

Create state websites tailored to high school apprenticeship opportunities

- **Washington** has developed a student-focused website that shows the advantages of participating in an apprenticeship program.

5. Address barriers to student and employer involvement.

Economic and liability issues may limit high school students' ability to participate in pre-apprenticeship or RA programs. For example, insurance providers may be unwilling to write policies that would allow youths under the age of 18 to engage in physically demanding WBL placements or offer policies that are often cost prohibitive. Several study states have developed strategies to remove such barriers, including offering discounts on workers' compensation and liability insurance or arranging for third-party agencies to be officially responsible for students' employment. Additionally, some states have created financial incentives to encourage student and employer participation in RA programs, including tax credits and tuition reductions.[69] While these incentives do not generally apply to the secondary pre-apprenticeship programs profiled in this report, study states reported this as a potential strategy for growing these programs.

STATE EXAMPLES

Address liability barriers to student WBL placements.

- The **Kentucky** Department of Education has partnered with the Adecco staffing agency to develop Youth Employment Solutions (YES) agreements, where Adecco serves as the "employer" and students are covered under the agency's workers' compensation liability insurance.

Incentivize businesses to develop RA programs.

- **Connecticut** and **Rhode Island** offer tax incentives to employers who sponsor apprenticeships in the manufacturing sector. If they meet state requirements, employers are entitled to a tax credit for each eligible apprentice of up to $4,800 or 50 percent of actual wages, whichever is less.

Incentivize students to enroll in RA programs.

- Both **Florida** and **Washington** offer tuition reductions for students enrolled in an RA program. The *Florida General Appropriations Act* for the Florida Department of Education waives all tuition fees for apprentices who receive related instruction from school districts and state colleges through the general revenue fund and trust funds for workforce education. Likewise, in Washington, registered apprentices can receive a 50 percent tuition reduction at community and technical colleges, supported by state funds.

[69] According to the Office of Apprenticeship (OA), 10 states currently offer tuition support, and 10 states offer tax credits. See http://www.doleta.gov/oa/taxcredits.cfm.

IN SUMMARY

Study findings suggest that states profiled in this report are using differing approaches to prepare CTE students for RA participation. In some instances, such as in North Carolina, CTE students participate directly in an RA program. In other cases, CTE programs may be designed to feed into RA, for example, by structuring CTE as a pre-apprenticeship program that awards students course credits and workplace hours that may be applied toward the requirements of an affiliated RA program, as well as a leg up in the program application process. The study states employing this approach—Connecticut, Florida, North Carolina, Kentucky, and Washington—also provide students with the information they need to decide whether entry into an RA program will help them achieve their career goals. In Rhode Island, the CTE curriculum, and not the individual students, is aligned with RA programs and registered with the state.

Recent federal initiatives are paving the way for an expanded pipeline from CTE to RA. The U.S. Department of Labor (DOL)'s groundbreaking initiative, the American Apprenticeship Initiative, will expand RA into new industries. Announced in December 2014, this initiative is a $175-million grant program to catalyze the creation of innovative postsecondary and WBL models to meet America's economic, industrial, and workforce needs.[70] Over time, grant-funded pilot programs will lead to new RA opportunities in high-growth occupations and industries, with an emphasis on expanding options for women and underrepresented populations. While the grant requires funds to be used for programs targeting adults or youths that are not currently enrolled in high school, this effort may have implications at the secondary level, given the range of CTE training options currently offered within states for which no viable RA option currently exists.

Irrespective of how programs are offered, CTE programs that are aligned to RA programs—directly or indirectly—give students access to high-quality career training that combines classroom instruction with applied and, in some cases, intensive WBL opportunities. In addition to providing students with firsthand knowledge about their career options, program completers often may apply the time spent in instruction toward meeting the related technical instruction and OJT requirements of an RA program. If the experiences of study states are indicative of the nation at large, then it appears that states are experimenting with a range of approaches for connecting CTE with RA, and there is considerable room for expanding the pipeline from CTE to RA by increasing program options for secondary CTE students.

[70] http://www.dol.gov/apprenticeship/grants.htm

REFERENCES

DOL (U.S. Department of Labor). 2014. *A Quick-Start Toolkit.* Washington, DC: DOL. http://www.doleta.gov/oa/employers/apprenticeship_toolkit.pdf.

Foster, Laura, Steve Klein, and Barbara Elliott. 2014. *State Strategies for Financing Career and Technical Education.* Washington, DC: National Center for Innovation in Career and Technical Education.

Hoffman, Nancy. 2013. *Apprenticeships Ensure That Young People in Switzerland are Employable.* http://qz.com/122501/apprenticeships-make-young-people-in-switzerland-employable/.

Klein, Steven. 2001. *Financing Vocational Education: A State Policymaker's Guide.* Berkeley, CA: MPR Associates, Inc.

Lerman, Robert. 2009. *Training Tomorrow's Workforce: Community College and Apprenticeship as Collaborative Routes to Rewarding Careers.* Washington, DC: Center for American Progress.

Lerman, Robert. 2014. *Expanding Apprenticeship Opportunities in the United States.* Washington, DC: The Brookings Institution. http://www.brookings.edu/research/papers/2014/06/19-expanding-apprenticeship-opportunities-united-states-lerman.

Lerman, Robert, Lauren Eyster, and Kate Chambers. 2009. *The Benefits and Challenges of Registered Apprenticeship: The Sponsors' Perspective.* Washington, DC: The Urban Institute. http://www.urban.org/UploadedPDF/411907_registered_apprenticeship.pdf.

OECD. 2015. *Short-Term Labour Market Statistics.* Paris: OECD. http://stats.oecd.org/index.aspx?queryid=36499. Accessed July 21, 2015.

Olinsky, Ben, and Sarah Ayres. 2013. *Training for Success: A Policy to Expand Apprenticeships in the United States.* Washington, DC: Center for American Progress. https://cdn.americanprogress.org/wp-content/uploads/2013/11/apprenticeship_report2.pdf.

Silverberg, Marsha, Elizabeth Warner, Michael Fong, and David Goodwin. 2004. *National Assessment of Vocational Education: Final Report to Congress.* Washington, DC: U.S. Department of Education. http://www2.ed.gov/rschstat/eval/sectech/nave/navefinal.pdf.

Steedman, Hilary. 2010. *The State of Apprenticeship in 2010: International Comparisons.* A Report for the Apprenticeship Ambassadors Network. England: London School of Economics and Political Science. Paper number CEPSP22. http://cep.lse.ac.uk/pubs/download/special/cepsp22.pdf.

U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, High School Transcript Study (HSTS), 2009. http://nces.ed.gov/surveys/ctes/tables/h123.asp.

U.S. Department of Education, Office of Planning, Evaluation and Policy Development. 2014. *National Assessment of Career and Technical Education: Final Report to Congress.* Washington, DC. https://s3.amazonaws.com/PCRN/uploads/NACTE_FinalReport2014.pdf.

This page intentionally left blank

APPENDIX A: INTERVIEW PROTOCOLS

CONNECTING CTE AND APPRENTICESHIP INTERVIEW PROTOCOLS

STATE APPRENTICESHIP DIRECTOR PROTOCOL

[Once OA emails the State Apprenticeship Directors, RTI will coordinate a time for the interview; the following questions are meant to be guiding questions and will not be read as a script.]

INTRODUCTION:

Thank you for agreeing to talk with me today about your state's apprenticeship program(s). Today's interview will last up to one hour. The questions are designed to help us learn more about registered apprenticeship in general in your state (independent from the CTE discussion), and then we will discuss if and how the state is connecting the two programs.

BACKGROUND:

1. What is your **title** or 'role' with registered apprenticeship?
2. **How long** have you been in this position?

OVERVIEW:

1. What **types of apprenticeships** are offered in your state and **at what level**?
   [Prompts: registered, unregistered, and pre-apprenticeship; secondary, postsecondary, adult]
2. What are the **key agencies or governing bodies** involved in overseeing the Registered Apprenticeship program in your state? *[Prompts: e.g. DOL, DPI (secondary), postsecondary, workforce training agencies]*
3. How are programs **funded**?
   [Prompt: i.e., federal, state, private sector]
   a. How are resources coordinated across federal sources?
      [Prompt: i.e., Perkins, WIA]
   b. How are employers and employer groups funding programs?
   c. What promising practices exist?

4. How are **business, industry, and labor involved** and how are they recruited?
    a. Does state legislation or administrative **policy** exist to structure partnerships and support employer participation?
5. How do **communications** between agencies or governing bodies occur?
   [Prompts: are there regularly scheduled meetings? Newsletters? Annual Reports? Etc.]
6. What have been the **opportunities and barriers** in the coordination of the apprenticeship programs?

PROGRAMATIC FEATURES:

1. How are programs selected for inclusion—are the **offerings statewide or locally determined**?
2. Are program curricula **sequenced and aligned across levels**?
    a. ***If yes:*** How is the program alignment process handled and who participates (e.g., secondary and postsecondary educators, business, industry, and labor partners)?

IMPLEMENTATION/PARTICIPATION:

1. In what **fields** are apprenticeships currently found in your state?
2. Who are some of the **key business**, industry, and labor currently involved?
3. How are **students recruited** for apprenticeship participation?
4. How do **student transitions** occur?
5. What is the **scale of participation** (across secondary students, postsecondary students, and adults)?

DATA:

1. What **types of information/data** on Apprenticeships are collected? {*i.e. Indicators/Definitions*}
2. Who is responsible for **collecting the data**? {*i.e. Source of data/ Methodology?*}
3. For what **purpose** is the data collected? {*i.e. Who are the users of the data?*}
4. What is the **availability of these data** and how valid/reliable would you consider the data?

CTE CONNECTIONS: [If not already discussed through answers to Q1-4]

1. What are the **linkages between CTE and apprenticeships** in your state?
2. Have there been **administrative and legal barriers to expanding apprenticeships** to secondary programs/CTE programs?
3. What are the **opportunities and challenges** to expanding linkages between apprenticeships and programs CTE programs?

FINAL THOUGHTS:

1. Are there other people that we should talk to?
2. Are there any other thoughts you would like to share?

STOP HERE

CTE DIRECTOR PROTOCOL

[RTI will coordinate a time for the interview; the following questions are meant to be guiding questions and will not be read as a script.]

INTRODUCTION:

Thank you for agreeing to talk with me today about your state's CTE program(s). Today's interview will last up to one hour, and will include questions related to four high-level themes: program oversight/funding, features, implementation, and data.

OVERSIGHT/FUNDING:

First, we would like to know more about how CTE is administered and funded in [STATE], and more specifically, the connections to apprenticeships…

1. How are CTE-related apprenticeship programs **funded**?
   [Prompt: i.e., federal, state, private sector]

   a. How are resources coordinated across federal sources? [Prompt: i.e., Perkins, WIA]

   b. How are employers and employer groups funding programs?

2. What have been the **opportunities and barriers** in the coordination of the CTE-related apprenticeship programs?

PROGRAMATIC FEATURES:

Now we'd like to get a better sense for the types of CTE-related apprenticeship opportunities offered and how they are developed in [STATE]…

1. What **types of CTE-related apprenticeships** are offered and **at what level**?
   [Prompts: registered, unregistered, and pre-apprenticeship; secondary, postsecondary, adult]

2. How are programs selected for inclusion – are the **offerings statewide or locally determined**?

3. Are program curricula **sequenced and aligned across levels**? If so, who participates in the program alignment process (e.g., secondary and postsecondary educators, business, industry, and labor partners)?

4. What are the **opportunities and barriers** to expanding linkages between apprenticeships and (secondary) programs CTE programs?

IMPLEMENTATION/PARTICIPATION:

1. How are **students recruited** for CTE-related apprenticeship participation?
2. How do **student transitions** occur?
3. What is the **scale of participation** (across secondary students, postsecondary students, and adults)?
4. In what **fields** are the CTE-related apprenticeships found?
5. Who are some of the key **business, industry, and labor** involved?

DATA:

1. What **types of information/data** on CTE-related Apprenticeships are collected? {Indicators/Definitions}
2. Who is responsible for **collecting the data**? {Source of data/ Methodology?}
3. For what **purpose** is the data collected? {Uses?}
4. What is the **availability of these data** and how valid/reliable would you consider the data?

FINAL THOUGHTS:

1. Are there other people that we should talk to?
2. Are there any other thoughts you would like to share?

This page intentionally left blank

APPENDIX B: OVERVIEW OF CAREER AND TECHNICAL EDUCATION AND REGISTERED APPRENTICESHIP IN STUDY STATES

Exhibit B-1: Secondary Career and Technical Education in the Study States, by Oversight Agency and Office, Definition and Number of Secondary CTE Concentrators (AY 2011–12), and Delivery Mode

State	State Oversight Agency and Office	State Definition of Secondary CTE Concentrator	Number of Secondary CTE Concentrators	Delivery Mode
Connecticut	Department of Education, Connecticut Technical High School System	Student who enrolls in at least two credits of either academic or CTE courses that align with state's standards (http://www.sde.ct.gov/sde/lib/sde/PDF/DEPS/Career/perf_stand_comp.pdf)	31,799	Technical high schools and a technical education center
Florida	Department of Education, Career and Adult Education	Student who completes at least three CTE credits in one of 12 state-approved occupational areas (http://files.eric.ed.gov/fulltext/ED555559.pdf)	143,639	Comprehensive high schools, and district technical centers
Kentucky	Department of Education, Career and Technical Education	Student who has completed two credits in a pathway and is enrolled in the third/ fourth credit within an approved CTE pathway (http://education.ky.gov/CTE/teds/Documents/TEDS_Glossary.pdf)	28,691	Comprehensive middle and high schools and local career and technology centers
North Carolina	Department of Public Instruction, Career and Technical Education Division	Student who completes four units of CTE credit in a career cluster, with at least one credit in a Level 2 course (http://www.ncpublicschools.org/src/guide/performance/)	40,586	Comprehensive high schools and technology centers

State	State Oversight Agency and Office	State Definition of Secondary CTE Concentrator	Number of Secondary CTE Concentrators	Delivery Mode
Rhode Island	Department of Education, Multiple Pathways	Student who completes at least two courses or parts in the required sequence of a CTE program of study (http://www.ripec.org/pdfs/2015-CTE.pdf)	13,052	Comprehensive high schools and regional CTE centers
Washington	Office of Superintendent of Public Instruction	Student who has enrolled in two or more CTE courses above the exploratory levels in a single cluster (http://www.k12.wa.us/LegisGov/2012documents/StrategicePlanforCTE2012.pdf)	54,153	Comprehensive high schools and skills centers

Source: U.S. Department of Education, Office of Career, Technical, and Adult Education, Consolidated Annual Report (CAR) for the *Carl D. Perkins Career and Technical Education Act of 2006*, unpublished data
Abbreviations: career and technical education (CTE), academic year (AY)

Exhibit B-2: Registered Apprenticeship in Study States, by State Oversight Agency, Numbers of Active Participants and Active Programs (FY 2014), and State Incentive Offered

State	State Oversight Agency	Active Participants	Active Programs	State Incentive Offered
Connecticut	Connecticut Department of Labor, Office of Apprenticeship Training	5,175	1,504	Yes (in the form of sector-specific tax credits)
Florida	Department of Education, Career and Adult Education	7,395	222	Yes (in the form of tuition reductions)
Kentucky	Kentucky Labor Cabinet	2,452	118	No
North Carolina	Department of Commerce, Division of Workforce Solutions	3,636	491	No
Rhode Island	Department of Labor and Training, Workforce Regulation and Safety Division	1,337	512	Yes (in the form of sector-specific tax credits)
Washington	Department of Labor	10,860	262	Yes (in the form of tuition reductions)

Source: http://www.doleta.gov/OA/data_statistics.cfm

This page intentionally left blank

APPENDIX C: EXAMPLE STATE TOOLS & RESOURCES

During data collection, the following tools and resources developed by the study states were identified that may be useful for states and regions that are developing or expanding similar types of programs.

CONNECTICUT

- The CTHSS website: http://www.cttech.org/

FLORIDA

- Pre-apprenticeship website: http://www.fldoe.org/academics/career-adult-edu/apprenticeship-programs/preapprenticeship.stml
- Example 'program requirements' guide: http://actcareers.com/wp-content/uploads/2015/04/ACT-Program-Requirments-2015.pdf
- Curriculum framework for pre-apprenticeships: http://fldoe.org/core/fileparse.php/10983/urlt/8000100-1516.rtf

KENTUCKY

- TRACK website, including outreach materials, hourly log templates, student agreement templates, safety modules, information about the Youth Employment Services agreement: http://education.ky.gov/cte/cter/pages/track.aspx

NORTH CAROLINA

- Website designed to help users create WBL programs, including tools for high school apprenticeship, such as sample training agreements: http://www.ncpublicschools.org/cte/curriculum/work-based/planning/ website: http://apprenticeship2000.com/

RHODE ISLAND

- Legislation linking vocational education and RA programs: http://webserver.rilin.state.ri.us/Statutes/TITLE28/28-45/28-45-18.HTM

WASHINGTON

- Apprenticeship preparation program website: http://www.lni.wa.gov/TradesLicensing/Apprenticeship/About/IntroProg/default.asp
- CTE apprenticeship website: http://www.k12.wa.us/CareerTechEd/Apprenticeship.aspx
- CTE POS to RA crosswalk: http://www.k12.wa.us/CareerTechEd/pubdocs/ProgramsofStudyandApprenticeshipAlignmentGrid.pdf
- Student-facing website: http://www.exploreapprenticeship.wa.gov/

The Department of Education's mission is to promote student achievement and preparation for global competitiveness by fostering educational excellence and ensuring equal access.

www.ed.gov