Programs of Study: Year 3 Joint Technical Report

July 2011

Programs of Study Joint Technical Working Group

NRCCTE
National Research Center for Career and Technical Education

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What Will Be the Impact of Programs of Study? A Preliminary Assessment based on Similar Previous Initiatives, State Plans for Implementation, and Career Development Theory	Mature Programs of Study: A Postsecondary Perspective	Programs of Study as a State Policy Mandate: A Longitudinal Study of the South Carolina Personal Pathways to Success Initiative	Rigorous Tests of Student Outcomes in CTE Programs of Study	Six Stories About Six States: Programs of Study
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Programs of Study Year 3 Joint Technical Report

Programs of Study (POS) were the most significant new requirement in the 2006 reauthorization of the federal legislation for career and technical education (CTE).[1] Consequently, the National Research Center for Career and Technical Education (NRCCTE) established as one of its priorities the development of information on the operation and effectiveness of POS. The NRCCTE is conducting four projects that examine POS from different perspectives. Three are longitudinal studies; due to the nature of their methodologies, they are at different stages of implementation. These three studies use some common data collection methods that allow for comparisons across studies and use others that are specific to their research questions. This document comprises the second joint report related to these three projects and presents their status as of July 31, 2010, the end of Year 3 of the current NRCCTE cooperative agreement with the U.S. Department of Education. The first joint report presented findings and observations derived from the first two years of these projects (Programs of Study Joint Technical Working Group, 2010). The fourth project described in this report was conducted entirely during NRCCTE Year 3. This project used case study methods to describe how six states were implementing POS during the first half of 2010, four years after POS had become part of the federal legislation for CTE. Before discussing the four projects, we provide some background on how POS came to be required by Perkins IV.

Previous Initiatives

The mandate for POS was new to Perkins IV, but efforts to align secondary and postsecondary CTE are not. In 1983, *A Nation at Risk* (National Commission on Excellence in Education, 1983) raised alarms about the performance of the nation's schools and the implications for our economy. In response to this report, virtually all states launched efforts to raise graduation requirements and increase the rigor of instruction. Parnell's 1985 book, *The Neglected Majority*, focused national attention on those students in the middle two quartiles of academic performance who completed high school but rarely continued on to postsecondary education. Parnell proposed Tech Prep as a way to engage the neglected majority and to prepare them for postsecondary education. The core of Tech Prep is an articulation agreement between a postsecondary institution and one or more high schools. The agreement specifies the instruction for defined occupations that will be delivered at the secondary and postsecondary levels, in addition to the criteria that students must meet to receive postsecondary credit for content studied while in high school. The 1990 reauthorization of the federal CTE legislation (Perkins II, then referred to as vocational education) provided funding to encourage Tech Prep, but did not require recipients to offer such programs.

Typically Tech Prep has been implemented through consortia of several high schools that work with one or more postsecondary institutions to develop articulation agreements. Negotiating and implementing these agreements often proved difficult. Hershey, Silverberg, Owens, and Hulsey (1998) conducted a national evaluation of Tech Prep that had been mandated by the authorizing

[1]The full title of this legislation is the Carl D. Perkins Career and Technical Education Improvement Act of 2006 (P.L. 109-270). This is the fourth reauthorization of this legislation to carry the name of Carl Perkins and is usually referred to as Perkins IV.

legislation. They found that implementation took three main forms, only one of which was a structured program that included all of the main elements proposed by Parnell and incorporated in Perkins II. The evaluators concluded:

> Most consortia have implemented particular aspects of Tech Prep (such as articulation agreements or applied academic instruction) but have not brought them together into structured, challenging programs of study that substantially change students' educational experience. (Hershey et al., 1998, p. xiii)

Hershey et al. also found, and Bragg et al. (2002) confirmed, that students rarely received formal credit for the postsecondary content they had studied in high school. This is because articulation agreements typically award such credits only after students have enrolled and made satisfactory progress at the articulated postsecondary institutions. Such contingent credits are usually referred to as escrowed, as opposed to transcripted, credits that are awarded upon successful completion of postsecondary courses while still in high school. Because Tech Prep students faced such difficulties in receiving postsecondary credits under these articulation agreements, Congress included a provision in Perkins IV that POS may provide the opportunity for high school students to earn such credits through dual or concurrent enrollment.

As CTE educators began to implement Tech Prep, they soon recognized a need to improve the organization of CTE instruction. Thus, career clusters were developed to aid in this organization. Career clusters consist of: 16 groupings of occupations on the basis of the types of goods and services that they produce (e.g., Agriculture, Food, and Natural Resources; Health Science; and Manufacturing; see States' Career Cluster Initiative, 2011). Within each of these clusters, career pathways were developed to specify the skills and knowledge that students must acquire to prepare for occupations in that cluster. The occupations in a pathway range from those that can be entered upon completing a high school program to those that require education and training at the post-baccalaureate and professional levels. Foundational courses provide instruction applicable to all occupations within a cluster. As students advance, the courses become increasingly specific to the particular occupations that students plan to enter.

To encourage the adoption of career pathways, the unit of the U.S. Department of Education responsible for CTE, the Office of Vocational and Adult Education (OVAE), funded the League for Innovation in the Community College to operate the College and Career Transitions Initiative (CCTI; Warford, 2008). The League conducted a competition that resulted in 15 community colleges being selected to work with secondary schools and other community partners to develop career pathways that would serve as models for other institutions. In 2004, 40 high schools joined in partnerships with the 15 colleges to enroll 2,853 students in 15 different pathways based on 5 separate career clusters. By 2007, the number of high schools included in the partnerships had doubled, the number of students had increased to 22,178, and these students were following 176 pathways based on all 16 clusters. The number of high schools and community colleges that adopted career pathways extended far beyond the 15 originally selected and led CCTI to establish a network open to any community college that wished to join. At its peak, the network enrolled 174 colleges. CCTI was grant funded, however, and when this funding ended, staff were no longer available to provide services. In a personal communication dated October 29, 2009, its director, Lawrence Warford, described the network as "static" (i.e.,

currently exists in name only). [2]

Although CCTI is no longer active, career clusters and career pathways continue as high priorities for the National Association of State Directors of Career Technical Education Consortium (NASDCTEc). In March 2010, this consortium published *Reflect, Transform, Lead*: *A New Vision for Career Technical Education* (NASDCTEc, 2010b). This document calls for the transformation of all CTE programs into POS, based on the 16 career clusters. A survey conducted by NASDCTEc (2010a) found that the 16 clusters (or a modified form of them) have been adopted by almost all (89%) of the states and territories for organizing their CTE programs.

This brief review of the background of POS indicates that CTE educators have acquired considerable experience in attempting to increase the rigor of CTE programs and to align secondary and postsecondary instruction. The POS requirements in Perkins IV attempt to overcome shortcomings in Tech Prep identified by past research, as previously discussed. To ensure that POS provide structured educational experiences leading to a defined outcome, Perkins IV requires POS to incorporate three mandated components (items a, b, and d) and one optional component (item c):

a. Incorporate secondary and postsecondary educational elements;
b. Include coherent and rigorous content aligned with challenging academic standards and relevant career and technical content in a coordinated, nonduplicative progression of courses that align secondary and postsecondary education to adequately prepare students to succeed in postsecondary education;
c. May include the opportunity for secondary students to participate in dual or concurrent enrollment programs or other ways to acquire postsecondary education credits.; and
d. Lead to an industry-recognized credential or certificate at the postsecondary level, or an associate or baccalaureate degree [P.L. 109-270, Sec. 122(c)(1)(A)].

To provide policy guidance to the states for implementing rigorous POS, OVAE developed a Design Framework for POS (OVAE, 2010). This framework built upon previous efforts by staff of the NRCCTE Technical Assistance Academy[3] to "unpack" the four legislated components in detail by giving specific examples of the elements considered essential for POS to be successful. MPR Associates assisted OVAE in the refinement of the framework by convening a panel of experts with representatives of the major associations representing CTE educators and OVAE staff. This panel made a number of recommendations that were incorporated in the final framework. The Appendix defines each of the framework's elements in more detail.

[2] For a review of studies that examined the effectiveness of Tech Prep, career pathways, and dual/concurrent enrollments, the reader is referred to the NRCCTE report by Lewis and Kosine (2008).
[3] The Technical Assistance Academy is conducted by the Academy for Educational Development (AED) in cooperation with MPR Associates and NASDCTEc. The Academy addresses issues relative to the implementation of Perkins IV that the NRCCTE, OVAE, and contacts with the field identify as of high concern to all stakeholders.

NRCCTE Projects

To determine the extent to which POS are being implemented as specified and to learn more about the outcomes of students who take part in these programs, the NRCCTE is conducting three longitudinal projects and has completed one descriptive study. The first of the three longitudinal projects is being conducted in cooperation with the National Institute for Work and Learning at FHI 360 (formerly the Academy for Educational Development, or AED). *Mature Programs of Study: A Postsecondary Perspective* focuses on three sites with programs that have several years of documented success in assisting high school students in making the transition to postsecondary education (i.e., "mature" POS) in order to examine how the programs were developed and what key elements make them work. The sites participating in this study were selected from a total of eight that were identified through recommendations from various CTE organizations and agencies and visited to determine the extent to which their operation aligned with the mandated POS components. Sites lacking strong relationships between secondary and postsecondary institutions were not selected for participation. Case study and backward mapping methods are being used with the three selected sites to provide information on the processes, policies, and key players involved in the initial development and continuation of the programs being studied. Since the start of the study, about half of the high school juniors and seniors enrolled in the two to three most mature POS at these three sites reported in surveys that their programs were in the career areas in which they had the most interest, but only about 10% of the graduating seniors enrolled in the same POS at the postsecondary level. Additional coding and analysis of the enrollment data will reveal whether these students stayed in the same career cluster, even though they may have changed their specific POS.

The second project, *Programs of Study as a State Policy Mandate: A Longitudinal Study of the South Carolina Personal Pathways to Success Initiative*, is investigating how a comprehensive, statewide policy that supports the development of POS is implemented in various high school contexts and if such a policy produces POS at the high school level and leads to improved student outcomes. This study is being conducted by the National Dropout Prevention Center at Clemson University, in collaboration with colleagues at the University of Louisville. In 2005, South Carolina passed the Education and Economic Development Act (EEDA), a career-focused school reform model intended to improve student achievement and preparedness for postsecondary education and high-skill, high-wage jobs. EEDA was designed to achieve these results through a focus on career awareness and exploration at all school levels and through the creation of locally relevant career pathways and programs of study beginning in high school.

EEDA preceded Perkins IV, but it required South Carolina schools to implement reforms that incorporate nearly all of the basic and supporting components needed for the successful development of a Perkins IV-funded POS as well as additional elements that could support and sustain the implementation of POS. For example, EEDA components include the organization of high school curricula around at least three career clusters per school, an enhanced role for school counselors, and extra assistance for high-risk students. Further, the law mandates evidence-based high school reform, regional education centers charged with facilitating business-education partnerships, and greater articulation between secondary and postsecondary education.

Project researchers are studying how eight high schools are implementing EEDA and the

influence its provisions are having on students and the development of POS. The schools being studied were selected to represent diversity in local economic conditions and industries, the degree of initial levels of policy implementation, and levels of school and community resources. Diversity in school size, location, and demographic characteristics of students were also taken into consideration in site selection. Data are being collected from three cohorts of students with different levels of exposure to the reforms mandated by EEDA: those who graduated in 2009 (who had little exposure to EEDA), and those whose on-time graduation will be in 2011 (with moderate exposure to EEDA) and 2014 (with exposure to EEDA since middle school). These three cohorts have and will complete surveys and at least one cohort will participate in focus groups. Additional student data are being obtained from the state educational database including grades, test scores, attendance, disciplinary incidents, and graduation.

Other qualitative and quantitative data are also being collected at sample schools through surveys of students, surveys of guidance personnel, and interviews and focus groups with administrators, teachers, and guidance counselors. A later section of this report presents preliminary results of analysis of these data sources, with a particular focus on reported changes in the duties of high school guidance personnel in career planning and other areas since EEDA was first implemented; the influence of the reform policy on CTE awareness and participation; and student reports of participation in career-focused education.

The third NRCCTE project examining POS, *Rigorous Tests of Student Outcomes in CTE Programs of Study*,[4] is a four-year longitudinal study measuring the effect of POS on secondary student academic and technical achievement outcomes. It is being conducted in four high schools, three in one large urban school district and one in a second large urban district. Two designs, one experimental, one quasi-experimental, are being used. In this study, the treatment is participation in POS, and the control condition is participation in the regular high school curriculum. Large school districts were sought because many of them already had programs like career academies that met the requirements of POS. Districts that had more student applicants than their programs could serve were favored; in such districts, a lottery was used to select those who would be admitted. The lottery made it possible to conduct a randomized control trial. The logic of this approach was that all characteristics of students (ability, motivation, parental support, etc.) that could influence performance on outcome measures, such as grade point average, were randomly distributed among the treatment and control groups. In the three schools in the first district, such a lottery was held. The fourth school in the study did not use a lottery to select those who entered its POS; this strand of the study used propensity score matching to create a comparison group of students who have characteristics similar to those who are participating in POS.

The fourth POS study, now concluded, was not longitudinal. Instead, *Six Stories in Six States: Programs of Study* used case study methods to describe the status of POS implementation during

[4] This project should not be confused with the unrelated OVAE program that has funded six states to develop rigorous POS (RPOS). Rigor in the NRCCTE project refers to the robustness of the methodology; that is, the degree to which student outcomes can be attributed to program effects. Rigor in OVAE program refers to the academic and technical content of the POS being developed. Additional information on the OVAE program is available on its website: http://www.ed.gov/news/press-releases/us-department-education-awards-six-state-grants-promote-rigorous-career-and-tech.

the first half of 2010 in six states. Neither the states nor the local districts visited in each were randomly selected. They represent a purposeful sample chosen based on their geographic and administrative heterogeneity and the recommendations of individuals who were knowledgeable about POS implementation nationally. The progress the selected states have made and the challenges they are encountering are described in a later section.

These four studies were designed to complement each other by focusing on different stages and aspects in the development and implementation process of POS to provide a more complete picture of POS nationally. The Six Stories in Six States study provides a statewide perspective of implementation and development of CTE POS across all school levels and offers a snapshot of variations in progress and challenges faced by six states that have been implementing Perkins IV requirements for approximately the same period of time. The other studies are longitudinal and focus on the development and implementation of POS at the school level and the effects they have on student secondary and/or postsecondary outcomes over time or the types of policies or processes in place that contribute to successful POS outcomes. Each of the three studies is examining sites that began the study at varying levels of POS maturity. The Rigorous Tests study is primarily comparing student outcomes of one high school cohort in schools with POS to those of control students in other high schools in their districts. The Personal Pathways study is also focusing primarily on high schools but includes schools and POS with varying levels of POS maturity and on both CTE POS and career majors as defined by the state. The schools under study not only are being affected by Perkins IV in its CTE programs but also by a state mandate that has similar requirements for the development of career pathways or programs of study for all students. The study is following the outcomes of three cohorts over time with varying exposure to the state policy. The Mature POS study focuses on the structures that facilitate students' transitions from secondary to postsecondary and students' progress into and through college in their POS.

The conclusion of this joint report synthesizes the findings from these four studies. The first section of the conclusion summarizes findings regarding the implementation of the four mandated components of POS. The second section presents information that emerged related to the 10 supporting components of the OVAE Design Framework for POS (OVAE, 2010; see the Appendix), which were released after the studies were already underway. In the third section, we present some closing thoughts on results across the studies. At this point, our findings are too preliminary to support firm conclusions regarding the efficacy and success of POS. Taken together, the four studies indicate that efforts are underway to establish POS that meet the legislated requirements of Perkins IV. Two long-standing problems for CTE affect the implementation of POS: the alignment of secondary and postsecondary instruction and the integration of academic and CTE content. As a result of the Perkins IV legislation, additional attention is being directed to these problems; however, continuing efforts at the state and local levels are necessary to address the many issues involved in creating aligned, articulated pathways from secondary to postsecondary education or employment.

Mature Programs of Study: A Postsecondary Perspective

This NRCCTE research study identifies and describes "mature" POS to understand how they work and why. We began with postsecondary institutions and are using a "backward mapping" technique to investigate how these colleges' relationships with partnering high schools began and how the POS are structured. Our Year 2 report described the qualitative theory and method for the study—a combination of case studies (Soy, 1997; Yin, 2009) and backward mapping (Elmore, 1980; Recesso, 1999)—and presented preliminary findings from interviews and observations across three mature POS sites. To complement these rich descriptions, we are also collecting data on student experiences. The current Year 3 report[5] examines students' perspectives on POS using multiple waves of student survey data. Future reports will combine the qualitative and quantitative data to present a coherent picture of how each of the three mature POS sites operates in order to inform policy and provide models for other POS.

Background

The Perkins IV legislation on POS contains components that have existed in various forms in prior Perkins Acts. Rather than search for research sites that incorporated all four critical components of the legislation, which would be difficult given that the concept of POS was only recently introduced when this study began, the primary selection criteria for mature POS sites for this study was the first component of POS under the law: specifically, several years of evidence that CTE students move from a high school CTE program *into and through* a postsecondary CTE program. Because mature POS may have begun under another name and include other aspects not in the Perkins legislation, we are seeking to understand all of the key features of sites where POS-like structures exist.

Although the purpose of the overall research study is to examine how these mature sites evolved and how they work, primarily using interview and observation data, we are also following students using survey and transcript data as they transition from high school to college in the POS at the selected sites. To understand what students might experience in POS and develop surveys to capture these experiences, we relied on prior legislation and literature. Initiatives of the 1990s like youth apprenticeships, School-to-Work, and Tech Prep formed the basis for POS in Perkins and included an increasing emphasis on the integration of academic and technical skills and ways to facilitate the secondary postsecondary transition. Research from the fields of career counseling and career identity development (Lewis & Kosine, 2008), CTE transition (Castellano, Stringfield, & Stone, 2007; Lekes et al., 2007) and other recent research on career pathway programs (Pierce, 2001), career academies (Kemple, 2004), credit-based transition programs (Bailey & Karp, 2003; Karp, Calcagno, Hughes, Jeong, & Bailey, 2007), and school-to-career programs (Furstenberg & Neumark, 2005) also informed our study.

The recent *Pathways to Prosperity* (Symonds, Schwartz, & Ferguson, 2011) and *Learning for Jobs* (Organisation for Economic Co-operation and Development, 2010) reports suggested that other nations provide more structured career preparation for secondary and postsecondary students. These recent reports have mobilized U.S. policymakers and educators regarding the

[5] See http://136.165.122.102/UserFiles/File/Tech_Reports/Mature_POS_Year_3_Final_Report.pdf for the full-length version of this report.

issue of linking secondary and postsecondary vocational training and work-based learning. In response, CTE proponents have argued that POS are a promising approach to increasing students' college and career readiness because they integrate academics and career-related technical skills in a sequence of courses leading to a postsecondary degree or credential. However, research evidence on POS has not yet borne results, and longitudinal research on CTE students' educational pathways is limited. Nonetheless, the NRCCTE's three studies shed some light on what researchers might find when studying POS.

Castellano et al. (2007) studied career-based comprehensive school reform in multiple schools over five years and found that higher participation in CTE was related to lower chances of dropout, and students at two of the three high schools studied were more likely than their control counterparts to report having a post-high school plan. Lekes et al. (2007) examined secondary student matriculation to two selected community colleges offering CTE transition programs through partnerships with K-12 and secondary districts. One component of the study compared CTE and non-CTE high school students on academic experiences, achievement, and transition into the first semester of college. The second component provided an analysis examining CTE pathway students' transition experiences and outcomes associated with enrollment at the local community college. The findings showed that participation in CTE transition programs did not interfere with academic course-taking in high school, in that CTE students were equally prepared for college as matched non-CTE students and other relevant comparison groups. Second, student participation in CTE transition programs was associated with their feeling more prepared for the transition to college and career, with numerous results pointing to student feelings of confidence and satisfaction with their choices about college and careers. CTE students also reported higher levels of preparation for college and careers than non-CTE students. Students who had taken dual credit courses earned more college credit and showed greater persistence than those who had not, and students requiring remedial coursework were not impeded in their persistence in college, at least within the timeframe of the study.

The findings from the CTE transition study (Lekes et al., 2007) are particularly meaningful to implementation of POS under Perkins IV because they promise positive results when academic and CTE curricula are integrated with dual credit. These results suggest CTE transition programs that provide high school students with a dual focus on CTE and academic preparation may facilitate student transition to college and career without hindering academic performance. They also offer promising opportunities for high school students to develop the academic and employability skills that foster student success in preparing for careers in high-demand occupational areas during their college education. A limitation of the Lekes et al. study was the short period of time during which the students were tracked. This curtailed the degree to which student matriculation patterns could be measured. Longitudinal research that spans more than the final year of high school and the first year of postsecondary experience is needed to determine the high school CTE practices that lead to success and retention in college and beyond to entry-level positions in the work force.

Karp and her colleagues (2007) were able to make use of large datasets from the state of Florida and the city of New York to examine dual enrollment using longitudinal student data and controlling for pre-existing characteristics. The findings led the authors to conclude that dual enrollment can be an effective college transition strategy. In New York City, students enrolled in

one of 19 vocational high schools and participating in a program called "College Now," which allowed dual enrollment at CUNY, were compared to their peers who did not participate. The researchers found that College Now students were more likely to pursue a bachelor's degree, have higher first semester GPAs, and earn more college credits than those who did not. Because the Florida dataset did not have indicators for CTE students, it was necessary to create a new variable based on student coursetaking in CTE. Among the subsample classified as CTE students, those who participated in dual enrollment were more likely to earn a high school diploma, enroll in college, earn college credits, persist in college, and have higher GPAs up to three years post-high school. Although these investigations made use of large-scale data that allowed statistical controls and subgroup comparisons to illuminate overall outcomes of dual enrollment participation, the components of the dual enrollment experience that created the positive effects for student outcomes were not included in the study.

These and other prior studies focused primarily on student outcomes with little detailed information about the implementation process of initiatives leading to these outcomes. The current study builds on previous research regarding student preparation for college and careers by directly examining one type of structure (i.e., POS) that supports students' transitions. The overall study uses a mixed methods approach, but this report is limited to findings from the student surveys that shed light on POS from student perspective.

Sample and Method

Site Selection

POS evolved over several decades of efforts to create effective transition programs from secondary school into postsecondary education or the workforce. Most of the mature sites in existence today are likely to have begun under a different name with slightly different components or structures. For this reason—in addition to the fact that younger programs created post-Perkins IV may not have been in existence long enough to meet our criteria for mature sites—we cast a somewhat wider net than just POS as defined by Perkins IV.

To identify mature POS-like sites, initial scouting visits were made in Year 2 to eight recommended sites to look for evidence that they met our criteria and establish relationships with relevant individuals in order to facilitate future visits should the sites be selected for the study. The method of identifying and narrowing down a pool of potential sites included nominations from CTE leaders at the national and state levels in government, for-profit, and not-for-profit sectors, preliminary web searches, phone calls, and finally an in-person visit. The research team received almost 40 nominations of local sites. In the initial screening (web and phone) we determined whether or not the site indeed had a secondary – postsecondary linkage. We did find many impressive secondary or postsecondary programs, but without the link between the two that provided a clear pathway to students, we did not consider these programs "mature" POS. We narrowed the sample to eight that we selected to visit.[6] Site visits were conducted to further

[6] The number of recommendations does not include entire states that nominators claimed we should look at because they had good models. Indeed, many states do provide well-developed templates and/or detailed guidelines for POS in their state. However, because this is a study of local implementation of POS, if specific local sites within a state

confirm sites' eligibility.

The criteria used for selection into the final pool of potential sites included: (a) active cooperation between secondary and postsecondary levels, (b) sufficient numbers (> 20) of students in each POS transitioning from secondary to postsecondary each year, and (c) access to electronic student transcript data (for ease of data collection). Several sites that were highly recommended and met all of our initial criteria declined our visit on the basis of limited time and resources for hosting researchers. For this reason and because of our own limited time and resources, we do not claim to have conducted an exhaustive search. However, what we do have includes a range of approaches to implementation of POS at the local level that can inform policymakers and practitioners in better understanding how POS are being implemented.

Of the eight sites that were visited, four were chosen to participate in the longitudinal study and three agreed to participate. Each of the three sites is anchored by a community college (see Table 1). Each college has at least a dozen area high schools feeding into it; however, only high schools that had developed a POS with the selected college and whose principals agreed to participate are included in this study. The sample therefore includes six regular high schools and one alternate high school feeding into River College, six participating high schools that feed into Desert College, and three high schools feeding into Northern College. Following the table appears a brief description of each site, excerpted from the case studies.

Table 1
Selected Mature Programs of Study Sites

Masked Site Name	Location		Programs of Study
"River College"	Midwest/South	Small town	Industrial Maintenance, Mechatronics
"Desert College"	Southwest	Medium city	Film Tech, Culinary Arts, Construction Technology
"Northern College"	Northern Midwest	Small town	Automotive Technology, Welding

River College is a community/technical college located in an industrial town with fairly close ties among education, business, and government. The college is fed by 14 high schools (including 2 vocational centers) in 6 counties. It has the highest enrollment of high school students in the state: 1,700 are dually enrolled (30% of its total enrollment). The college began developing dual enrollment options over eight years ago to provide needed skills to the younger generation in a town with an aging population. The curricula are set in collaboration with the local workforce investment board, and agreements between the college and area high schools are individually tailored by a dedicated coordinator to the needs of each high school (including providing distance learning for rural schools). The college has tried to make it easy for each of its feeder high schools to set up articulation agreements to fulfill their vision that every student should be able to graduate from high school with some college credit.

Desert College plays a central role in postsecondary education for an urban population that is

were not also identified by the nominator or others whom we asked, we were unlikely to pursue state-level recommendations.

heavily Hispanic and lower-income. The college population includes many first-generation students who need help navigating the college culture. To assist these students, each department at the college has its own "achievement coach" who works with students on everything from financial aid to personal problems to promote retention. In 2000, with large enrollments in technical areas, the college began to explore ways to build pipelines that started preparing students at the high school level to feed into the college. They funded a staff person with Perkins money in 2001 to head this effort, and by 2006 there were three full-time staff in the Office of High School Relations whose sole function is to work with area high schools on recruitment, articulation, credits, and enrollment. The college has articulation agreements in CTE areas with 4 feeder districts. Every program at the college is required to have an advisory board including secondary, postsecondary, and business/industry representatives. The CTE programs are highly attuned to the needs of both students and employers in the region; some students are even recruited to work before they have finished their programs. Due largely to the college's outreach to high schools, dual enrollment has more than doubled in the last few years.

Northern College is a technical college in a small city that is the linchpin of a regional Tech Prep consortium that includes 27 school districts. It is also co-located with the local workforce center. The college's articulation/dual enrollment programs started six years ago in response to high schools' need for expanded CTE programs that they could not afford alone. Area high school CTE teachers were retiring, and the schools approached the college to talk about how to work together and share resources to offer relevant programs to students. People from area colleges, high schools, businesses, and workforce development were gathered to talk about ideas and what was going on elsewhere. In addition to Tech Prep, initial funding to launch new training programs to fill jobs in manufacturing came from a state "sector" grant as well as from local industry. The leadership/implementation team meets regularly, as do consortium-wide curriculum groups with high school and college faculty in each program. College faculty are regularly out in the high schools (many of the college level classes are taught by college faculty at the high schools), and high school students are also brought to campus to become familiar with the college environment. The college has a website for POS to show what is offered at each high school and how it connects with the college. The college website links to a state website that provides information about all state POS.

Survey Instrument[7]

Surveys for high school and community college students include items that the NRCCTE POS team selected from multiple national surveys with external and construct validity. Researchers from the South Carolina POS study then piloted the student survey at two of their schools, and Cronbach's alphas were determined to be acceptable. The surveys ask about students' activities, attitudes about their experiences, and career and educational goals (immediate and future). On the detachable front page of the survey, students were asked to provide future contact

[7] In addition to surveys, we are also collecting student transcripts from high school and college to follow their course enrollment and performance in the POS. Cumulative transcripts have been collected for all high school students participating in the study and are being coded using the Classification of Secondary School Courses (CSSC). Standardized test scores, graduation status, and cumulative GPA are also being recorded. Two trained coders are completing the transcript work, and a member of the research team is double coding a few transcripts from each school to ensure inter-rater reliability.

information so that once the students leave school (either immediately following high school or after postsecondary education), we may contact them to participate in a subsequent survey. In follow-up surveys administered annually, students are being asked about their educational and occupational experiences since the last survey, reasons for deviations from expectations (e.g., compared to when you were finishing up in high school, do you have different ideas now about the kind of career you might want?), immediate and long-term goals, and employment status. Students who were added to the sample at the college level were asked retrospective questions about their high school career-planning experiences. Students who drop out of school or do not continue to the college are being sent a brief online survey to determine what they are doing and the reasons for their education and employment decisions.

Student Sample and Survey Administration Method

Two cohorts of CTE students from each of the participating high schools in the selected sites are being tracked for a period of four years (Years 2, 3, 4, and 5 of the study) on their secondary and postsecondary experience, academic and technical achievements, and initial work-related experiences. The time frame includes the students' last one to two years of high school and the first one to two years of postsecondary education and/or work, depending on the cohort (see Figure 1). Student surveys were first administered to high school students during visits to each of the three sites in Spring 2009 and at two subsequent time points throughout 2010 (see Table 1 and Figure 1). Surveys were collected from students participating in classes that were relevant for the POS of interest at each site. For those students under 18, letters (in Spanish and English) were sent home to parents describing the study and allowing parents to opt out on behalf of their children; only 3 did so. Students were asked for their assent prior to taking each round of surveys. Surveys administered at the colleges included all students enrolled in the POS of interest, not just those who had attended the feeder high schools in our study. Therefore, the college sample is much larger than (and unfortunately has little overlap with) the high school sample, as will be discussed in the results section.

Student Survey Results

Although the planned research design spans five years and includes systems data, this report presents the survey findings from participating student cohorts in the first two years of the study. Thus, the research should be considered in progress. Nevertheless, interesting findings are emerging. It should be kept in mind that the results presented below are for students participating in POS of interest in this study at the high school and/or college level only. No comparisons are being made to students not enrolled in a POS because data were only collected from POS students. Also, the high school and college samples do not include the same students; due to the small number of students transitioning to college in the same POS, the two samples are, for the most part, independent and should not be interpreted as longitudinal. Finally, because the sample is not representative, findings should be interpreted as applying only to those students who participated in the survey. Results presented are all descriptive, even when comparisons are drawn between year to year results in the high school sample.

In presenting study results, we begin with the first round of high school student surveys. We then report the second round so that results can be compared from junior to senior year for the

youngest cohort (1A and 1C in Figure 1). Next, we present survey findings for school leavers (those who were neither in high school nor college during the second round of data collection; 1B in Figure 1). Finally, we present findings from the first round of college data collection, which includes participants from the older cohort if they made that transition (2A in Figure 1). Future reports will include survey findings from the remaining rounds of data collection (2B, 2C, 3A, and 3B in Figure 1).

Original High School Sample (Round 1A)

In Spring 2009, we visited each of the participating high schools across the three sites and administered surveys on-site to all available juniors and seniors in the POS of interest (some sophomores happened to be taking these classes as well). A total of 219 students (44% seniors, 54% juniors, 2% sophomores) completed the first-round survey in high school. The final sample included 72% male, 43% Hispanic, and 51% White respondents. The majority of students (62%) had selected their POS by tenth grade. More than half of the students surveyed in the spring of 2009 answered that the POS in which they were currently enrolled was the one in which they were most interested (52%), and that it was related to their career goals (65%).

Although interviews with administrators and counselors at the high schools suggested that they were using CCTI-type templates for POS to help students plan their courses, most students (69%) had not participated in a counselor-parent-student conference, and almost half (45%) of high school students were unaware of dual credit courses being offered in their POS. Students reported that they tended to discuss course planning most frequently with friends (62%), and that parents were the most helpful individuals regarding course planning (31%). Students were more likely to have received no help at all (21%) than help from guidance counselors (17%) or teachers (13%). Despite the lack of school-based guidance, 84% of high school students were at least somewhat satisfied with the help they received in planning their courses.

The majority of high school survey participants (79%) planned to enroll in postsecondary education (at least technical school) after high school, with 30% planning to enroll in a four-year college. Most students (88%) claimed to have at least some knowledge of the qualifications needed for their chosen job; however, 39% had not participated in any work-based learning (WBL) experiences. For students who did participate in WBL, almost half (47.4%) reported that WBL experiences were at least somewhat related to their future career. Less than a quarter of students (21%) reported current paid jobs as being at least somewhat related to chosen careers.

High School Second Round (Seniors in Spring 2010; 1C in Figure 1)

In Spring 2010, 63% of the Desert sample, 43% of the River sample, and 51% of the Northern sample were still in high school (see 1C in Figure 1). The initial high school survey was adapted for an online format for this round of data collection to reduce costs (i.e., site visits were not made for this round). Only high school students who were in the initial high school sample and expected to be still enrolled in high school (mostly those who had been juniors in Spring 2009; $N = 122$) were recruited for this survey because they were the only ones whose parents had received notification of the study in the previous year. Individual letters with the survey invitation were purportedly distributed by school administrators. Reminders to students were

conducted through e-mail as well as general verbal reminders by school staff. Students who completed the survey were sent a $25 Amazon.com gift card. These efforts resulted in a 28% response rate ($N = 34$) among those moving from eleventh to twelfth grade.[8]

Although this section compares responses longitudinally from these 34 students in their junior and senior year, statistical repeated-measures testing was not conducted due to small cell sizes. Within these limited data, several trends are worth noting. High school students' opinions about their involvement in a POS and their academic engagement in school remained positive, and there were increases in the percentage of students reporting that:

- being enrolled in a POS made them more interested in coming to school (from 24% in Year 1 to 42% in Year 2);
- being in a POS has helped them (a) focus their studies (from 29% in Year 1 to 44% in Year 2), improve their grades (from 18% in Year 1 to 27% in Year 2), (b) make connections[9] (from 35% in Year 1 to 46% in Year 2), and (c) take courses they would need in the future (from 32% in Year 1 to 33% in Year 2).
- they were more likely to involve their parents in course selection (from 15% in Year 1 to 21% in Year 2).

These students' reports of school relevance to college and career did not change drastically from one year to the next, with most students continuing to agree that information learned in school will be useful for everyday life, further education, and a future career. Overall, students had engaged in more career-related research by their senior year compared to their junior year, which might be expected even if they were not in a POS.

The number of students reporting that they had a good deal of knowledge about aspects of their future job increased in all categories from junior to senior year except for "advancement opportunities," which remained unchanged. The job aspects about which students seemed to be gaining the most knowledge between their junior and senior years were job qualifications and required training and education. Again, the sample size of students responding at both time points was only 34, so the results presented in the preceding section should not be interpreted as representative of all POS students.

School Leavers (Alternate Survey; 1B in Figure 1)

An alternate survey was developed and administered in Winter 2009 for the subgroup of students who had participated in the survey as high school seniors in the POS during the initial Spring 2009 data collection but who did not appear on college POS enrollment lists the following Fall, The purpose of this follow-up survey was to find out the education and job status of those students who had not enrolled in the expected POS at the college level and reasons for deviation from expectations. Invitations and regularly spaced reminders were sent automatically through SurveyMonkey directly to the email addresses students had provided on their 1st round survey. Out of 78 eligible students, the 14 participants who completed the survey (18%) each received a

[8] Chi-square analyses indicated no significant differences in follow-up response status based on gender, site, educational aspirations, or immediate plans after high school.

[9] In Year 1 "make connections" was asked as: "POS helped me make connections." In Year 2, this was asked as, "Having a POS has helped me make connections between what I study and what type of career I want."

$35 Amazon.com gift certificate. The following findings only apply to the responding sample. Only 1 of the 14 students who responded was not employed or in school and had no definitive plans to return to either. Twelve were in school either full- or part-time, either in two-year colleges or four-year universities. Four of these students (all from one site) were in fact enrolled at one of the postsecondary institutions participating in our study, just not in the same POS that they started in high school. Three-quarters (9) of the alternate survey participants' responses about the field they see themselves in at age 30 were consistent with their high school response (in some cases, the POS they were enrolled in did not match their interests because their desired POS was not offered at the high school they attended).

First Year College (2A in Figure 1)

Online surveys were administered to all college students in the POS of interest in Fall 2009. In addition to questions about students' college experiences thus far, the college survey covered employment and retrospective questions about career planning during high school. Potential college participants were identified by obtaining enrollment lists for the POS of interest from the three participating colleges. Recruitment efforts focused on all students in the POS of interest at the college level, those who may have attended one of the feeder high schools where survey data were collected as well as those who did not attend one of the participating high schools.[10] This survey was administered online with an invitation and reminder schedule similar to the alternate survey for school leavers, except in this case email addresses provided by the colleges were used. Those who completed the survey ($N = 85$) were entered in a lottery for either a $50 gift certificate or a $100 gift certificate to Amazon.com.[11]

Fewer students transitioned from the high school to the college portion of the POS than expected (see Figure 2). Of students who participated in our study as seniors in high school ($N = 94$), a total of 16 students (17%) across the three sites were enrolled in college in the same POS in Fall 2009, according to the colleges' enrollment rosters.[12] Of these 16 students, only 2 (13%) completed our online survey, despite reminders and incentives. (The majority of the students who took the survey in the college POS had either come from different POS at the participating high school, another high school, or were older and returning to college from the workplace.)

Unlike the Year 2 high school participants, college survey participants ($N = 85$) were mostly new participants in the study (i.e., primarily not the same sample that participated in the first round of the high school survey). We anticipated roughly equal numbers of students in the college POS who had attended one of the participating high school POS and who had not, so that comparisons could be made. Although survey data may not provide opportunities for such comparisons, we are now collecting and analyzing college systems data to accomplish the same purpose.

The majority of students who took the college survey were full-time students in the process of earning an associate's degree. About half of the participating college students were not employed

[10] This allows for a natural comparison group for later analyses.
[11] The incentive structure changed later in the study in an attempt to increase the response rate.
[12] The 16 are only from River and Northern sites; no 2009 high school participants from Desert were enrolled at the college in the POS of interest by Fall 2009 (see Figures 2 and 3). This may be because Desert College is larger and has more options for students to choose from.

at the time this survey was administered. Of the students in this sample, over half (56%) who responded to the question felt adequately prepared for the transition from high school to college. A larger percentage (62%) felt academically prepared for college studies. However, almost half (47%) of college students reported that they were required to take remedial courses in college.[13]

College students in this survey had mostly positive opinions about how well their high school prepared them for college or work. The majority (75%) of those who responded to the question agreed or strongly agreed that the content of their classes was relevant for the real world, and 64% agreed or strongly agreed that career guidance was made available to them. However, only 37% agreed or strongly agreed that they had clear career direction while in high school (recall that the majority of these respondents were not part of the high school POS we studied). College students had the most favorable opinions of the writing and science skills their high school education provided them. Opinions on math skills and speaking skills provided by high schools were also favorable. Slightly less than half of students responded that they received the needed computer skills to be successful. Over half of college students who responded to questions about their CTE training in high school had positive perceptions of the skills and competencies they have gained.

About 10% of the sample on average reported earning college credit while in high school, mostly through dual credit options at their high school, taking classes at a community college while still in high school, or taking Advanced Placement (AP) classes.

The majority of college student participants reported parents as the most helpful individuals to turn to for various school and career-related topics during high school. In fact, after parents, college students mostly reported that no one was helpful. Only teachers were seen as more helpful than "no one" for discussing things studied in class and grades, after parents.

Most college students reported having at least some knowledge of different aspects of their chosen careers. However, the majority (72%) of college students who responded to the question reported thinking differently about their desired career, compared to their ideas at the end of high school.

Employed College Students

Employed college students were fairly equally divided over agreement versus disagreement that their high school education adequately prepared them for their current job. A quarter of employed students reported taking classes in high school that provided them with specific skills needed for their current jobs.

In general, employed students had favorable opinions of their jobs. However, less than half (45%) of employed college students agreed that their current jobs were related to either their

[13] A chi-square analysis revealed no significant difference between students who were required to take remedial classes and those who were not in feelings of either being adequately prepared for the college transition or being academically prepared for college-level studies. In fact, the majority (64%) of students who reported needing to take remedial classes (47% of the sample) reported that they felt prepared or very prepared for the transition to college, and half (50%) reported being prepared or very prepared academically for college studies.

major or their desired job in 5 years. The second round of college survey data (2B in Figure 1) is currently being collected, and these data will shed further light on the pathways and experiences of college students in these POS.

Limitations of the Study

This study only focused on selected POS within three unique sites. Results thus cannot be generalized to POS elsewhere. Further, low survey response rates also minimize the extent to which conclusions can be drawn about the POS in this study. Low response rates were primarily due to administering the survey online; one reason we believe our response rate with this format is so low is that this population (community college students, almost half of whom are minority, primarily enrolled in skilled trades fields) does not seem to use email frequently; according to interviews with college administrators and faculty, students' time and energy outside of classwork is likely spent working at jobs or spending time with friends and family. We have determined that on-site administration and immediate distribution of incentives to all participants, which we did in Round 3, is much more effective. Although this Year 3 report focuses on student perspectives, it should be noted that these are not the primary focus of the overall research study. Rather, student surveys supplement the qualitative findings, which use case studies and backwards mapping to illustrate the structure of these mature POS, to be presented in next year's report.

Summary of Findings from Student Surveys at Mature POS Sites

We were unable to obtain high response rates from original high school participants after they left high school. However, based on enrollment records from the participating colleges, we determined that fewer than 10% of students across the two cohorts in our initial sample made the transition from high school to college in precisely the same POS; further analyses will allow us to determine whether the others at least continued in the same career cluster. It appears that even when a POS is well-established and mature, it does not necessarily guarantee that students will continue to progress through it; career interests and college and work decisions are still in flux at this point in students' lives. These findings may also demonstrate that the high school to college transition is not linear, particularly when the number of options for possible career fields increases greatly when students get to college. It is not surprising that students may go in other directions. This does not indicate that the POS studied are not successful in preparing students for postsecondary education or facilitating decision-making regarding career paths. Although the alternate survey responses (sent to those not in the college) are not representative, we can cautiously conclude that among those who responded, it seems students are graduating high school and enrolling in programs at other schools, changing their minds about their majors, or taking classes at the expected college without formally enrolling in the same POS they were in during high school.

Despite a lack of clear evidence for students actively transitioning into the postsecondary level of their POS, high school participants reported generally positive opinions about their POS experience, as did the mostly independent sample of college participants when asked to reflect back on their CTE training in high school. The measure of success of POS may not necessarily be the rate at which students are guided into career paths during high school, but the capacity

these programs have for providing students with the ability to make future educational and career decisions using the skills they gained through participation in POS. According to the survey findings in this study, POS students have positive feelings about school and confidence in career planning. If such outcomes are an intent of the POS legislation, then whether or not the student continues in that same career path or chooses another may be less important.

Both rounds of high school participants and college participants reported that their parents were the most helpful when planning for academic success and the transition to college and career. This pattern of relying on parents for guidance regarding education and career planning seems to persist into the college years, when students might not be living at home anymore and would typically be exposed to other sources of education and career planning assistance. It is therefore critical to place a greater focus on equipping parents to be as knowledgeable and supportive as possible in guiding students in their education and career-related decisions, given that students appear to consistently rely on them for this type of information.

Although many high school students were taking advantage of dual credit opportunities, fewer than half knew whether dual credit courses were offered in their POS. This is despite the fact that each of the sites were in part selected because they offered dual credit to students. These findings suggest that POS students are not receiving adequate course guidance in high school—a conclusion supported by on-site interviews with counselors (reported in Year 2), who revealed that they did not always have necessary information about the POS to share with students.

Neither high school students nor college students were participating in much work-based learning, and those who were working for pay for the most part reported that their jobs had little to do with their chosen careers.

The students who participated in our surveys are, arguably, receiving better CTE programming than sites without mature POS in place. Furthermore, those students responding to the online surveys and those who responded to more than one round of survey administration are presumably a self-selected motivated group. Yet these students are still not being prepared as well as may have been envisioned by those who shaped Perkins IV. As POS are further developed in the field and further clarified by OVAE and Congress, the findings from this study suggest that it is critical to ensure that both students and parents receive increased information and guidance from school and college staff regarding education and career options. Ensuring that available work options for students while they are in school are at least somewhat related to students' course of study may also be warranted.

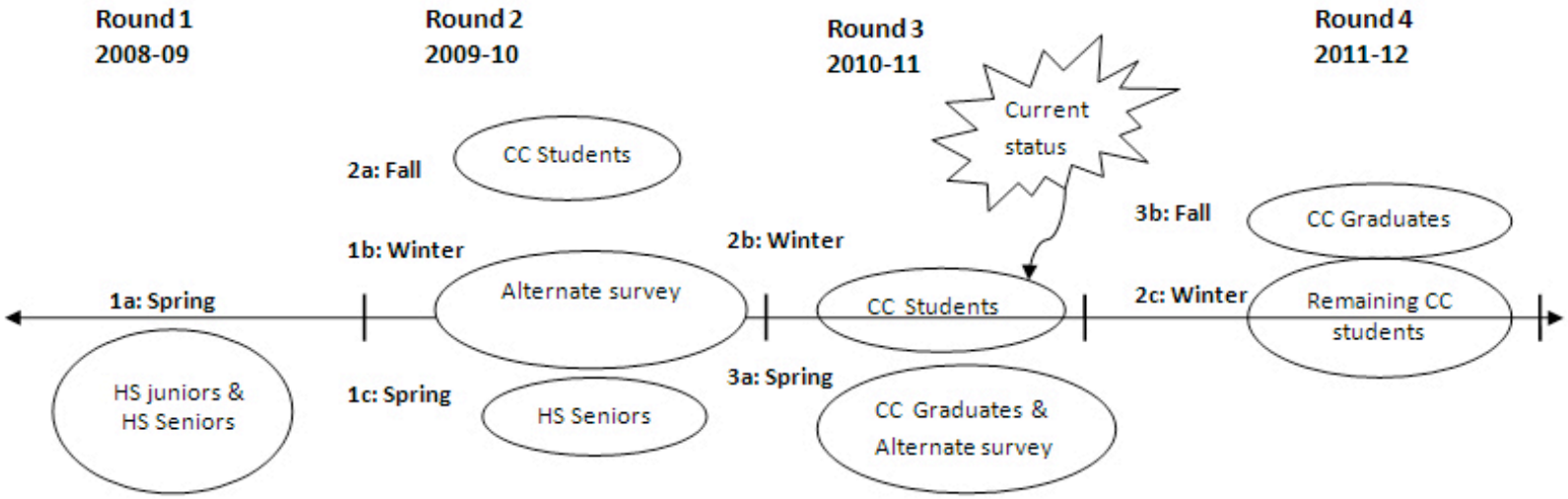

Figure 1. Data collection progress and current status.

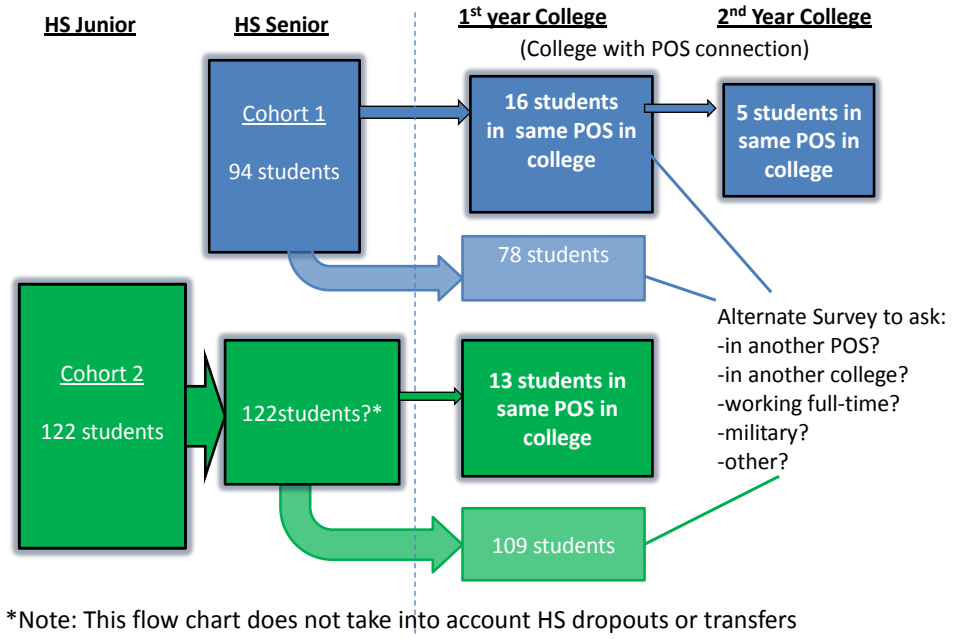

Figure 2. POS students transitioning to college.

Programs of Study as a State Policy Mandate: A Longitudinal Study of the South Carolina Personal Pathways to Success Initiative

The purpose of the five-year Personal Pathways study is to examine the influence of the implementation of South Carolina's Education and Economic Development Act (EEDA) on the development of POS and student outcomes in eight high schools in the state. EEDA, enacted in 2005, is a career-focused school reform model intended to improve student achievement and preparedness for postsecondary education and high-skill, high-wage jobs. It was designed to achieve these results through a focus on career awareness and exploration at all school levels and through the creation of locally relevant career pathways and programs of study beginning in high school.

EEDA contains nearly all of the basic and supporting components needed for the successful development of a Perkins IV-funded POS as well as additional elements that could support and sustain the implementation of POS. For example, EEDA components include the organization of high school curricula around at least three career clusters per school, an enhanced role for school counselors, and extra assistance for high-risk students. The law mandates evidence-based high school reform, the creation of regional education centers to facilitate business-education partnerships, and greater articulation between secondary and postsecondary education.

This study examines the effects of a career pathway and POS model on the development of career-focused POS and on high school students' engagement, achievement, and transition to postsecondary education and/or employment. It also examines whether the availability of school and community resources and future employment opportunities—whether substantial or limited—influence the development of POS and the outcomes of students enrolled in them.

Study Design

Because all public high schools in the state are operating under the same law, it was not feasible to randomly assign schools to experimental and control groups. Instead, this study uses a quasi-experimental design (Shadish, Cook, & Campbell, 2002) with a mixed-methods, triangulated approach (Tashakkori & Teddlie, 2002) to follow three student cohorts from a sample of 8 high schools. Both quantitative and qualitative data are being collected at the school and individual student levels and these data are being analyzed through a variety of methods. In the future, results from archival data for the three student cohorts, such as grades, attendance, and dropout rates, will be combined with content analysis of curricular materials and perspectives gleaned from interviews and focus groups with guidance personnel, school administrators, teachers, and students.

School and Student Samples[14]

The sample of eight high schools is comprised of schools from economically and culturally diverse regions of South Carolina that vary on factors critical to our research questions: (a) community economic conditions and industries, (b) levels of school and community resources, and (c) initial levels of EEDA policy implementation. Schools also vary in the size of student

[14] For a more detailed description of our sampling strategy, please see Sharp et al. (in press).

population, school performance outcomes, ethnic diversity, and locale (urban, suburban, or rural).

We chose to follow three student cohorts from these eight schools because of their varying levels of exposure to the state policy. The Class of 2009 would receive very little to no exposure to the policy, whereas the Class of 2011 would receive moderate exposure beginning in the eighth grade. By contrast, each school's Class of 2014 would be exposed to the full effects of the policy since before middle school.

Summary of Activities and Findings to Date

To date, we have collected both quantitative and qualitative data from all of the sample schools. Two of the three student cohorts (Class of 2009 and Class of 2011) have been surveyed once about their experiences with career-focused activities, career planning, and school engagement. We will be administering the survey again in NRCCTE Year 4 to one of these cohorts (Class of 2011) prior to graduation and in NRCCTE Year 5 to the third cohort (Class of 2014). We have also surveyed guidance personnel about their involvement in career-focused education and the development of student Individual Graduation Plans (IGPs) and changes in their assigned duties since EEDA. Two site visits have been conducted at sample schools and partner postsecondary institutions to interview school personnel about implementation of the reform policy and the progress made in career-focused education, the development of POS at their schools, and the characteristics of these POS.

Our full report,[15] synthesized here, focuses on three main groups of findings that emerged from data analysis conducted during this third year of the study: (a) reported changes in the duties of high school guidance personnel in career planning and other areas since EEDA was enacted, (b) influence of the reform policy on CTE awareness and participation, and (c) student reports of participation in career-focused education.

Reported Changes in the Duties of High School Guidance Personnel

Role of guidance personnel in the school reform policy. A key component of EEDA is a comprehensive and sequential school guidance and counseling program designed to support career-focused education, including career awareness at the elementary school level, career exploration at the middle school level, and career preparation at the high school level (South Carolina Technical College System, 2006a). Guidance personnel are required to limit their school duties to guidance and counseling and should no longer perform many administrative tasks, such as administering standardized tests or developing the master class schedule.

Guidance staff must help all middle and high school students to select majors, develop and revise their IGPs, and arrange out-of-classroom learning experiences. Each high school is required to implement a career guidance program model that includes annual career guidance counseling for each student to help further define career goals; review and update an individualized IGP; and, during tenth grade, declare a major (i.e., an academic focus) within a cluster of study. Both

[15] The full report is available for download at http://136.165.122.102/UserFiles/File/Tech_Reports/Personal_Pathways_Year_3_Final_Report.pdf.

middle and high schools are required to reduce their student-to-guidance personnel ratio to 300-to-1 or lower (South Carolina Technical College System, 2006b).

All middle and high schools are required to have either a counselor with a special career development certification or to hire a career specialist with that certification (South Carolina Technical College System, 2006b). These specialists are to deliver career awareness, development, and exploration activities to students and teachers, and to assist students in setting up work-based learning (WBL) experiences (South Carolina Department of Education, 2006).

IGPs are designed to be organizing tools that show links between a student's high school coursework and plans for the future and "list courses required for graduation, electives that focus on students' individual interests, their post-graduation plans, and their professional goals" (South Carolina Technical College System, 2006b, p. 3). Every eighth grader is required to develop an IGP during a conference with a counselor and parents/guardians (South Carolina Technical College System, 2006a). As part of IGP development, each student selects a cluster of study to explore, and course schedules are then built around the choice of cluster.

Data collection from and about guidance personnel. Due to this centrality of counseling in the implementation of EEDA and to better understand whether and how guidance personnel duties have changed since EEDA, we have collected guidance personnel data from a variety of sources. These sources include data collected for the purposes of this study and data that were collected by the South Carolina Department of Education (SDE) for accountability purposes for EEDA.

During our initial site selection visits and the second site visits, we interviewed guidance directors and other personnel about how the reform policy was being implemented at their schools and their roles in its implementation. During the second visits, we explored in depth the impact of the policy on guidance counseling and POS in sample schools. We explored the roles of guidance personnel through surveys of guidance counselors and career specialists and follow-up interviews with counselors at sample schools on whether and how their duties may have changed since EEDA implementation.

Two surveys were developed: one for school guidance counselors and one for career specialists. Each survey included a list of possible school counseling duties, adapted from the School Counselor Activity Rating Scale (Scarborough, 2005). Duties related to assisting students in the areas of career, academic, and social development; consulting with other school staff or parents; coordinating activities; and "inappropriate" duties (based on EEDA guidelines) were included.

The surveys were distributed to guidance personnel during site visits to schools in the fall of 2009. Twenty-five of the 29 counselors from our eight sample high schools responded to the survey, for an 86% response rate. Five of the eight sample schools reported employing one or more career specialists. Seven of the eight career specialists employed at four of these schools responded to the survey. The career specialist from the fifth school did not respond. Follow-up, in-depth phone interviews on these duties were also carried out with school counselors at seven of the eight sample schools. We were unable to arrange an interview with counselors at the eighth sample school during the interview timeframe. One to three counselors at each of the

seven schools agreed to be interviewed, for a total of 12. All were certified school counselors, had worked at their schools for 2 to 17 years, and all but one carried student caseloads.

We used a semi-structured interview format to ask counselors about their perceptions regarding (a) changes in their job duties and roles; (b) changes in their school's counseling program services; (c) the degree of alignment between services provided for EEDA and the American School Counselor Association (ASCA) National Model; and (d) the type of training needed by school counselors for advising students about career pathways, majors, and postsecondary options.

We reviewed data from a semi-annual online questionnaire, *Career Specialists/Guidance Personnel Accountability Report* (*GP Accountability Reports*), required by the SDE after each semester for reporting career development and planning activities provided to students, parents, and educators.

Finally, we examined student reports of participation in these types of activities. This information was gathered from a survey of the Class of 2011 after completion of the tenth grade. The survey included questions regarding career clusters, career planning and development, majors, coursework, school engagement, and demographic characteristics.

Preliminary Findings on Changes in School Counselor Duties in Sample Schools

(1) School counselors in sample schools reported engaging in more career-focused guidance activities as a result of the reform policy.

In surveys and interviews, school counselors reported engaging in more policy-mandated, career-focused guidance activities across all schools. The survey results revealed that the top three activities for which counselors reported increased duties were assisting students with the development of their career plans and IGPs, meeting with parents about career issues, and counseling students on career issues. More moderate changes were reported in identifying and coordinating work-based/extended learning opportunities for students and conducting professional development workshops in career development and guidance for teachers and guidance counselors. Respondents also reported continued participation in activities considered to be "inappropriate" under EEDA, including registering and scheduling students for classes, developing the master schedule, and maintaining educational records/reports.

During phone interviews, counselors at six of the seven schools reported that their duties related to career services had increased as a result of EEDA. Counselors at the seventh school reported that they were already highly focused on career services for students prior to EEDA, but that the policy resulted in an increased focus on IGPs. From interview reports, it appears that much of the counselors' time is being spent on IGP-related tasks, including an increase in both one-on-one meetings with students and parents about career exploration and planning and an increase in career counseling to larger groups in classroom guidance activities and career day assemblies.

In 2008-2009, across the state, 96% of both ninth and tenth graders (the only two grades required to develop IGPs that school year) had completed electronic IGPs (SDE, 2009a). School-level

data from the 2008-2009 *GP Accountability Reports* indicate that a majority of ninth and tenth graders in our sample schools attended an IGP conference during that school year, and at seven of the eight high schools, attendance was over 90% for both grade levels. At the eighth school, around three-fourths of ninth graders and two-thirds of tenth graders attended IGP conferences during that school year.

Other data from these reports indicate that guidance personnel presented a total of 36 career development and guidance workshops to at least 997 teachers, school counselors, and work-based constituents over the course of the year, with an average of 125 participants per workshop. The number of workshops per school ranged from 0 to 9. Guidance personnel across the eight schools were also responsible for 254 one-time career events, classes or programs, ranging from 6 events at one school to 89 events reported at another school.

EEDA mandated that a variety of career exploration and assistance activities be provided for ninth and tenth graders during 2008-2009. A total of at least 203 on-going career events/activities were reported by sample schools, ranging from 3 events to 97 events/activities across the eight schools. Guidance personnel reported the numbers of students participating in these activities. We estimated the percentage of students served at each grade level by adding the unduplicated count of students given for each reporting period for that grade level and then dividing the total by the reported enrollment for that grade level for that year. For seven schools, it appears that approximately 100% of their ninth and tenth graders received assistance in identifying and accessing career information pertaining to various career clusters during the school year. We were unable to calculate the percentage for the eighth school due to missing data. The percentage of ninth and tenth grade students who completed at least one career assessment during the school year was approximately 100% at four of the schools, and at least 90% or more for at least one of the grade levels at three other schools. Again, we were unable to calculate the percentage for the eighth school due to missing data. At all but one of the sample schools, 95% or more of the ninth and tenth graders appeared to have used computer-assisted career guidance systems to explore careers. At the remaining sample school, we were unable to calculate the percentage due to missing data.

(2) The IGP process has increased both one-on-one counselor-initiated interactions with students and student-initiated interactions with counselors; with interactions mainly centered around career and course-related issues.

Eight of the 12 counselors interviewed reported that the requirements involved in implementing IGPs with students have resulted in an increase in one-on-one counseling sessions centered on career issues and postsecondary options and plans. A variety of career- and postsecondary-related topics were discussed in counselor-initiated sessions, including giving information on the different career pathways, helping with identification of career goals, and providing guidance on the selection of a major and appropriate coursework to help students achieve their identified goals. Five of the 12 counselors interviewed reported an increase in student-initiated interactions. These tended to be focused on personal/social and career-based issues. In career-related sessions, students often wanted further information on various career pathways or on course requirements for majors, advice on choosing electives, or assistance with getting into courses or changing majors.

(3) A majority of the Class of 2011 students, after tenth grade, report at least some involvement in career-focused activities/planning with school counselors.

We sought to compare counselors' reports to those of students about their involvement in career-focused activities. The Class of 2011 was the first class required to adhere to EEDA guidelines about these activities; they were required to develop an IGP and select career clusters in eighth grade and select a major in tenth grade. A survey of the Class of 2011 was conducted in sample school classrooms early in eleventh grade.

Student reports of participation in the IGP process. Based on the reports of counselors, we expected that the vast majority of our Class of 2011 cohort by the end of the tenth grade would report that they had developed IGPs and selected career clusters and majors. Although a majority of students responded that they had participated in these activities, the proportion doing so was lower than expected, particularly for developing an IGP. Students were more likely to report having selected a career cluster (85%) than putting together a career plan or IGP (65%) or selecting a major within their career cluster (63%). Nineteen percent of students reported not having developed an IGP, whereas 17% reported that they did not know if they had developed an IGP, and 9% reported that they did not know whether they had selected a career cluster. These percentages may reflect problems with the terms used in the survey to describe these activities. Despite the availability of statewide standardized materials, our pilot survey and school site visits revealed that "official" EEDA language was not used consistently across schools or even within schools. In Spring 2011, we plan to explore this issue during focus groups with the Class of 2011 cohort.

Students who reported having developed an IGP were asked how often they talked with specified individuals while developing their IGP. According to EEDA guidelines and guidance personnel reports, by the end of the tenth grade, each student should have talked with guidance personnel and parents about IGPs at least three times: once each in eighth, ninth, and tenth grade. Fifteen percent of students reported never talking to a guidance counselor and 8% reported never talking to a parent when they put together their IGP; whereas 35% of students reported talking to a guidance counselor and 50% reported talking to a parent at least three times.

EEDA guidelines require that students take part in an annual meeting at school with a parent/guardian or parent designee and a counselor to review their plans and have parents sign them. All guidance personnel reported that these meetings were taking place. Looking at data from the *GP Accountability Reports,* at all but one sample school, the number of tenth graders that guidance personnel reported having attended an IGP meeting with counselors during that school year indicate that 95% or more attended such a meeting. At the eighth school, the number of tenth graders reported having attended an IGP meeting with counselors made up about two-thirds of students at that grade level. Looking at student survey results, by the end of tenth grade, a majority (61%) of students surveyed reported participating in a meeting with a parent and counselor about their IGP at least once. However, 39% of students reported never having taken part in such a meeting. The problem may again be the terminology used to describe these meetings. Although they may not have reported meeting with counselors, guidance counselors were identified by students as being the most helpful in developing their IGPs. Of those students

who had developed IGPs, 49% reported that their guidance counselor was the most helpful, and 33% reported that a parent was the most helpful in developing these plans.

Student reports of topics discussed with guidance counselors. Guidance counselors are required to discuss careers, jobs, and steps necessary to pursuing careers as part of the IGP planning process with students. However, not all students surveyed reported talking with counselors about these topics. Between the start of ninth grade to the end of their tenth grade year, 64% of students reported talking at some point with a guidance counselor about possible jobs or careers and 63% reported talking with a counselor about steps necessary to pursue their career. This is compared to 91% of students reporting talking to counselors about courses to take that school year and 72% talking about going to college. In a subsequent phase of analysis (Year 5), we hope to compare these trends in student responses between cohorts at the same grade levels and between grade levels within specific cohorts.

(4) There was an inconsistent impact of career activities on the amount of contact between parents and counselors.

EEDA requires that schools provide parents with information each year about career clusters, IGPs, and available career development opportunities for their child and to schedule annual student-parent-counselor IGP meetings. The IGP process has the potential to increase parent contact with school counselors and increase parent engagement in the course and career planning of their child. Guidance personnel at sample schools reported using a variety of strategies each year to inform parents about career clusters and the IGP process and to motivate them to get involved in IGP meetings.

Despite these efforts, interviews and *GP Accountability Reports* data indicate inconsistent levels of parental involvement in the IGP process. Counselors at several schools reported an increase in parent contact due to their involvement in the IGP process, whereas counselors at other schools reported no meaningful change. *GP Accountability Reports* data for 2008-2009 revealed that the presence of parents at the annual IGP meeting varied widely that year across schools. Across sample schools, a parent or guardian was reported to have been present at an average of about 60% of IGP meetings for both ninth and tenth graders. But there was a wide range in attendance levels of parents/guardians (between 3% and 95%) or presence of designees (between 0 and 33%) across schools; and at 4 sample schools, more than half of ninth and tenth grade IGP meetings were held without a parent or designee present. The average percentage of ninth and tenth grade IGP meetings held without a parent, guardian, or parental designee present ranged from 0% at one sample school to 91% at another sample school.

During interviews, guidance personnel offered a variety of explanations for the low or inconsistent level of parental involvement. Parents were reported to be much more likely to attend the eighth grade IGP meeting than later meetings. Counselors at several schools reported that some parents told them that they didn't see any need to attend a meeting each year after that first meeting. Counselors at one school reported that parent involvement picked up when children reached twelfth grade and were preparing to graduate. Guidance personnel at one of the schools with low levels of school and community resources noted that parents in lower income and/or rural communities had transportation problems or difficulty taking time off work to attend

meetings. There were also reports from several schools that information on IGP meetings and the process was not consistently reaching all parents. During a focus group interview at one school, guidance personnel reported feeling that some parents were not getting involved in the planning process because they did not feel it was important for their child to be involved in career planning or because they did not understand why they should be involved in the process with their child.

(5) The increase in career-focused activities resulted in reports of increased workloads, where new duties were added onto old ones.

EEDA mandates that guidance counselors participate in a number of new career-focused duties. As noted, counselors and students report that these types of activities are occurring. Although funding is available to hire career specialists to assist with the new duties, counselors generally felt that funding was inadequate for implementing the new policy requirements. Staff in all of the schools visited, regardless of local economic conditions, were struggling to carry out the policy without being able to hire more staff.

Some schools were very creative in reorganizing their guidance staff to try to accommodate these new expectations and responsibilities. We did not find a complete change in roles for guidance personnel at any of the schools, however. Counselors reported increased workloads that they felt were due to large caseload sizes and the amount of time required to implement EEDA-related duties. Many spoke of being "overwhelmed" by the increased workload and duties expected of them and that, rather than replacing the old responsibilities, the new ones required by the state policy were being "piled on top" of the old ones. Increased workloads resulted in counselors reporting feeling rushed, unable to go into detail about career issues/concerns, and unable to adequately conduct academic interventions with students.

One of the issues surrounding workload is the fact that a school may technically meet the EEDA-mandated 300:1 student-to-guidance ratio but this may not mean that each counselor has a caseload of 300 or fewer students. Based on *GP Accountability Reports* submitted by sample schools, all schools met the required 300:1 student-to-guidance ratio. However, counselor reports of their actual caseloads varied widely. The reason for the contrast in reported and actual caseloads is the inclusion of career specialists along with guidance counselors in the calculation of the official ratio. Interviews confirmed that, although career specialists helped with some aspects of the workload, they could not help to reduce caseload size due to EEDA mandates restricting their responsibilities.

(6) The IGP development and review process was a central factor that contributed to guidance counselors' increased workloads and changes in duties.

IGPs are the organizing factor for career-focused activities and planning because they outline a student's career goals and postsecondary plans as well as selection of a career cluster, major, and coursework to lead toward those goals. To be effective, IGP development requires at least some discussion between counselors and students about career exploration and planning. Counselors reported that most of their efforts are now centered on the development and renewal of IGPs and the career services that go along with them. They reported spending much of their time on some

aspect of the process; counselors with caseloads of 300 or more students reported that they spent on average 3 to 4 months of the school year engaged in the IGP process. This time intensive nature of the IGP process was seen by counselors to be a key factor in work overloads. At some sample schools, course scheduling and registration have been merged with the IGP process for time management purposes. Because all of the course information is entered into the electronic IGP database (e-IGP), several schools told us that they use this database to generate their semester course schedules and register students for classes. This allows course offerings to be based on student interest as well as the need to meet graduation and major requirements.

(7) Many of the counselors report still being involved in "inappropriate activities," as defined by EEDA guidelines.

In both surveys and interviews, guidance counselors generally reported little change in their involvement in "inappropriate duties," with the least amount of change occurring in the coordination of special services referrals. For some inappropriate activities, counselors were more likely to report increased involvement, especially registering and scheduling students for classes, developing the master class schedule, and maintaining or completing educational records or reports. Counselors at a majority of schools reported continued involvement in testing duties; this caused difficulty in their ability to deliver appropriate counseling services for students. ASCA guidelines clearly specify that it is inappropriate for school guidance counselors to organize or administer cognitive, aptitude, and achievement tests (ASCA, 2005). Schools with higher student/counselor ratios and in which counselors continue to be in charge of testing reported the most difficulty in effectively managing their counseling duties. The IGP was also cited as a primary factor in keeping counselors involved in "inappropriate duties" because of the merging of course scheduling and registration, both deemed "inappropriate" under EEDA (SDE, 2006). Due to this merging of duties, responsibility for student registration and developing the master course schedule was still in the hands of counselors at most sample schools.

(8) Career specialists help carry some of the load but their contributions are restricted by EEDA guidelines.

Interview and survey responses from career specialists at sample schools indicate that their duties vary widely across schools. Career specialists appear to provide a range of activities, such as career testing, incorporating career test results into IGPs, disseminating career information to students and teachers, and helping students identify career interests. The majority of duties assigned to career specialists who responded to our survey related to career guidance and reflected those duties stipulated in EEDA. These include activities such as meeting with parents about career issues, assisting students with development of IGPs, or consulting with teachers about career issues. Although they are not allowed to do the final review or approval of student IGPs, all but one of the responding career specialists reported being involved in the development of student career plans and IGPs. No career specialists reported involvement in registering and scheduling students for classes or developing the master class schedule. Career specialists at sample schools with the highest student enrollment and largest student caseloads were the most likely to report being assigned "inappropriate" duties for guidance personnel.

There were mixed reports among guidance counselors as to whether career specialists had actually helped to reduce their workload. One of the primary reasons that career specialists cannot reduce guidance counselor student caseloads related to IGPs is that the EEDA mandates that only certified guidance counselors can legally sign off on IGPs. So, although the state allows career specialists to be factored into a school's student-to-guidance ratio, the presence of career specialists does not reduce guidance counselors' student caseloads for IGPs. This was a major criticism of EEDA voiced by guidance personnel across sample schools.

(9) All reported counselor duties were not in compliance with ASCA National Model guidelines.

The increase in IGP development and time spent on career services was perceived by counselors to have caused an imbalance in their ability to provide comprehensive guidance services in the areas of career, academic, and personal/social, putting them out of compliance with ASCA National Model guidelines. Personal/social services were mainly limited to crisis intervention, with less time focused on programming and individual counseling. Some schools were able to continue with existing personal/social programs whereas others were forced to cut back on such programs. Attending to crises also put a strain on counselors' time, requiring them to delay other tasks like IGP meetings and career assessments, often resulting in longer work hours.

(10) Despite challenges, counselors reported feeling prepared to carry out the new duties required by EEDA.

EEDA stipulates that all guidance counselors and career specialists must be provided with career development and training. All guidance personnel reported receiving some training on career pathways and IGP development but the amount and type of training varied as well as the topics covered. Training ranged from courses and workshops to personal research and "do-it-yourself" experiences and covered topics such as IGP development and advising students on career pathways. Regardless of the types of training described, guidance counselors interviewed generally felt satisfied with the training they had received and the resources and support available to them and felt prepared to provide reliable career guidance.

(11) The IGP process has increased counselor awareness and knowledge of CTE courses and programs and dissemination of that information to students, parents, and other educators.

During Year 3 site visits, guidance personnel reported becoming more knowledgeable about CTE offerings at their schools. Counselors commented that, because of EEDA and the IGP process, they were required to learn more about available CTE courses and programs in their schools. CTE teachers at six of the eight sample schools reported that the IGP process helped them to identify students for their programs and that more, and/or more focused, students were being directed to their programs. This increase in awareness and information sharing resulted in reports at some schools of an increase in the number of students taking CTE courses.

The impact of EEDA requirements and the IGP process on guidance personnel's knowledge of CTE programs was apparent during discussions with guidance personnel at two high schools that

use career centers to provide CTE courses and programs. These personnel commented that they now know much more about the offerings of the career center. They reported an increase in interaction and information sharing with career center staff. They noted that center staff representatives now meet annually with ninth-grade classes to provide information on center programs. Reports from the two 2008-2009 *GP Accountability Reports* reinforce interview comments that CTE information is being disseminated to educators, parents, and students in at least seven of the eight sample schools. At the remaining sample school, only small numbers of parents and educators relative to staffing and enrollment at the school were reported to have received information on available district CTE programs during that school year and it was unclear if none of the ninth or tenth graders received information or whether the data were missing on this variable for students. Data from this school appears to indicate that CTE information was not being widely disseminated.

Influence of the Reform Policy on CTE Awareness and Participation

In November and December 2009, the study team visited the eight sample schools, several career centers linked to schools, and the primary community/technical college partner for these schools to follow up on major- and cluster-specific information such as articulation agreements, postsecondary linkages, standards, curriculum integration and certifications. At the secondary level, high school guidance personnel, curriculum directors and other administrators were interviewed as well as CTE directors, administrators, and teachers. Questions covered not only the specifics relating to majors, clusters, and POS, but also dealt with relationships among traditional CTE programs and traditional academic programs, among faculty in both areas, and among administrators in both areas. Questions were also asked concerning what has changed since EEDA. The following are highlights of some of the findings from those interviews.

(1) CTE teachers at a number of schools report not only an increase in numbers of students being directed into their courses but also more appropriate placement of students in CTE courses/programs.

The IGP was being used in a number of schools as a screening device to help students and parents be more realistic in their goals and to more carefully place students in academic and CTE courses. Rather than assigning academically struggling or misbehaving students to any open CTE courses, the IGP process has encouraged counselors to review students' past performance and attempt to relate their goals and abilities to appropriate courses and programs. A number of CTE teachers commented that guidance staff were sending them academically better prepared students and students "who want to be there" because the course fits their career goals. One of the career centers reported increased enrollment; the other stated that the IGPs help them to identify students for programs and that high school guidance personnel help with recruitment. A career-pathways focused model has also prompted a number of the school administrators to think about making sure all students have some kind of practical skills to prepare them for the work world after graduation, whether through earning some type of certification or participating in an apprenticeship or internship before they graduate.

(2) At several schools it is clear that any stigma associated with taking CTE courses or attending a career center has been reduced in recent years.

At five high schools, we asked specifically about whether there was any stigma associated with CTE programs. At three of these schools, staff reported a reduction in stigma that they attributed to their efforts to better educate students, parents, and the community about what CTE can offer. At one school, employability was mentioned as a draw. Staff at two other schools pointed to IGPs, clusters and majors and integration of CTE into core classrooms as being key to reducing stigma. At the fourth school, staff reported that there was still a stigma associated with CTE programs among students and parents. This school is making some effort to address this, such as including CTE-focused clubs on the school website along with other clubs (previously each CTE-focused club was only listed under the webpage of the teacher who sponsored the club, whereas other clubs were listed on the school's club page), conducting a campaign to showcase high-paying career options for CTE majors, and working to increase the options for enhanced GPA weighting of some CTE courses. At the same time, some interviewed at this school felt that the majority of their students were college bound and those who were not would benefit from a district-wide career center where career-focused students could concentrate on gaining technical and career skills. So, although there may be a campaign to heighten awareness of CTE at this school in some high-paying areas, it was apparent that there is still the view that some students are more "suited" for CTE, whereas others are more "suited" for college, sending mixed messages to students and reinforcing the stigma. Finally, at the fifth school, staff commented that the problem with some students enrolling in CTE courses has not been a stigma associated with CTE, but rather the fact that CTE courses often carry a lower weight and result in a lower GPA and thus hinder college entry.

The research team hypothesized that part of the reduction in stigma may be related to the greater interaction occurring at some schools between CTE and non-CTE teachers. Historically in our sample schools, CTE and "academic" programs had been somewhat isolated from each other. Three of the five schools asked about stigma were organized into Smaller Learning Communities (SLCs). In these schools, groups of core academic and CTE teachers are housed together in SLCs, reducing the physical isolation between CTE and academic faculty that is common on comprehensive high school campuses. SLC groupings have the potential to reduce isolation and offer opportunities for core academic teachers to become more familiar with available CTE programs, to observe CTE teachers planning and teaching, and to better understand that CTE programs do have rigor as well as to increase interaction between CTE faculty and non-CTE students.

This opportunity for consistent interaction between CTE and non-CTE faculty and students in SLCs has the potential to lead to less stigma attached to CTE programs. However, only one of the SLC schools visited reported reductions in CTE stigma, and that was a school that was newly organizing their SLCs around career clusters. Another school that randomly placed students into SLCs reported that CTE was still not as attractive to students as it would be if more CTE courses carried higher GPA weighting. And researchers noted that at the third SLC school, being housed together did not appear to have helped to reduce the stigma attached to CTE, which was still being perpetuated by students, parents, and administrators at the school.

(3) Students face challenges with taking and scheduling CTE courses and tradeoffs when choosing between CTE, AP, honors, and dual credit courses.

One common theme heard in nearly every school was that when postsecondary plans are considered, students, parents and counselors often have to weigh the tradeoffs for students in choosing CTE courses over core academic courses, honors, AP, or dual credit academic courses. One challenge with choosing CTE courses over other courses is that CTE courses only count for elective credit. In order to graduate from high school in South Carolina, a student must earn 24 units of credits, 17 units in core academic courses and 7 in elective courses. For those planning to go to a four-year postsecondary institution, 1 unit of the 7 elective units must be spent in another year of foreign language. Students may find it difficult to fit in the exact electives they desire. In addition, even if a student has room in their schedule to take a CTE elective course, they may face problems getting into the course because of limited space or limited time offerings of CTE courses.

Another major challenge for students in taking CTE courses is the impact that CTE courses can have on a student's GPA. Students with goals to attend four-year colleges, particularly those that are more highly selective, work to get their GPAs as high as possible to help improve their prospects for college admission and scholarships. In addition, several of the state scholarships available in South Carolina require a 3.0 GPA or higher (LIFE and South Carolina HOPE scholarships) or, depending on SAT or ACT scores, either a 3.5 or 4.0 GPA (Palmetto Fellows Scholarships) to be eligible (South Carolina Commission on Higher Education, 2011). Because AP classes carry greater weight than CTE classes, a student may find it more advantageous for their GPA to take an AP course. Dual credit courses also help to boost GPA, because in most districts, AP and dual credit courses carry the same weight. Students would not face GPA penalties if these options were consistently available for CTE courses. We found at sample schools, however, that options for dual credit or AP credit in CTE were often limited and did not provide a viable option for many students. A similar problem occurs with honors credit, where some schools reported that only recently had some CTE courses received honors level credit. These course options were not available across all schools.

Student Reports of Participation in Career-Focused Education

The *Student Engagement/POS Experiences Survey* was given to 1,455 members of the Class of 2011 cohort attending our eight sample high schools early in the fall of 2009, just after their tenth grade year, to obtain information about their high school experiences. Schools were asked to administer the survey to as many of the members of this cohort as possible and these responses represent 67% of the cohort's population across the eight sample schools. Percentages of the cohort taking the survey at individual schools ranged from 45% to 95%. The survey included questions about career clusters, career planning and development, majors, coursework, school engagement, and demographic characteristics.

Differences Between CTE and Non-CTE Participants

Because EEDA was designed to give all students, not just those in CTE, access to career-focused education, we wanted to compare student experiences of those taking CTE courses to those not taking CTE courses. On the student survey, we asked students to report how often they had been in CTE-type courses (e.g., culinary arts, cosmetology, construction, graphic communication, health science) while in high school. Ninety-six percent of respondents (1,401 students) indicated whether or not they had taken these types of courses; 4% of respondents (54 students) did not answer this question. Students who reported taking one or more CTE courses were classified as CTE participants whereas those who reported taking none of these types of courses were classified as non-CTE participants. Seventy-one percent of the students reported taking at least one CTE course by the end of the tenth grade and were classified as CTE participants, whereas 29% of students reported never taking a CTE course and were classified as non-CTE participants.

A majority (85%) of students surveyed indicated they had selected a career cluster. Although a majority of both CTE participants (87%) and non-CTE participants (82%) indicated that they had selected a career cluster, CTE participants were significantly more likely to report that they had selected a career cluster than non-CTE participants ($p = .046$).

(1) According to student reports, having majors and clusters was more likely to improve student engagement for CTE participants than non-CTE participants.

There were significant differences in CTE and non-CTE participants' level of agreement with statements about having a high school major and career cluster and the subsequent impacts on their engagement with school. For students who reported having a high school major and career cluster, 70% of CTE participants agreed that they felt more likely to want to come to school, whereas 61% of non-CTE participants agreed with this statement ($p = .007$). Sixty-nine percent of CTE participants who reported having a high school major and career cluster agreed that they were less likely to want to drop out of school compared to 65% of non-CTE participants ($p = .008$). CTE participants also agreed more frequently than non-CTE participants that having a high school major and career cluster helped them to get better grades (70% and 62%, respectively, $p = .026$) and make connections between their studies and the type of career they want (88% and 83%, respectively, $p = .006$). Approximately 92% of CTE participants agreed that having a high school major and career cluster made them more likely to take courses needed for the future compared to 85% of non-CTE participants ($p = .004$). However, there were no significant differences between CTE participants and non-CTE participants in their level of agreement about whether having a high school major and career cluster made it more likely that their parents got involved in the selection of their courses.

(2) CTE participants more consistently reported participation in job/career identification activities than did non-CTE participants.

Several questions in the survey were geared toward discovering more details about activities aimed at helping students identify jobs or careers of interest. A majority of both CTE and non-CTE participants reported answering job- and career-related questions on a computer or filling

out a questionnaire, researching different jobs and careers, and researching different colleges, universities, or military branches. Differences between the groups were significant on two activities. Higher percentages of CTE participants reported researching different jobs or careers (p = .007) or different colleges and universities (p = .006) than non-CTE participants.

Some career-focused activities, such as speaking with or visiting individuals in careers of interest, have traditionally been more available through CTE courses than non-CTE courses. EEDA was designed to offer these types of activities across the curriculum, and it is important to compare student experiences to find out how widespread these opportunities become under the state policy. A significant difference existed between CTE and non-CTE participants on reports of having spoken with or visited someone in a career of interest to them; 57% of CTE participants as compared to 48% of non-CTE participants reported these types of activities (p = .003). Fifty seven percent of CTE participants reported that they had been in a class where someone from a local business talked about working at their company or in their career. A smaller percentage (53%) of non-CTE participants reported having had this experience, although the difference was not significant. About one-quarter (24%) of CTE participants reported taking a school-sponsored tour of a local business compared to 18% of non-CTE participants, a significant difference (p = .021).

(3) Greater proportions of CTE participants than non-CTE participants reported participating in activities that helped them think about and plan for their future job.

Students were asked about how much thinking and planning they had done for job-related activities. CTE participants had a significantly different distribution of responses than non-CTE participants for all four items. Larger percentages of CTE participants than non-CTE participants reported having made plans to or having already gathered information about jobs that interest them (64% and 54%, respectively, p = .002), taken classes to help them decide on the kind of job they want (74% and 65%, respectively, p = .001), participated in school or out-of-school activities that would help them decide what kind of job they want (55% and 47%, respectively, p = .035), and volunteered, interned, or worked on a job to help them find out the kind of job they want to have in the future, with a greater proportion of CTE students (47%) reporting they had already done this or made plans to do this as compared to non-CTE students (43%; p = .050).

(4) Greater proportions of CTE participants than non-CTE participants reported participation in WBL experiences than non-CTE participants.

Students also reported whether or not they participated in WBL experiences. The number of WBL experiences that any one student reported participating in ranged from none to six. The distribution of the number of WBL experiences reported by CTE participants significantly differed from that of non-CTE participants. Sixty-six percent of CTE participants indicated that they had participated in at least one WBL experience, as compared to 59% of non-CTE participants (p = .013). The proportion of CTE participants who participated in co-ops (10%) and school-based enterprise experiences (15%) significantly differed from the proportion of non-CTE participants who participated in these activities (5% and 7%, respectively; p = .012 and p = .000, respectively). There were no significant differences in the proportions of CTE and non-CTE participants who participated in internships, job shadowing or work-site visits, mentoring, or

community service.

Summary of Findings from Personal Pathways Sites

By the end of the 2009-2010 school year (the third year of our study), implementation of EEDA was in its fourth year. Although not expected to be fully implemented until the end of the 2010-2011 school year, there are indications from data collected to date that EEDA has already increased the amount of career planning activities and guidance that students are receiving in our sample high schools and changed the roles of many guidance counselors in these schools. Early data indicate that a variety of career-focused activities are being offered, with the amount and type of activities varying widely across our sample schools. The IGP process, a key facet of policy implementation, has served to increase counselor interactions with students on career- and course-related issues; students reported turning to their guidance counselors more than anyone else for help in planning. This process was seen by school personnel as a valuable tool to guide students in developing career goals and strategies for achieving these goals.

School guidance personnel reported engaging in more career-focused guidance, yet they still report participating in "inappropriate" duties like testing and course scheduling. Rather than trading traditional roles for new ones, many counselors reported that new duties were added on to old ones and that these new EEDA-mandated duties, like developing IGPs, are time consuming and often cause work overloads. Without adequate funding to hire more staff, counselors reported struggling to carry out mandates. Despite challenges, counselors were perceived as being enthusiastic about many aspects of the state policy and reported feeling prepared to carry out the new duties required by EEDA. Several reported that they had found ways to manage their duties using teamwork, working longer hours, or working more days of the school year. It will be important to see in future research if declining state funding and local budget crises requiring cuts in personnel and other necessary supports for EEDA influence counselor roles, as well as whether further changes in counselor roles continue or are stalled or reversed.

There are indications that EEDA, particularly the IGP process, has increased the knowledge and awareness of guidance personnel of the CTE programs and courses available to students at their schools. There is also evidence of changes in participation in CTE resulting from EEDA implementation. CTE teachers at a number of schools reported not only an increase in the numbers of students being directed into their courses but also more appropriate placement of students in CTE courses and programs; the students "want to be there" and "want to do the work." In addition, it is clear at several schools that any stigma associated with taking CTE courses or attending a career center has been reduced in recent years, although it remains present at some of the study schools. Students face challenges, however, with CTE coursetaking and scheduling and face tradeoffs between CTE, core, AP, and non-CTE dual credit courses. We will continue to follow these trends over the final two years of the study and explore whether knowledge and awareness of CTE continues to spread across schools and if there is any change in the challenges to CTE course taking.

Although EEDA mandates career-focused education for all students in South Carolina, differences consistently appear between CTE and non-CTE participants in student reports of

participation in these types of activities. In a survey of tenth graders in sample schools, CTE participants were more likely to report improved engagement in school when they had a high school major and career cluster and to report participation in job/career identification and planning activities and work-based learning experiences than non-CTE participants. These reports, however, are based on students' experiences up to the end of the tenth grade, and the experience of students in this cohort may change as they enter their final years in high school. We will be surveying this cohort again at the end of this fourth study year when they will be seniors and we will be able to compare reports of their experiences at that time to these earlier reports as well as to those from seniors from an earlier cohort with little exposure to EEDA. We may find that reported experiences of CTE and non-CTE participants become more similar as students move toward graduation or as they are exposed to EEDA for a longer period.

In future reports, we will be exploring in more depth the influence that EEDA policy may be having in sample schools on the development and direction of Perkins IV-style POS. We will also be exploring differences in student outcomes between cohorts with varying levels of exposure to EEDA and to POS with archival data such as grades, attendance, and dropout.

Rigorous Tests of Student Outcomes in CTE Programs of Study

The recent reauthorization of the Perkins legislation that funds CTE, known as Perkins IV, modified existing practice by increasing program accountability in the areas of academic achievement, technical skills achievement, and alignment with postsecondary technical education in the form of POS. This study is a four-year longitudinal mixed-methods study examining the effects of POS on academic and technical achievement for students who entered ninth grade in 2008-2009.[16] The study uses both experimental and quasi-experimental research designs and includes a qualitative component intended to generate rich descriptions of treatment schools' implementation of POS.

Research Questions

We hypothesize that POS affect student academic and technical achievement outcomes in high school and the transition into postsecondary education, the military, or work—indicators drawn from Perkins IV. As such, our main research question asks, to what extent does participation in a POS lead to improved student outcomes as compared to outcomes of (1) control group students (who applied to a POS but were not selected in a lottery), or (2) in a quasi-experimental strand, a well-matched comparison group? Specifically, to what extent does POS participation increase student academic achievement, technical skills achievement, high school completion, employability, and completion of coursework leading to college credits? A second research question asks, how do POS differ from the traditional high school experience at the schools that the control and comparison group students attend?

Study Design

Two designs have been utilized: An experimental cohort includes three sites in one large district (West). We took advantage of a district-run lottery that assigned students to the POS or control condition to construct a randomized controlled trial. Our second design used quasi-experimental methods to identify a well-matched comparison group in another large district (East). A third experimental district, South, was added to the study in Center Year 4; we will describe it in later reports. Both cohorts employ a qualitative component intended to contextualize the quantitative findings. During annual site visits, we conduct interviews and observe classes in treatment and control schools. Interviews distinguish differences between POS and the control condition, how differences influence outcomes, and how programs prepare students for further education and work. Classroom observations allow us to discern program differences and verify the fidelity of treatment. All quantitative measures come from district systems data.

Sample

West District is located in a large city in a Western state; about 65% of its students self-identify as ethnic minorities, and about 43% are eligible for the federal free lunch program. As noted, West uses a districtwide lottery system to select student applicants to their magnet high schools, some of which offer wall-to-wall career academies meeting the requirements of POS. Three of

[16] This project's full-length Year 3 report is available on the NRCCTE website: http://136.165.122.102/UserFiles/File/Tech_Reports/Rigorous_Tests_Year%203_Final_Report.pdf.

these high schools, described below, are participating in the experimental strand of this study.

East District is located in a large city in the Eastern United States. About 66% of its students self-identify as ethnic minorities, and 49% are eligible for free lunch. East has multiple magnet programs across all grade spans that are accessed through a lottery system, but in 2008-2009, a lottery was not used at the treatment school because it had expanded its enrollment that year. In lieu of random assignment, district personnel ran a cluster analysis on the other high schools in the district, searching for four comparison schools that were most similar to the treatment school in terms of student demographic variables, mobility, and prior achievement. Then propensity score matching was employed to identify a well-matched comparison group within those four schools.

Summary of Activities and Findings to Date

To date, we have collected two years' worth of quantitative and qualitative data from our sample schools, having visited each district once per year since our sample students entered high school. The two principal investigators spend at least one day each at each treatment school, with the rest of the week devoted to visiting control or comparison schools. At the treatment schools, we interview administrators, teachers, and students to learn how POS differ from the traditional high school experience, and how students feel about their POS and how it is preparing them for life after high school. At the control or comparison schools, we probe for familiarity with the POS concept and ask about other ways the school helps students become college- and career-ready.

Site visits include classroom observations. We observe POS classes to ensure fidelity of treatment (i.e., are treatment students indeed receiving POS as in Perkins IV). At the control or comparison schools, we observe CTE classes in order to ensure that control students are not receiving POS. We also observe academic classes in all schools to get a sense of the academic press at each school, given that POS require rigorous academics as well as technical skills.

We have also connected with the local community colleges in the cities served by our districts. These are the colleges with whom the districts have formal articulation agreements for CTE courses and programs. We have conducted interviews at the colleges with deans and department chairs in the departments with district articulation agreements. We have spoken with administrators to ascertain their perspective on POS and the level of preparation of the students coming to them. We will rely on these institutions to help us collect data on postsecondary credits earned in high school. If funding permits, we will follow our cohort into these community colleges to determine their level of postsecondary degree, credential, or certificate completion.

Our full technical report focuses on ninth-grade CTE and academic results and reports CTE and academic GPAs. We focus on mathematics coursetaking as a reflection of the schools' academic press. We describe the levels of math that students are taking and how well they did in their ninth-grade math coursework. We also describe results from a student survey that includes treatment and control student responses to prompts about the level of difficulty of their classes, the kind of career preparation they have experienced, and to whom they turn for information about preparing for the future. The qualitative portion of the full report describes the treatment

and control schools at length based on our observations of classes we observed at schools in both conditions, and how the CTE programs do or do not meet the required elements of POS.

POS Findings: West District

West District's magnet and POS high schools were designed to improve student achievement, promote diversity, and create an awareness of career opportunities. Three of West's dedicated POS high schools—Navy, Sky, and Azure—are participating in the experimental strand of this study. Navy is a new, green facility and the district's first purpose-built POS high school; it offers POS in the areas of alternative fuels/transportation, biotechnology, construction management, culinary, engineering, hospitality, media/journalism, medical/health, teacher education, and early childhood. Sky, the district's former career center, expanded its mission to focus on providing intensive academics along with high-quality CTE. Sky offers traditional and technology-focused POS in 3D animation, architectural engineering, automotive, business, computer networking, culinary, film and video, graphic arts, health, and welding. Azure Academy is a magnet high school of eight wall-to-wall academies: business and finance, computer graphic design, computer-assisted drafting and design (CADD), computer science, pre-engineering, information technology (IT), legal studies, and systems technology support.

Below we briefly summarize how the four mandated and 10 supporting components of POS are being implemented in the three treatment schools in West District; a full-length version of these findings, as well as our observations of the control schools, is available in the full technical report.

Mandated Components of POS in West District Treatment Schools

1. Incorporate and align secondary and postsecondary education elements. The process of aligning secondary and postsecondary curricular elements has been accomplished through the institutionalization of relationships between and across secondary and postsecondary institutions and business and industry. These relationships may be formal and district-wide, as in the case of the Joint Technical Skills Committees (JTSCs) that govern various programmatic areas, or more localized, as in the case of programs that work directly with postsecondary partners to align their curricula and standards. Textbooks and curricular materials are chosen through cooperative work with local postsecondary institutions in order to create aligned curricula. Secondary and postsecondary alignment is also fostered by the Tech Prep system, described in more detail in a separate section.

2. Include academic and CTE content in a coordinated, non-duplicative progression of courses. Across all of our treatment schools, much technical content is aligned with academics. With regard to the alignment of courses in a non-duplicative sequence, all three treatment schools offer programs that progress from broad-based foundational courses through more advanced courses to more intensive experiences in twelfth grade. However, the schools differ in when students actually begin their POS; most begin in either ninth or tenth grade, but all provide the recommended progression from broad foundations, through more intensive middle-range courses, to the most intensive, career- or job-specific culminating or capstone courses.

3. Offer the opportunity, where appropriate, for secondary students to acquire postsecondary credits. West District students can take certain CTE classes in high school and receive college credit for the course if they pass with an A or a B. Even if they take a class as a ninth-grader, during their junior or senior year they become eligible to apply for the credit. Students must apply for these credits while still attending high school. Many of these credits are transferable to the state university system. The numbers of Tech Prep-eligible courses vary across our treatment schools as well as across programs. Other postsecondary credit-earning options include AP, dual enrollment (for courses not offered at the high school), virtual high school, and summer school.

4. Lead to an industry-recognized credential or certificate at the postsecondary level, or an associate or baccalaureate degree. All of the POS at these schools lead to either an industry-recognized credential at the postsecondary level or an associate or baccalaureate degree program. In addition, many industry certifications can be earned while students are still in high school. These POS offer credentials in construction (NCCER), culinary (ProStart, ServSafe), IT (CISCO, CompTIA A+, and Oracle), and health occupations (CNA), among others. The time, personnel, and monetary commitments required to establish and maintain such programs were often cited as problematic, however. So, too, were the costs to students for acquiring these certificates. In better times, districts paid for student exams to earn credentials.

In addition, all CTE students in the district may earn a CTE competency certificate in their program area upon graduation if they maintain a 2.0 GPA. The certificate displays students' levels of skill competencies, hours of instruction, attendance records, and a brief explanation of the skill rating standards. A certificate with Honors is given to students who maintain a 3.5 GPA in their CTE program area. Recipients of this certificate are recognized at graduation.

Supporting Components of POS in West District Treatment Schools

Legislation and policies. The development and implementation of POS in West was described as taking Tech Prep to the next level—establishing and institutionalizing practices, partnerships, and policies that were loosely or locally arranged under Tech Prep. West was driven not by mandates but by a desire to boost student achievement and provide students with enriched, career-oriented educational experiences. Locally constituted partnerships of secondary, postsecondary, and business and industry members jointly envisioned the structure and mission of the district's POS.

Partnerships. Partnerships are integral to West's POS. These may be district-wide or more localized; institutionalized or personal and idiosyncratic to the school, program, or POS teacher. They function best when personal or local relationships become formal partnerships (e.g., the JTSCs), but these require nurturing. Navy and Sky have dedicated positions for making and maintaining school-community partnerships; at Azure, an administrator does this part time.

Professional development. Professional development is key in West's implementation of POS and ranges from statewide POS training, support for new teachers from business and industry, POS-specific training, support for guidance counselors, and trainings specific to schools.

Accountability and evaluation systems. West prioritizes the use of data for program

improvement in both academic and CTE areas. Principals share student achievement data with program chairs and faculty and use data to adjust instruction. District data allow one to compare student performance across the school, region, and district on an item-by-item basis.

College and career readiness standards. West recently implemented a college- and career-ready graduation policy that mandates that students take at least one arts and humanities or CTE class. Treatment schools are largely free to define college and career ready according to their contexts and populations, but all three are focused on preparing students to synthesize academic and technical content knowledge and skills, apply these to the solution of real-world problems, and graduate ready for postsecondary education or training without the need for remediation.

Course sequences. All treatment schools offer non-duplicate POS program sequences, as previously described. The schools differ in when students begin their programs and also in the number and type of upper-level courses offered. Most sequences start in the tenth grade. Students are expected to carry any postsecondary credits they have earned into aligned postsecondary programs.

Credit transfer agreements. Articulation agreements have been established at the district level for courses eligible for Tech Prep credit. These agreements apply to all district schools.

Guidance counseling and academic advisement. Career advising largely happens in the POS. Guidance counselors serve largely academic planning needs and are not connected to or experienced in POS areas. POS faculty are accustomed and expected to do informal and formal advising, including counseling students about postsecondary programs, professional standards, and job and college searches. All students have a four-year graduation plan tied to career goals.

Teaching and learning strategies. Strategies for engaging students in meaningful learning varied widely across treatment schools. Curriculum integration was seen as desirable but challenging due to staffing and scheduling issues. Several teachers reported doing curriculum integration on their own. Other strategies included technology integration, project-based learning (PBL), school-based work opportunities, work-based learning (e.g., internships, co-ops), and interactions with businesses.

Technical skills assessments. The state's Perkins plan notes that the state is working to develop a technical skill attainment measure that includes uniform exit-level assessments. The state plans to use third-party assessments instead of developing its own and planned to pilot the program in several CTE program areas. However, the state is currently facing extreme budget, staffing, and planning challenges, and piloting the assessments is being delayed until these issues are resolved.

POS Findings: East District

East District offers magnet programs across grade spans, and a number of high schools offer magnet and POS programs to qualified students. Blue Academy, our treatment school, is a state-of-the-art high school featuring nine pathways in three integrated technology academies combining rigorous academics with POS in engineering, medical sciences and biotechnology, and IT.

In the sections that follow, we briefly summarize our observations of the four mandated and 10 supporting components of POS in Blue Academy; a complete analysis, as well as descriptions of the four comparison schools in East District, is available in our full technical report.

Mandated Components of POS at Blue Academy

1. Incorporate and align secondary and postsecondary education elements. Curriculum alignment with postsecondary is a priority at Blue; in some programs, once-a-month alignment meetings are held in which teachers across the district review curriculum and pacing guides. Some meetings are held at the local community college and led by a community college instructor. The community college has also helped secondary teachers with their techniques: The community college IT chair we spoke with described the work he has done on the steering committee for the secondary and postsecondary IT standards, assessments, and curriculum that must be retooled constantly in alignment with industry demands.

2. Include academic and CTE content in a coordinated, non-duplicative progression of courses. Coursetaking patterns at Blue follow a career clusters-oriented POS model—that is, a progression of courses beginning with a foundational, introductory course and leading to more intensive coursework in sophomore and junior year with a culminating experience in senior year. Students are also encouraged to take AP courses related to their academy. Students are required to complete their course sequences within their academies; once complete, they are encouraged to take related courses either within their academy or outside it. With the budget situation constraining the total number of courses the school can offer, it is becoming more difficult to fill students' schedules. One academy chair noted that the shortage of courses means that more resources are being dedicated to the foundational courses with bigger enrollments instead of upper-level, highly specialized courses that serve few students.

3. Offer the opportunity, where appropriate, for secondary students to acquire postsecondary credits. While there is articulation of courses between secondary and postsecondary institutions, the credit is not automatic. If a student gets a B in the course and passes the technical skill assessment at 80% or better, then a notation is made on his or her high school transcript that they are eligible for college credit. In order to receive the credit, a student must attend the community college within two years of graduation and present a high school transcript showing the eligible postsecondary credit. In some cases, credit will only be awarded after the student presents a portfolio or takes an examination. It appears that many credits are never obtained because students forget they have them, or they enroll at the college in a non-occupational program with the intent to transfer to a four-year institution, in which case the CTE credits are moot because they are not part of most transfer programs' requirements.

Other opportunities to earn postsecondary credits, include articulated credit, AP, IB, concurrent enrollment at the local community college for classes not taught at the high school, virtual high school, and online university and community college courses. However, multiple interviewees expressed concern that students were not performing well in the online courses, which do not offer the discipline and support structures present in real classrooms.

4. Lead to an industry-recognized credential or certificate at the postsecondary level, or an associate or baccalaureate degree. All Blue programs lead to either an industry-recognized credential at the postsecondary level or an associate or baccalaureate degree program. Given the advanced nature of some of Blue's programs, industry certifications that are often earned in postsecondary educational institutions can be earned while students are still in high school. Blue also offers a range of certificates such as National Center for Construction Education and Research (NCCER) accreditation in construction and CISCO and Oracle certifications in the IT academy. The medical academy guidance counselor noted that it had become far more difficult for students to acquire their CNA certifications; the district stopped paying for the tests although the program continues to prepare students for certification.

Supporting Components of POS at Blue Academy

Legislation and policies. State graduation requirements for our cohort provide three content options: college preparatory, CTE focused, or a combination. Students may approach graduation lacking the credits needed to graduate under a more rigorous option and switch to a less onerous one. Blue students may not change because they are in a CTE magnet with higher graduation requirements. All courses taught at high schools or community colleges must be approved by the state; state law mandates the articulation of high school and postsecondary courses.

Partnerships. Postsecondary and business and industry partners provide vital support to Blue. Academy directors and faculty, many of whom come from industry, bring in guest speakers from the community. Blue's National Academy Foundation (NAF) academies and advisory groups provide resources. Pre-recession, stronger partnerships existed between Blue and the community college. Conflicts between high school and college schedules created difficulties for college instructors, and many Blue students who took classes at the college bypassed it in favor of four-year universities upon graduation.

Professional development. Professional development assists academic and CTE teachers schoolwide with such topics as improving technical literacy. Related to POS, Blue's department chairs participated in a district meeting regarding the state's new career clusters and then returned to the school to disseminate information to teachers and counselors.

Accountability and evaluation systems. Assessment and accountability are valued at Blue, and teachers are expected to use data to improve their teaching. Academic test scores are widely advertised around the school. The school wants all students to achieve high scores on the state exams and seeks to increase academic and technical rigor so that all students will be prepared to succeed without remediation.

College and career readiness standards. Blue sets high expectations of students and provides them with the extra resources to meet them. Teachers are paid extra to provide tutoring in various subject areas. Soft skills are imparted through the school's cultural practices— which involve creating a safe, supportive, and friendly atmosphere, setting and maintaining high standards, and encouraging professionalism—and modeled by faculty and administrators. All students are expected to move on to postsecondary.

Course sequences. All courses that make up POS are approved at the state level. Local educators are permitted and encouraged to develop new courses that must go through an approval process in order to be taught statewide. This approach aligns well with statewide secondary-postsecondary articulation agreements, but the process takes a long time.

Credit transfer agreements. State-level articulation agreements govern the formation of faculty course review committees and credit award processes. Articulation agreements are flexible and allow colleges to accept subsets of courses depending on local conditions. To receive credit, a student must attend college within two years of graduation and present a high school transcript showing the eligible credit. Some credits may only be awarded after presenting a portfolio or taking an exam.

Guidance counseling and academic advisement. This state requires all CTE curricula to contain a certain percentage of career guidance, which mostly happens in POS classrooms. Blue's academy counselors provide additional support. Pre-recession, all high schools had career coordinators who managed career exploration activities, student internships, the technical skills assessment system, and Tech Prep. Blue's academy directors and counselors share these tasks, a strategy implemented as a cost-saving measure.

Teaching and learning strategies. Curriculum integration occurs in all CTE programs because the state mandated that relevant academic skills be embedded in programs; they are part of its technical assessment system. Specific techniques (e.g., team teaching) are rare. However, due to the adoption of professional learning communities at Blue, more work across disciplines is happening there. Curriculum integration also happens at the individual classroom level.

Technical skills assessments. The state requires CTE programs to assess technical skills using curriculum-based assessments; CTE teachers must embed relevant academic content and assess hands-on skills. Technical skills assessments have been designed so that students who have not mastered either the academic content or the technical skills are unlikely to score well.

Ninth-Grade Academic Findings

In this study, we are measuring academic gains using systems data, including course grades and state test scores. We have compared several measures of ninth-grade achievement, including academic GPA, percentage of students taking honors math and English, the level of math course taken, and algebra pass rates. The exploration of ninth-grade achievement detailed in our full technical report and synthesized here represents an early look at the academic press at our treatment and control schools. As with our CTE findings, these early results do not provide much information about the effects of POS given that the results reported are only for the ninth grade, which for most students is largely made up of course requirements. At East District and at two of the three high schools in West District, students began their POS in ninth grade, but fully 25% of our treatment students from West District did not begin their POS sequences in ninth grade. It should come as no surprise that we have found little discernible difference between the treatment and control or comparison conditions at this point—particularly any difference attributable to POS. Rather than look to POS to explain differences in results at this early stage, we have chosen

to focus on building a descriptive base concerning the academic press at these schools, based on achievement results and site visit observations made over two years.

West District

In the technical report, baseline data show that there were no significant differences between treatment and control groups in prior achievement as measured by eighth-grade math test scores. We found no difference between treatment and control students in terms of overall ninth grade academic achievement and progress toward graduation. In terms of mathematics results, among students who took a math course above Algebra I, treatment students were significantly more likely to pass that course than control students (94.7% vs. 90.3%, $p < .05$). Nearly half of the entire West District sample had already taken algebra by the time they entered high school, and nearly all the rest were taking it in ninth grade. Although this is mostly explained by eligibility criteria for the POS, another conclusion we can draw is that West District prepares a sizeable number of students for Algebra I before or in ninth grade. This reflects well on the entire district culture regarding academic subject-area learning, because preparation for higher math begins in elementary school with a strong mathematics foundation and continues in middle school with increasingly more challenging concepts (National Mathematics Advisory Panel, 2008).

Other achievement results in West District were not significant. Our observations and the student survey results support the idea that West District holds high expectations for these students, and achievement results seem to show that students attempted to meet those expectations. For the most part, we observed rigorous English and science courses that used class time wisely and employed a variety of pedagogical techniques intended to engage students and maximize learning; further, most teachers interviewed mentioned using interim assessments as a way to monitor and target student progress before the end of the marking period. Principals also noted a commitment to using assessment data to help improve instruction and increase student achievement.

East District

In East District, we found no significant differences in the groups' ninth-grade GPA or their progress toward graduation. Evidence for a strong academic press at Blue is found in the mathematics results: Among students who had not taken Algebra I by the beginning of ninth grade, significantly more treatment students were taking some kind of algebra course (i.e., extended, regular, or honors) than were control students (96.3% vs. 88.9%, $p < .001$). Our treatment and comparison groups began ninth grade evenly matched in mathematics prior achievement, so although Blue students may have self-selected for the treatment, they were matched with students of similar prior achievement. Data suggest that students entering Blue without having taken algebra are being pressed harder to take algebra instead of a lower-level preparatory class or even the extended algebra sequence. Pass rates for algebra are respectable for both the treatment and comparison groups—about 79%—but more students appear to be progressing faster through the math sequence at Blue because they passed higher-level courses, presumably in order to be able to understand complex technical concepts in their POS courses.

Other achievement results in East District were not significant. Our observations and the student survey results support the idea that Blue holds high expectations for students and that college and career planning are central elements of the curriculum. Ninth-grade attendance data suggest that Blue students are more engaged in school than the comparison students. Both treatment and comparison schools were well-equipped with instructional technology and the faculty had clearly received training on its use. At Blue, we saw rigorous, well-taught academic courses; we have not observed enough academic courses at the comparison schools to comment at length, although a range of regular and honors Algebra II courses observed across treatment and comparison schools during our 2010 site visit showed the district-wide adoption of digital projectors, Smart boards, graphing calculators, and related software to deliver instruction.

Ninth-Grade CTE Findings

West District

Although significantly more treatment students took one or more CTE courses than did control students (87.5% vs. 68.2%, $p < .001$), the control students enjoyed a significantly higher CTE GPA (3.25 vs. 3.17, $p < .01$). The greater coursetaking by the treatment groups is surely attributable to the structure of POS schools in which the sequences begin in the ninth grade.

Our observations of CTE in West District confirm that resources for CTE are more plentiful in the POS schools than in the control schools. This is not due to district favoritism; schools receive finite resources and must allocate them according to their needs, missions, and student populations. At the POS high schools, which were constructed for the purpose of delivering a wide variety of technologically up-to-date, career-oriented POS, this means strongly supporting CTE; the comprehensive high schools have a wider range of competing demands on their funding. As a result, we saw less emphasis on real-world careers at the CTE being offered at the control schools compared to the treatment schools. .

East District

The story regarding CTE outcomes is somewhat different in East District, which has a well-established TSA system. There, data suggest that Blue students are taking significantly more TSAs (40.7% vs. 22.3%, $p < .001$) and that health occupations students in particular significantly outscored their comparison counterparts (95.4% proficient vs. 70.6% proficient, $p < .01$). However, overall, there was no difference in CTE GPA or in the total number of students reaching proficiency in their respective courses and programs.

Our observations of CTE in both our treatment and comparison schools in East District revealed that Blue students enjoyed a school environment supportive of CTE as a means to attend college, more up-to-date equipment, teachers with former careers in POS areas, and stronger business and industry partnerships than comparison students. The comprehensive schools, on the other hand, often had more traditional programs (e.g., foods and nutrition as opposed to the more career-oriented culinary arts) that, as in West District, lacked a tangible connection to careers and "the real world." Project Lead the Way (PLTW) programs were not fully funded at the

comprehensive high schools and did not offer the entire sequence; as in West District, CTE had to compete for funds at the comprehensive high schools.

Ninth-Grade Student Survey Results

Working in conjunction with the NRCCTE's two other field-based POS studies, the *Rigorous Tests* team developed a student survey that was administered to ninth-grade students in West and East Districts. The survey contained seven sections on course planning, POS, career planning, classes and schoolwork, plans for the future, beliefs and opinions about school, and background information (e.g., gender, age, race/ethnicity, parents' level of education).

Common Findings Across Districts

In our full technical report, we report survey results separately for each district; these results reveal differences between our treatment and control or comparison groups in each district. Here, we note commonalities across districts. Because this joint technical report also presents the survey results of the other NRCCTE-sponsored studies of POS, it seemed instructive to see what patterns emerged across our districts. This section reports on survey responses that were either overwhelmingly positive or negative across districts and thus perhaps may say something broader about students' POS experiences. There were several survey responses that were not significantly different within districts, but both districts shared a common outcome. For example, over half of the students in both districts reported having spoken to a counselor about their individual graduation plan at least three times during the ninth-grade year: 53% in West District and 54% in East District.

Across both districts, students most often spoke with their parents about college and career planning. One might conclude that this is simply the way ninth graders operate at this point in their high school careers—they still orient more toward home in most matters, including those pertaining to the future. In each case in which there was a significant difference between groups in either district regarding with whom students had spoken, treatment students chose school personnel over parents, whereas control students chose parents over school personnel. This could be related to the POS experience: POS students are exposed to personnel who have the expertise they can draw upon to succeed. They still get advice from their parents, but they are starting to branch out—perhaps more so than control students, who may have fewer such opportunities.

Students spoke with their counselors most about what courses to take and least about things studied in class and finding a job after high school. These same topics and options were available for a second survey question, "Who provided the most helpful advice?" In both districts, students reported that parents provided the best advice in all areas except things students were studying in class. Students in both districts reported that the best advice counselors provided was regarding what courses to take (41% in West District, 43% in East District).

Summary of Findings from the Rigorous Tests Study

In this synthesis of our full technical report, we share observations made over our student cohort's first two years of high school; our conclusions are tentative, given that most students

have not yet engaged in the most intensive experiences of their POS. Thus far, we believe that POS reflect a significant amplification of CTE as it is being offered at the control schools. POS offer students rigorous, engaging instruction in academic and technical content areas with opportunities to apply their knowledge and skills to the solution of real-world problems, earn valuable college credits, familiarize themselves with careers, and connect with business.

Both districts are fully implementing the four mandated components of POS. The alignment of secondary and postsecondary elements has been achieved by formalizing local or personal relationships between and across secondary, postsecondary, and industry. POS improve and expand the alignments begun under Tech Prep. All POS schools have aligned academic and technical content in non-duplicative course sequences that progress from broad introductions through more intensive coursework and culminate in advanced, career-specific courses. The recession has curbed the types of postsecondary credit-earning opportunities available, but all POS schools make it possible to participate in some form of dual or concurrent enrollment. All POS at our treatment schools lead to either an industry-recognized credential or a postsecondary degree, but budget issues have constrained district support for in-school student credentialing.

Although local contexts color districts' implementation of the 10 supporting components, some common findings emerged. Although East is located in a more "top-down" state (e.g., is more state-controlled) than locally driven West, both districts have policies institutionalizing POS, including secondary-postsecondary articulation agreements and advisory committees. Postsecondary, community, and industry partnerships are vital to both districts; these function best when personal or local relationships become formal structures. Both districts provide program- and school-specific professional development supporting POS, and both use data to improve instruction. Both have college- and career-ready graduation requirements emphasizing academic and technical achievement and preparation for postsecondary education and training without the need for remediation. Course sequences are non-duplicative and aligned with postsecondary; articulation agreements ensure that students can earn college credits while in school. Across districts, career guidance is largely delivered by industry-experienced POS teachers; career counselors and centers supplement this guidance. Common teaching and learning strategies include curriculum integration, technology integration, PBL, and some WBL.

We cannot yet say whether POS as implemented by these two districts will positively impact student engagement, academic and technical achievement, and transition to postsecondary education and careers. In future reports, as these students further engage with their POS and the entire high school curriculum, additional measures of CTE and academic achievement will become available, like college credits and industry-recognized credentials earned in high school. We will incorporate these measures in our analyses in addition to continuing to examine academic achievement. The next two years of data collection and analysis will help us make a larger contribution to the national conversation regarding the reauthorization of Perkins.

Six Stories About Six States: Programs of Study

The purpose of this investigation is to tell the story of how six states are developing Programs of Study (POS) as mandated by the Perkins IV federal legislation. Our effort focuses on how states' technical assistance systems evolved and what successes and challenges existed for states developing POS. There was no intent to compare one state with another; instead, we sought to identify those elements they have in common and those that were unique to each state. The full report, which we synthesize here, includes profiles of each state, which are located throughout the United States.[17]

States for the study were recommended from a group of states that had applied to a national organization to receive technical assistance on their POS. From that pool of states, three were selected from among those who received formal technical assistance; three were also selected from those that had not been included in the formal technical assistance program. All states agreed voluntarily to participate in the study.

Data were collected from March 2010 to June 2010 during on-site meetings and through "participatory journal" entries responding to specific questions about POS development. Interviews and voice recordings were transcribed and all data were analyzed using Spradley's Developmental Research Sequence (1980), through which major themes and cluster topics were identified across sites. State profiles were based on two sources of information: (1) site visits to school districts (rural and urban) where interviews, focus groups, and group meetings were conducted with middle school, high school, college and university instructors and administrators, and community members supporting POS efforts, and, (2) written reflections by individuals in the states who were intimately connected to POS development. The two researchers involved in the study individually compared and contrasted the themes developed and then as a team generated a set of common themes and challenges reported from the states.

Findings

The overall findings were quite positive. No matter whether a state was described as "top-down," with major direction and impetus for POS coming from the state department of education, or "bottom-up," with a major focus on developing programs at the local level, all states had some mixture of involvement through advisory committees with the state for establishing the general guidelines and templates for program requirements, important program components, processes for program approval and validation, and systems for communicating among and between the various levels of institutional participation.

Every state had excellent examples of collaborations, alignment, inter-institutional articulation and matriculation between secondary and postsecondary, integration of academics with career and technical education (CTE) courses and activities, and long-term plans for achieving Perkins IV goals for 2013. Based on spoken and written comments, the trends for states updating and

[17] The full report is available for download at http://136.165.122.102/UserFiles/File/Tech_Reports/NRCCTE_Six_States.pdf.

continuing their POS development efforts to align with Perkins IV goals were both positive and promising.

Supporting these positive trends were specific findings or themes, including the following.

- **Technical assistance is provided at both the state and local levels.**

Technical assistance for POS development came from both the state and local levels, delivered by teams experienced with CTE. Every state had a technical assistance team that was competent and passionate about ensuring the success of POS efforts.

- **No matter what the context, "relationships matter."**

A sentiment expressed by one study participant, repeated or implied by many others, was: "You have it backwards. It is not rigor, relevance, and relationships; it is relationships, relevance, and rigor." Participants posited that where there were good relationships between individuals and units, relevant and rigorous courses and programs emerged. Although both relevance and rigor were considered vital, developing good working relationships between individuals involved with POS, including teachers and students through student CTE organizations, positively impacted student motivation and learning and the ultimate delivery of the program.

- **Champions deliver much of technical assistance.**

At the state level, and even more so at the local level, technical assistance was delivered by "champions," people deeply committed to CTE and to teacher and faculty collaborations. Many of those providing technical assistance came from the Tech Prep movement and leveraged their knowledge of program components to forge better and stronger secondary and postsecondary collaborations, as well as articulated, aligned curricula. In some states, individuals were recruited out of retirement to bring their extensive Tech Prep knowledge to provide additional supports for updating and aligning their state's POS development efforts with the Perkins IV goals for 2013.

- **POS are more than just about CTE: They are about basic educational reform connecting academic learning with real-world contexts.**

Most participants suggested that the POS system in their state, despite its tremendous requirements for detail and paperwork, was a positive force because it promoted dialogue and discussion among and between secondary and postsecondary institutions, and, business/industry personnel. The POS system in each state allowed the POS stakeholders a venue to focus on what was being taught, what needed to be taught, and why it was important to have articulation and collaboration between educational systems and business to produce high quality preparation for education, work, and life. Participants thought the POS effort was about more than just connecting CTE with academics and different institutional levels: It was about developing educational reforms around project-based learning; integrating academics with hands-on, real-world learning; and engaging students in interests that go beyond the school curriculum.

Challenges to the Implementation of Programs of Study

Although much of what was occurring in the states appeared to be moving in positive directions, the study also found that there were fundamental challenges to implementing large-scale federal legislation at both the state and local levels. Not all states had the same infrastructure or level of organization and collaboration between secondary and postsecondary education for instance; nor did they have the same priorities for program development (e.g., labor market responsiveness vs. career education orientation). Specific challenges noted included the following.

- **Cultural/mission misalignments existed between secondary and postsecondary, as well as between academic and CTE programs.**

One of the greatest challenges to the development of POS was the perceived mission misalignments between secondary and postsecondary institutions and faculty. The missions and focus of secondary and postsecondary institutions were highlighted as being different, partially due to the ages of the students they serve and their ability to operate independently in the world of adults and the world of work. In addition, at both the secondary and postsecondary level, connecting academic instruction and CTE programs has been around for a long time. Getting academic teachers to understand POS means they need to work with CTE personnel, however, and getting postsecondary faculty to understand POS means they need to work with secondary education teachers. Bringing these groups together remains a persistent challenge that has been increased by a lack of sufficient time to develop relationships and a shortage of people with credibility in both worlds who could lead such efforts. It can be difficult to foster a spirit of collaboration when some educators and administrators perceive that their efforts at the different academic levels misalign with the educational aims and expected outcomes of others.

- **Time and resources are needed to meet all the demands of POS development and certification.**

Besides the time needed to build successful collaborations, most participants thought there was a need for more extensive time and resources to address all the logistical and programmatic demands of the Perkins IV POS goals for 2013. Most felt the paperwork, articulation, collaboration, and group development of curriculum and dual credit systems' expectations were enormous and that they would require more time and resources to effectively implement to the letter and intent of POS legislation. One described the process as "building a boat while sailing it"—even meeting the implementing challenges of just the basics for Perkins updates did not seem to allow for the time needed to update and maintain, let alone construct and test, the reworked POS system before making it fully operational.

- **Real-world occupational pathways are not always linear.**

Many individuals in the participating states suggested that measuring the success of POS might be compromised because career or occupational pathways are not always linear. Some of the adults interviewed cited their own personal experiences in which they left education right after

high school in order to take jobs to which they were connected (frequently through after-school career programs) and then later returned to postsecondary education to pursue their careers. Yet, as mentioned by several teachers and business people, some students do well in secondary programs and actually get job offers right out of high school, thus forgoing immediate transition into postsecondary training programs. This meant, according to the interviews, that while there was some occupational and skill success on the secondary level, it actually undercut the standards for success for POS sequences and outcomes, thus making the programs appear to be unsuccessful, when in fact, the acquisition of a job right out of school meant that the student had actually benefitted from the CTE program.

Recommendations

Several recommendations arose from the data and analyses that could potentially improve the development and implementation of POS. They include the following.

- **Continue the collaboration between state and local personnel around issues of articulation, alignment, and course and program implementation.**

In order to keep improving POS initiatives throughout the states, participants believed that it was necessary to continue to (1) develop collaborations between secondary and postsecondary and between academic and CTE instructors, as well as to (2) pursue stronger connections between courses, programs, and business and industry outcomes. Every state had already developed good models of POS systems and had already approved and authorized their adoption and implementation. The challenge was simply to continue the process and expand the opportunities for all connected to the effort to meet, interact, and develop the courses, institutional articulation, and personal relationships needed to achieve the goals set for 2013 in the Perkins IV legislation. The problem, for several interviewed, was that they might not be able to meet the expected outcomes. More time and resources were needed.

- **Find a way to streamline the paperwork and approval process so as to remove some of the burden from teachers and business and industry representatives. Try to keep the process simple and consistent—do not keep changing the requirements and system each year.**

One of the challenges mentioned in all states was the enormous amount of paperwork associated with documenting important POS components, including courses, aligned and articulated curricula, business and industry involvement, and other related elements. Many states regularly altered some of the POS forms and requirements over the years. Several participants vented their complaints during the focus groups and interviews regarding putting in hours of work preparing and having POS materials signed off on, only to have to redo their efforts to accommodate the newest requirements. Although all of the states are moving to more stable, sophisticated systems, it is important to be reminded that frequent changes at the top were often mentioned as frustrating and demoralizing for people on the ground.

- **As some states have done, develop stronger partnerships with other postsecondary education institutions to assist with staff training and evaluation. There should be special emphasis placed on teacher development and training models to connect academic instruction with real-world contexts.**

In some states, individuals who had a long history with CTE and with the newer POS efforts suggested that programs could be strengthened by helping teachers learn to develop programs that used real-world contexts, such as work-based learning, as a teaching platform for academic instruction. They said that academic teachers were not taught how to use work-based learning contexts to teach academic concepts. Vice-versa, career and vocational teachers were not as effectively taught how to teach academic concepts through work-based activities. Several cited models, such as Math-in-CTE, as efforts to do just such teaching, and suggested that these initiatives needed to be reinforced and developed in teacher education/teacher development programs in universities responsible for teacher pre-service and teacher staff training. They suggested that four-year institutions involved in this work could collaborate with high schools and community colleges to provide added support and direction to ensure that the more general goals of Perkins IV legislation was being supported through a larger, connected program.

- **Develop a publicity campaign within the state that promotes POS, explaining why they have value for all students.**

Individuals in most states believed there were POS models that were sufficiently well developed that they could be publicized as exemplars of what POS are trying to accomplish. Many felt POS were still not well known in their state and would benefit from a media or promotional campaign to inform the public, especially parents, of the availability of this outstanding model of education. Such a promotional campaign would also help to alert business and industry and get them more involved. In essence, going public with the purpose, goals, and opportunities presented by POS would broaden their appeal and make them much more credible as an educational initiative.

- **Ensure, no matter what the configuration (top-down or local control), that there is sufficient information flow so that those "at the top" may constantly hear and react to the comments or perceptions of those people "on the ground" who are actually delivering the instruction.**

Participants in every state expressed concern about the tensions between the ideal POS operating at the state level and the reality of trying to implement POS for people "on the ground." People at the state level were aware of these tensions; they just needed to find more time, resources, and opportunities for interaction to ensure that those actually implementing and teaching POS in school districts and community colleges could provide continuous feedback so the system did not get too complicated or too distant from reality.

- **Focus on making counselors an important part of the POS team.**

Most of the participants in the study believed that POS needed more involvement from counselors, especially high school counselors, in order to reach their full potential as an effective educational and occupational strategy. Students and their parents needed to think about career plans and pathways and the many programs available to help them achieve their lifetime goals. To do this, counselors should be included in the POS teams so they can both obtain and share the POS story with students as they plan their school programs.

- **Collect appropriate and accurate data on participants and program outcomes.**

One of the real challenges to state personnel was devising systems that provided accurate data regarding who was involved in CTE (and POS) and how students could be tracked and monitored in order to determine the full impact of the effort. There was concern that, because of inefficiencies in collecting data, some students would not be counted and the overall measure of the success of POS might be diminished. All states were aware of this issue and were developing plans to address it. States should be reminded that clear and effective ways to identify POS students and track their progress from secondary to postsecondary to employment will weigh heavily in the overall assessment of their programs' success.

- **Recognize the legal and logistical restrictions in developing POS efforts and resolve them in realistic ways.**

Individuals from almost every state discussed some of the issues that prevented them from developing POS. Some were concerned about legal restrictions, especially for secondary students, that prevented students from performing the physical activities of certain occupations identified as strong POS models. They suggested there were laws in place that did not allow students under 18 to perform work in particular settings, especially if there were safety concerns and limitations. In addition, they also noted logistical problems where a CTE training program at the secondary level did not have a matching course/program in the local community college. This prevented the kind of articulation and alignment envisioned in the Perkins IV legislation.

Conclusions from the Six States Study

Six stories of POS in six states reveal that this CTE initiative is alive and well. Despite several challenges, many of which were experienced in Tech Prep programs developed years ago, POS are expanding their scope and numbers and becoming a more stable component of the CTE system for delivering articulated, documented, collaborative programs that truly connect secondary schools, community colleges, and business and industry. Technical assistance in developing these initiatives is provided by real "champions" in the field, frequently persons with Tech Prep experience, who assist with all levels of course development, cross-institutional collaboration, and instructional integrity. Time will tell how effective this technical assistance is in creating a sustainable, effective system for delivering CTE that is integrally connected to academic instruction and produces educated and skilled employees for tomorrow's workforce.

What We Have Learned

The evidence collected as of the end of July 2010 by the NRCCTE's four field-based projects examining POS indicates that all the sites being studied are offering POS, but there are some gaps between the expectations for such programs as established by the Perkins IV legislation and the OVAE Framework (2010), and the actual programs that are being implemented by states, districts, and schools. These gaps primarily involve the alignment of secondary and postsecondary instruction and the integration of academic and technical content. Most sites have established opportunities for students to take dual or concurrent enrollment courses to earn postsecondary credit, but relatively few students have done so. To date, only the Mature POS study has been able to collect evidence on the extent to which students continue at the postsecondary level in the same career areas they studied in high school, and the result was lower than expected. However, it is too early to speculate on reasons for the low rate of transition; data are still being collected and analyzed to better understand students' pathways after high school.

In the first section of our conclusions, we examine preliminary findings related to the four components of POS established in the Perkins IV legislation. The information in this section is drawn from all four field-based studies. In the section following, we summarize observations relevant to the 10 components of the POS Design Framework developed by OVAE (2010). None of the four studies was originally designed to address all 10 of these components, but each study reported observations on as many as possible given their unique contexts. At this point, our findings are too preliminary to support firm conclusions regarding the efficacy and success of POS. Thus, in the final section below, we present a set of closing thoughts about the four studies in Year 3 rather than a definitive discussion about project outcomes.

Mandated Components of Programs of Study

Two of the four mandated components of POS involve issues that have long been a concern for educators and policy makers: the alignment of secondary and postsecondary instruction and the integration of academic and CTE content. Calls for curriculum integration (e.g., horizontal integration) date back to the early decades of the 20th century when vocational education became a part of the secondary curriculum. The need to align secondary and postsecondary curricula (e.g., vertical integration) emerged in the second half of the 20th century as community colleges became major providers of technical training. Both issues are problematic because they are rooted in structural, administrative, and instructional practices at the secondary and postsecondary levels. The inclusion in Perkins IV of alignment and integration as defining characteristics of POS underscores their importance, persistence, and complexity. If these issues were easily resolved, there would be no need for legislation specifically addressing them. The other two components – providing opportunities for students to earn dual credit and the goal of earning a postsecondary degree or certificate or industry credential at the end of the POS— reflect more recent policy discussions around preparing all students for college and careers. Here we provide a cross-study summary of findings on the four mandated components of POS as well as observations from the separate studies.

1. Incorporate and align secondary and postsecondary educational elements.

Cross-study summary. Efforts to align secondary and postsecondary instruction were evident at each of the sites studied across the four studies. Sites with established methods to facilitate communication across institutions and partners, such as joint technical skill committees or advisory groups (which bring together secondary and postsecondary faculty with business and labor partners), appear to have achieved better alignment than sites without such methods. Good relationships among the various partners appear to foster alignment. Three of the four studies found that the advent of the Perkins IV POS mandates have increased the attention paid to aligning secondary and postsecondary programs. The fourth study, in South Carolina, also found increased attention being paid to aligning secondary and postsecondary programs, but it is unclear whether this is due to Perkins IV, EEDA, or some combination of factors.

Site observations. The Six States study found that "champions" play a major role in providing technical assistance on the implementation of POS. These champions often have backgrounds in Tech Prep from which they gained experience in the processes of aligning secondary and postsecondary instruction and integrating academic and CTE content. A defining characteristic of the sites in the Mature POS study was that each postsecondary institution had dedicated staff responsible for creating connections with secondary schools. At their sites, both the Six States and Rigorous Tests studies found that the articulation agreements developed under Tech Prep were enhanced under POS: POS connect and sequence courses and their content with the goal of producing the occupational proficiencies that are reflected in industry-recognized credentials and postsecondary degrees. In one state involved in the Six States study, a respondent noted that Tech Prep directors have assumed an almost quasi-governmental role helping local CTE directors understand regulations regarding POS and other topics. In the Mature POS study, the directors of the offices of high school relations at two community colleges had advised their state CTE offices on POS development.

Although the states in the Six States study have focused their efforts on implementing POS, researchers noted that these efforts are often hampered by an inherent cultural or mission misalignment between the secondary and postsecondary levels. The primary goal of high schools is to ensure their students meet the academic standards states have established for graduation. The primary goal of postsecondary institutions is to ensure their instruction is aligned with industry standards and meets the needs of employers. The Rigorous Tests study found that strong district- and school-level administrative support can counteract this misalignment and enhance secondary-postsecondary cooperation.

The South Carolina legislation facilitates alignment between secondary and postsecondary education in several ways. One of the goals of the development of IGPs, mandated by EEDA, is to help students link their secondary coursework with postsecondary training and education. The state has also called on industry-specific advisory committees to help develop curricula and there is an active statewide course alignment project. Sample schools with strong CTE programs and experienced CTE faculty that were participating in the Personal Pathways study were more likely to have better alignment between secondary and postsecondary instruction than those with weaker CTE programs.

2. Include coherent and rigorous academic and relevant CTE content in a coordinated, non-duplicative progression of courses.

Cross-study summary. The studies generally found that when integration of academic and CTE content occurs, it happens primarily in CTE courses rather than in academic courses. Individual teachers typically initiate any integration that does occur, rather than it being a school-wide or system-wide effort. In the Rigorous Tests study, one of the states mandates that relevant academic skills be embedded in CTE programs; these skills are measured as part of the state's technical assessment system. Although the South Carolina legislation mandates integration of academic and CTE content, researchers in the Personal Pathways study are finding inconsistent evidence that it is actually occurring. When it has been observed in participating South Carolina schools, it is primarily in the same form as found elsewhere, that is, of the integration of academic standards and content into CTE courses and not of CTE content into academic courses. Across all four studies, sites are developing POS that offer sequences of courses that begin with broad introductions to career areas and become more focused on specific occupations as students advance in their pathways.

Site observations. Most of the findings of the Six State study with regard to the alignment of secondary and postsecondary elements also apply to the integration of academic and CTE content. Of particular relevance is the study's finding regarding the cultural or mission misalignment of secondary and postsecondary institutions. At each of these levels, there is an additional disconnect between academic and CTE instructors. Personal relationships were cited as the key to resolving these differences. Administrators and instructors at both levels need time to meet with their counterparts and work through the many issues involved in aligning academic and CTE content as well as administrative and logistic matters. Often, however, the revenue shortfalls being experienced by states and local districts have led to staff cutbacks and reduced the time available for relationships to develop and documentation be completed.

The Rigorous Tests study found that curriculum integration was seen as highly desirable but difficult to achieve. Except in one school structured around PBL, much of the integration observed was undertaken by individual teachers working largely on their own and seeking assistance on an as-needed basis from peers in other curricular areas. The Mature POS study found that academic instructors were frustrated by the difficulty of gearing academic content in their classes to students enrolled in a variety of POS career areas simultaneously. Some of the "integration" cited was observable only on paper and not in practice. Echoing the findings of the Six States study, both the Rigorous Tests and Mature POS noted the barriers to curriculum integration arising from staffing and scheduling issues.

The South Carolina legislation requires that academic and CTE content be integrated and that resources and instructional materials for all courses be aligned with the state's content standards. EEDA requires the state to provide training in contextual teaching to all middle and high school educators; this training must emphasize methodologies that focus on hands-on instruction and content presentation with an emphasis on real-world application and problem solving. Integration was reported in Personal Pathways study sample schools to be mainly occurring in efforts to integrate literacy or reading across the curriculum or into CTE courses. These efforts were

reported in five of the eight sample schools; efforts to integrate math across the curriculum were reported in three sample schools.

The organization of schools into SLCs at three of the South Carolina sample schools appears to have increased collaboration between academic and CTE teachers, especially in the school that organizes its learning communities around career clusters. As part of the SLCs' curriculum and instruction efforts, core academic teachers are integrated with CTE and other teachers. Teachers find that being located on the same hall, having common planning periods, working in learning community teams, and advising a cross-section of students, all help to stimulate efforts towards integration and collaboration.

3. May include the opportunity for secondary students to participate in dual or concurrent enrollment programs or other ways to acquire postsecondary education credits.

Cross-study summary. All of the POS being followed in the three longitudinal studies offer opportunities for high school students to earn postsecondary credits through dual or concurrent enrollment. However, student awareness of these opportunities varies widely. Interviews conducted for the Mature POS study indicate that unless credits are automatically transcripted at the college upon course completion, relatively few students actually take advantage of them. If they are not transcripted, students often must satisfy certain requirements, such as enrolling in the college that offered the course and presenting documentation of credits earned before having the credits added to their transcripts, which students rarely do. A college administrator interviewed for the study claimed that dual credits in CTE could not be recorded in their system; it is unclear to the researchers why AP credits can be transcripted but CTE dual credits cannot. The other studies found that, at the high school level, the time and scheduling requirements of POS course sequences, AP, and dual credit courses often conflict and students must make difficult choices among them.

Site observations. The Rigorous Tests study found that high school students could earn postsecondary credits through Tech Prep, AP, International Baccalaureate, concurrent enrollment, and online courses. In one district, however, dual enrollment credits are not directly awarded upon successful completion (with an A or B grade) of an eligible course. Instead, after high school, students must enroll in postsecondary institutions that are partners in articulation agreements, present evidence of successful course completion, take examinations, or in other ways document their eligibility for credit. Although online coursework was often cited as an alternative to dual enrollment, relatively few high school students appear to be taking advantage of online courses, and many study participants cited problems with students' ability to do well in such courses. For example, some enroll without an understanding of the amount of work required, and online courses do not provide as much support as regular classrooms.

At one of the Mature POS sites, the state encourages high school students to take some form of college credit, which means that local colleges are competing for students with online providers, which are often more affordable. The state in which another of the Mature POS sites is located recently passed legislation requiring students to take college credit while in high school. The college at that site is now scrambling to create articulation agreements with high schools but is challenged by a shortage of CTE teachers qualified to teach college-level technical programs. In

both of these sites, if high school teachers are qualified, college courses can be taught at the high schools. Such courses are more affordable for the districts than those taught at the colleges by college faculty, for which the districts have to pay students' tuition. The districts' priorities are to keep courses at the high school, to save money and keep high school teachers employed.

All three of the postsecondary institutions participating in the Mature POS study have offered dual enrollment courses for several years which is one reason they were selected for participation. At one of these institutions, 30% of its total enrollment consists of high school students in dual credit courses. Despite the efforts being made by these institutions, almost half of the high school students who completed questionnaires about their POS experiences reported they did not know if the courses they took offered dual credit. As discussed in more detail in the next section, this may reflect a lack of knowledge about the availability and benefits of dual credit courses among guidance counselors and parents.

South Carolina students face several challenges with regard to dual credit courses. First, 17 hours of core academic credit are required to graduate, leaving students with only 7 elective credits—and all CTE courses are elective. Second, no CTE course has been approved for core academic credit, even if it offers dual credit. Third, there is often limited space for students in courses and limited time offerings of CTE courses, making it difficult to schedule CTE courses around required academics. Fourth, there are limited numbers of dual credit CTE courses available. Although 57% of students in the Class of 2011 cohort responding to a survey about their POS experiences reported that they planned to take at least one dual credit course before graduating, most opportunities for dual credit in sample schools were in core courses. Finally, taking CTE courses can lower students' GPAs, because CTE courses rarely carry honors, AP, or dual credit, all of which carry higher weight than CTE courses. College-bound students interested in CTE courses thus have to balance them with other courses to keep up their GPAs.

4. Lead to an industry-recognized credential or certificate at the postsecondary level, or an associate or baccalaureate degree.

Cross-study summary. All POS being studied across the NRCCTE's three longitudinal studies fulfill this component to some degree in that they all can be said to lead to credentials, certificates, or degrees at the postsecondary level. The strength of secondary-postsecondary links to achieve this goal, however, varies across POS from vague mentions (e.g., "can lead to a Bachelor's degree") to specific information about which course sequences lead to which degrees at which institutions (e.g., "six credits toward an AAS degree in X program at Y college"). Data on POS students' transition from secondary to postsecondary are available only in the Mature POS study, and what is available implies that few graduates continue their postsecondary studies in the same POS they followed in high school. In addition to working to establish smoother transitions for graduates to enter postsecondary certificate or degree programs, some of the POS in the high school sites studied offer opportunities for students to earn industry-recognized certificates or other credentials at the secondary level, but others have been unable to make the commitments of time, personnel, and funding required to establish and maintain the programs that offer such credentials.

Site observations. The Six States study raised questions about the appropriateness of the attainment of a postsecondary credential as an indicator of the success of POS. High school students who perform well in internships or cooperative placements may be offered full-time employment when they graduate. If they accept such offers, they do not meet the POS criterion of postsecondary degree or credential attainment; by all other measures of success, however, they have obviously benefited from their high school training.

The Mature POS study findings also call into question the appropriateness of the postsecondary credential as an indicator of POS success. Substantial majorities of both the high school and college students who completed study surveys rated various aspects of their POS experience positively. The students perceived their programs as increasing their satisfaction with school and preparing them for careers. Clearly, the students are getting something out of the high school portion of the POS even if they do not continue in the same occupational area in college. It may be that our definitions of successful transitions are too strict; students may have limited options at their high schools but when faced with multiple possibilities at the college level choose a related field rather than the same one they studied in high school. Further analysis will reveal whether students stayed in the same career cluster. Interviews at one of the Mature POS sites support the Six States study finding that colleges do not want to "lose" their students to employers before they complete a full program, although this sometimes happens and results in such students not being included in counts of "POS completion." All of the Mature POS sites work with local employers to learn what skills and credentials are needed, and then design their programs around these so they are all on the same page. A college instructor at a Mature site who traveled to Germany to earn a Siemens certification emphasizes industry credentials in his courses. Although students may have passed industry certification exams, he does not let them take a job before he is satisfied that they have not only the skills but also the maturity to handle the job because he wants employers to trust him and value his program.

All of the POS schools in the Rigorous Tests study offer the opportunity to earn industry-recognized credentials at either the secondary or postsecondary level in at least some of their POS. The secondary educators interviewed thought that such credentials added value to their POS, but considered the costs to students to acquire certification to be excessive. In many cases, budget limitations were seen as diminishing the number of and support for credential or certification-earning opportunities provided in secondary schools.

All of the sample high schools or their partner career centers in the Personal Pathways study offered opportunities for students to earn industry-recognized credentials while in high school in at least one of their POS. Administrators interviewed at several schools wished more certificate programs were available to high school students. A lack of industry-qualified teachers to provide the instruction for certification in some areas was often cited as an obstacle. The schools in the Personal Pathways study also work with local employers to learn what skills and credentials are needed, and then design their programs around these. Every POS identified in the Personal Pathways study has a postsecondary component that culminates in a credential, certificate, or degree at the postsecondary level.

OVAE Design Framework

As noted in the introduction, the Design Framework for POS was developed by OVAE (2010) to provide policy guidance to states regarding the development of POS. The research staff from the four NRCCTE POS studies agreed to use the framework as an additional analysis lens. In this section, we summarize preliminary observations relative to the 10 components in this framework.

Legislation and Policies

Research on educational reform has repeatedly emphasized the importance of leadership at the school, district, and state level. Consistent support from all three levels is needed for change to occur (e.g., Fullan, 2007; Louis, Leithwood, Wahlstrom, & Anderson, 2010). In one of the states in the Six States study, this support included a governor who had a special interest in developing POS in large urban districts. Although this support was welcomed, the governor's agenda became a factor that had to be reconciled with local considerations before planning could move forward. The POS in the other five states did not experience such targeted attention from their governors. As mentioned in the previous section, two of the Mature POS sites are experiencing challenges due to state directives regarding dual enrollment.

Perkins IV does not appear to be the primary driver of the POS being examined in the Rigorous Tests study. Instead, particularly in one district, the researchers identified the impetus for POS as arising from a broad-based, widely shared desire to boost student achievement and provide educational experiences that produce graduates who are both career and college ready. These efforts build on and strengthen practices, partnerships, and policies that began in a more loosely coordinated, locally directed manner under Tech Prep. The Mature POS study, by definition, includes sites that had already begun POS-like programs well before Perkins IV. In addition to the earlier Tech Prep impetus, other reasons these sites began developing POS were to prepare students for employment in local companies, recruit high school students into the community college to increase enrollment, and share resources such as instructors and equipment between districts and colleges.

One of states in which the Rigorous Tests study is being conducted has legislation that mandates the articulation of high school and postsecondary courses and specifies what some of those courses must be. There is also a state-level articulation agreement between community colleges and high schools that specifies principles for forming faculty committees to review courses and a process by which to award credit. The state articulation agreement allows colleges to accept some subset of articulated courses depending on the offerings at the local schools and the work of the curriculum alignment committees.

The Personal Pathways study offers an opportunity to explore the impact of a statewide, comprehensive career-pathways/POS reform model on the delivery and outcomes of career-oriented education. Because the legislation affects all high schools, the study is drawing upon naturally occurring variations in implementation, community resources, and extent of exposure to the changes required by the legislation to assess the factors that influence its impact. Early evidence from sample schools indicates that the legislation's requirements regarding guidance

have increased the influence that counselors and career specialists have on the educational and career plans of students. Although the structure and content of the state policy help to streamline guidance roles and responsibilities, some schools reported that it will be difficult to implement EEDA fully without additional resources. Only some facets of the legislation have received state funding, which has made it difficult for most schools, particularly those in high-poverty communities, to fully implement the policy.

Partnerships

Various types of partnerships were identified across the four NRCCTE studies, ranging from local, personal relationships (e.g., student-faculty relationships, informal secondary-postsecondary relationships, business-administration relationships, academic-CTE relationships) to partnerships formed through formal, written articulation agreements and memoranda of understanding (MOUs), to ongoing councils and organizations created solely to strengthen efficiency and communication among educational institutions at all levels and to bring businesses, communities, state and local leadership, and schools together for their mutual benefit.

Relationships were identified as essential to developing POS by the Six States study, which quotes a participant as stating that the new "three Rs" (rigor, relevance, and relationships) are in the wrong order: Relationships are the most important. These relationships extend in many directions: teachers and students, secondary and postsecondary academic and CTE teachers and administrators, and education and business representatives. The OVAE framework (2010) suggests that MOUs be written by partnering organizations, but findings from the Six States study imply that the strength of the relationships between the partners is more important than written agreements. No matter what an MOU says, the problems that inevitably arise are more easily solved if the individuals involved know and trust one another.

The findings of the Rigorous Tests study provide further support for the importance of personal relationships. One teacher described the relationships among the members of a joint technical skills committee as founded in friendship and shared interests. When these relationships are institutionalized in formal committees, they are more likely to persist. But even such committees require considerable investment to maintain their viability. Two Rigorous Tests treatment schools each have a staff member whose sole assignment is to establish and maintain school-community partnerships; at a third school, an administrator has been tasked with these responsibilities. The findings from interviews in all of the Mature POS sites confirm the importance of personal relationships: in smaller towns, where relevant individuals know each other and there is less bureaucracy, such relationships help facilitate POS development, whereas in larger sites, multiple stakeholders, politics, and bureaucratic red tape often stall POS efforts.

Prior to the 2008 economic downturn, one of the high schools in the Rigorous Tests study had an exemplary relationship with a community college. College instructors taught classes at the high school and also taught high school faculty who sought certification to teach product-based courses (e.g., CompTIA A+). College counselors spoke with the high school students and teachers about entrance requirements for different programs and administered placement exams. The college also hosted a volunteer organization of businesspeople who taught after-school courses. Most of these activities have stopped due to budget and scheduling constraints and the

higher enrollments with which the college is now dealing. The college has also acknowledged that the high school's better-prepared and better-informed students are now eschewing the community college in favor of accepting scholarship offers from four-year universities.

School administrators and CTE faculty at Personal Pathways study high schools mentioned local advisory teams as being important in program development and keeping schools informed on the needs of industry. Links to business and industry were also important to comply with policy mandates for increased job shadowing, mentorship, and internship training opportunities for students. But having staff available to identify, establish, and maintain partnerships is critical to the success of these efforts, as is the availability of local business partners. Few sample schools had staff that they could dedicate to developing these partnerships and some schools were in such remote or economically depressed regions of the state that there were serious challenges to creating the necessary partnerships with industries.

Despite these obstacles, several initiatives in the South Carolina EEDA policy help promote partnerships between local schools and districts and local businesses for CTE and non-CTE programs. EEDA created 12 Regional Education Centers (RECs) to help disseminate information about the policy to local industries and the community; to help schools to educate students and staff about career opportunities, job training, and apprenticeships; and to connect local education and businesses. Involvement with the RECs was inconsistent across sample schools, ranging from no contact to periodic contacts. Another program developed by the state and partially administered through the RECs is the Connect2Business program, which recruits businesses to be involved with local schools. Currently, 901 businesses across the state have volunteered to have their contact information listed and to be partners with their local schools.

Professional Development

The Six States study found that much effort has been directed toward providing professional development regarding POS in such varied formats as meetings, conferences, site visits to business and industry, and online training (e.g., webinars, websites). This training primarily focuses on the development of career clusters, the alignment of curriculum between secondary and postsecondary programs, updating the knowledge and skills of instructors, career counseling, and guidance training. In some of the states, representatives from the state department of education and colleges teamed up to deliver POS training. State-developed models in which states provide resource guides, model programs, documents, and templates were identified as especially helpful. Study participants identified the importance of continual access to resources and regular meetings and trainings as helpful in the development and implementation of POS.

Researchers from the Rigorous Tests study found evidence of professional development on many topics relevant to POS delivered by both state and local staff. These included general introductions to POS requirements, training for new teachers from business and industry, district-wide, program-specific professional development, support for guidance counselors, and trainings specific to the unique needs and contexts of the treatment schools. At one school that emphasizes PBL, for example, all new teachers receive a week of PBL training during the summer and additional in-service learning opportunities during the year. A different school provided training in how to improve students' technical literacy. Professional development for guidance counselors

at Rigorous Tests treatment schools included information on dual credit, credit retrieval, apprenticeships, and a workshop on improving the retention of nontraditional students in CTE programs. One limitation to on-going professional development is the length of the contractual workday, which makes it a challenge to pay for teachers' time after work or to arrange for full-day substitutes.

Some of the individuals interviewed for the Six States and the Mature POS studies identified a need for professional development to help (a) academic teachers to use real-world contexts for their instruction, and (b) CTE teachers to teach the academic concepts that are inherent in their curricula. Several of those interviewed cited Math-in-CTE workshops from NRCCTE as examples and some suggested that such models needed to be developed and reinforced in university-based teacher education departments and other programs responsible for teacher pre-service and staff training.

EEDA requires the South Carolina State Department of Education to provide training, professional development, and resources to K-12 school personnel in various aspects of the policy, such as the use of cluster of study curriculum frameworks and IGPs. The policy mandates that all middle and high school educators receive training in contextual teaching, involving methodologies used by teachers that focus on concrete hands-on instruction and content presentation with an emphasis on real-world application and problem solving. South Carolina's reform policy also requires all state colleges of education to include in their training of teachers, guidance counselors, and administrators the following topics: career guidance, the use of the clusters of study curriculum framework and IGPs, learning styles, the elements of the South Carolina Career Guidance Model, contextual teaching, cooperative learning, and character education. The State Board of Education has developed performance-based standards for all teachers and principals in the areas of career exploration and guidance.

Teachers in the Personal Pathways study schools reported receiving varied amounts of training related to EEDA activities from their school, district or the state. The state was credited with providing good virtual job shadowing and other general resources through websites such as the Personal Pathways to Success website, the college and career planning sites through Kuder, Microburst learning sites, and the REC sites. However, guidance personnel and school-based career specialists were reported to be the main providers of training for teachers. Teachers in sample schools were most likely to receive school or state-sponsored training in the early stages of policy implementation but little training as the implementation continued. Some teachers found this training too general and felt the need to supplement initial training with their own research. Some teachers commented that the best training they were receiving on content integration and career clusters was through professional development provided by High Schools That Work (HSTW) staff.

Guidance personnel in the Personal Pathways study schools reported receiving at least some training on career pathways and IGP development, but the amount and type of training varied, as did the topics covered. This training was offered through a variety of channels, including the local school district, the state education department, and state and regional professional development meetings and workshops. Guidance counselors at one school reported receiving

training through a local business alliance. Regardless of the types of training described, guidance counselors interviewed generally felt satisfied with the training they had received.

Accountability and Evaluation Systems

Both the Mature POS and Six States studies identified concerns about states' ability to categorize POS participants at the secondary level and track them into the postsecondary system. Those raising these concerns want their states to develop systems that can track students by unique identifying numbers and use course classification codes to determine if students continue POS at the postsecondary level in the same career clusters they studied in high school. One of the states participating in the Six States study has such a system, but it is not using it for this purpose. Instead, a representative of a community college reported that tracking at his college is done manually by a staff member. Each of the states participating in that study has somewhat different methods for identifying and monitoring student progress and outcomes.

Both districts in the Rigorous Tests study stress the use of data for accountability and program improvement. The results of standardized testing are publicized and teachers are expected to use data to improve their teaching and student performance. One of the schools prominently displays posters labeled "The Data" that feature the school's standardized test results.

When the research staff for the Mature POS study contacted the three participating colleges to collect systems data, including transcripts, two sent electronic files and one sent actual transcripts, photocopied and complete with handwritten notes, for each student in the program. None of the colleges was able to supply information from the high school level (such as GPA or courses taken) about their students because they do not keep students' high school transcript information on file. In addition, even if they did, definitions of "POS student" vary; for this reason, the researchers asked for information on all students enrolled in POS courses. Based on these data experiences at "mature" POS sites, it is likely that many institutions across the country lack definitions and data systems that would allow reporting of data on POS student pathways or outcomes from secondary to postsecondary.

The Personal Pathways study is monitoring efforts of the state to refine a statewide database on all students that will include demographics, individual outcome information (from elementary school forward), and information on IGPs and career-focused educational activities. Currently, the system does not incorporate CTE information or postsecondary data on graduates, but future plans include adding these data to the database, as well as links to other state databases, such as juvenile justice and crime records, and to other agencies' databases. EEDA also requires schools to collect data on at-risk students and use these data to target programs to identified students and track their progress. Sample schools reported various methods of accomplishing this. The HSTW process was reported to have provided detailed information for school administrators to use for decision making.

College and Career Readiness Standards

In the Rigorous Tests study, one of the participating districts has established a College-and Career-Ready course of studies—the district's name for its graduation requirements—that

requires students to take at least one arts and humanities or CTE elective. This requirement, however, has not restricted the schools from defining college and career ready according to their unique contexts and student populations. The treatment schools in both districts all stress rigorous academics as part of their CTE courses. The culture of the treatment schools sets high expectations for all students; these expectations include some type of postsecondary education following high school.

Two of the sites in the Mature POS study (both in small towns) began building POS-like programs to connect high schools and the technical college a decade ago to meet the needs of the local labor market and ensure that their graduates were well prepared for employment in the region. Both sites have active employer advisory committees to make sure that graduates of the college are prepared to begin working, and several of these employers offer internships for students to gain experience and a "foot in the door" before graduating.

The Six States study identified POS as a force for educational reform that centers on the application of academic learning in real-world contexts and involves the interactions of secondary and postsecondary institutions, business and industry, and social organizations. Study participants provided examples of such application and interactions, like the integration of academic subjects in CTE, postsecondary faculty engagement in research to identify predictors of students' success, and informing students of the academic skills needed to successfully engage in college-level work. Some students are so well prepared that they are being hired before or upon graduating from high school, resulting in such students being removed from POS secondary-postsecondary channels.

One issue affecting readiness in the Six States study centered on students' engagement in work-based learning (WBL) activities. Specifically, students are often restricted from engaging in WBL activities due to age requirements (under 18 years of age), safety issues, and legal restrictions in certain occupations. Similar restrictions were noted by administrators at several schools in the Rigorous Tests and the South Carolina study.

All of the Rigorous Tests treatment schools sought to incorporate college and career readiness standards by preparing students to graduate from high school ready to transition to postsecondary education or training or to work by employing high academic standards, providing enriched CTE experiences, teaching problem solving skills, and, to some extent, integrating academic and CTE curricula. In addition, one school taught students career readiness skills through portfolio development, resume building, and opportunities to interview with business and industry professionals.

Similar to schools in the Rigorous Tests study, a goal of EEDA is that all of South Carolina's students will complete high school fully prepared for successful employment, further training, or postsecondary study by requiring high academic standards across the curriculum, integration of academic and CTE content, and opportunities for work-based experiences. Each student's IGP includes postsecondary options and all students are encouraged to take the SAT or the ACT college readiness tests.

Course Sequences

Some students participating in POS may enter them as early as the ninth grade, but study of a career area typically does not start until the tenth or eleventh grade. All POS start with broad foundational courses and narrow their focus on specific occupations and higher level knowledge and skills as students progress through the curriculum. In well-developed programs, the senior year often involves projects, capstones, or WBL designed to integrate and apply content studied in earlier courses. In some schools, textbooks and curricula are selected in cooperation with postsecondary institutions as a means of aligning the two levels as well as incorporating state and national standards. Business, industry, and public representatives serving on advisory committees may also play a key role in helping to lay out course sequences according to the skills needed in the industry and the best sequences to obtain those skills. In one of the Rigorous Tests districts, for example, state agencies responsible for CTE must review and approve the courses proposed for POS before they are offered. This has led to a few complaints that by the time approval is received, the curriculum may be out of date. As noted in our discussion of dual credit, it is often difficult for students to meet POS requirements and also take AP or other dual credit courses.

Course sequences in Personal Pathways study schools are complicated by the fact that schools and districts can create their own unique set of courses and course sequences and call it a "major," the term used for POS-like programs in South Carolina. These school-developed majors may not directly follow a course sequence for a Perkins POS available in their school or district or may be a combination of one or two Perkins POS and include parts of sequences from each.

The Mature POS study found that a characteristic of strong POS was regular meetings of secondary and the postsecondary faculty to discuss curriculum and plan course sequences so that each level knows what the other will teach. These meetings are also informed by local business representatives who advise on curriculum content, sequencing, and skills standards. As mentioned, these meetings are facilitated by strong relationships among stakeholders, sometimes characterized by informal gatherings of individuals in addition to formal meetings.

Credit Transfer Agreements

The main findings regarding this component of the OVAE framework (2010) were presented in the discussion of dual or concurrent credit, above.

In the Six States study, POS were identified as a catalyst for communication between secondary and postsecondary institutions. The POS system provided a framework for stakeholders to identify what was being taught, what needed to be taught, and the importance of articulation and collaboration between institutions. At the same time, institutions were sometimes misaligned in terms of the focus and mission between secondary and postsecondary. Study participants identified a need for more time and resources to develop articulation agreements, to appropriately align curriculum, and to create dual credit systems that would result in a seamless process for students to earn credit for postsecondary courses taken during high school.

One of the districts participating in the Rigorous Tests study demonstrated the application of credit transfer by providing opportunities for students enrolled in certain CTE courses to receive

college credit. Students taking these courses at any time during high school can apply for the community college credit when they are in the eleventh or twelfth grade, with some of these credits transferable to the state university system (often as elective credits). One fundamental advantage of this credit transfer system is that it provides students with the opportunity to earn college credit while saving money on tuition and fees.

The Mature POS study also found that logistical and funding arrangements had to be overcome at each site for dual enrollment to function. For example, the college and the district(s) need to agree on who would teach the college course (and whether they would receive additional pay) and where it would be taught (and who will provide transportation if students need to go to the college campus to take the course). The three Mature POS sites differed with regard to the financial contributions for tuition, teacher compensation, books, and transportation made by the state, district, and college. In one site, the college was footing the tuition bill (at a substantial annual loss) for all dual credit courses as long as the districts could get the students to classes and pay for their books. This college viewed high school student tuition waivers as an investment in the future.

All eight schools in the Personal Pathways study reported having either dual enrollment or dual credit arrangements, or both, with local postsecondary institutions. Although not all POS terminate with a four-year college degree, some could. Therefore, in South Carolina, efforts have been made not only to increase traditional local dual credit offerings for high school students, but also to create statewide articulation agreements between the community/technical colleges (which offer two-year associate degrees) and four-year colleges and universities across the state. Currently, 86 statewide courses with approved curriculum will automatically transfer from state two-year community/technical colleges to four-year institutions of higher learning across the state.

Guidance Counseling and Academic Advisement

The role of guidance counseling and academic advisement varied across the three longitudinal POS studies, with school counselors playing different roles in the POS process. In some sites, guidance counselors were integral to the career development of students, whereas in other sites, counselors played only minimal roles. In general, however, career guidance itself was identified as a necessary component of the POS process, regardless of who actually provided the guidance. At all sites, counselors were actively involved in academic advisement.

In the Personal Pathways study, career guidance and counseling services were identified as critical to the state's education reform policy, with school guidance and counseling programs playing a key role in students' career development and career planning. Under EEDA, students are exposed to career development efforts in elementary school with the exploration of career pathways and career interests. This process of exploration continues throughout the later grades. In the eighth grade, each student, along with parents or guardians, works with a counselor to develop an IGP, which includes courses required for graduation and appropriate electives that align with the student's interests, postsecondary plans, and professional goals. The process of working with counselors continues into high school where, on an annual basis, students meet with school counselors to review and revise their IGPs. Further, school counselors with career

development facilitator certification or other school personnel with such training provide students with career awareness and career exploration activities and WBL experiences. The initiation of South Carolina's education reform policy has reportedly increased the interaction between students and counselors in sample schools with counselors reporting more time being spent on career development activities and engaging in one-on-one career guidance with students.

In one district participating in the Rigorous Tests study, career advising was typically provided within programs, with CTE teachers playing a strong role in advising and mentoring students about postsecondary options, training and certification, professional standards, and college searches. In the other district, career specialists supplemented the role of the counselor and the CTE teacher by providing interest inventories and work-based learning opportunities for students; this position was lost in many high schools due to budget constraints. The guidance counselors' activities in both districts in this study centered on academic advising, scheduling, and the development of four-year graduation plans, with much less emphasis on career guidance.

Perhaps because these programs started before they were called POS, or because they were initiated and maintained by CTE instructors rather than administrators, most of the high school counselors interviewed for the Mature POS study did not know very much about the POS offered in their schools. In one case, the researcher's questions about POS were the first indication to the counselor that the POS articulation agreement even existed at her school. High school counselors are often focused on testing, scheduling, and student applications to four-year colleges rather than on CTE programs or students. Students' survey responses regarding career advising and course planning in the Mature POS study showed that they received little career advisement from counselors, with students reporting that their parents and friends were helpful in aiding in career and course planning. The high school relations staff at one of the colleges told researchers that they went to every feeder school to talk about the POS opportunities in CTE classes because they did not trust the high school counselors to convey the information.

One consistent counseling and guidance activity across the Rigorous Tests and Personal Pathways sites was the development and maintenance of students' four-year plans. Although the level of use of the plans varied across the study sites, as did the names of the plans (e.g., Individual Learning Plan, Individual Graduation Plan), the central purpose of the plans was the same: to provide students with an academic blueprint toward graduation and beyond, based on their career goals and within the context of their career pathway. Such plans often provide students with access to career assessment data, aiding them in matching their career interests and personality traits with career goals and postsecondary options. It appears that when an increased emphasis is placed on these plans, as is required by EEDA in South Carolina, students are likely to receive more academic and career guidance services.

Teaching and Learning Strategies

Coordination—or integration—of coherent and rigorous academic and CTE content is a teaching and learning strategy specifically required by Perkins IV, as previously discussed. We have also discussed the emphasis that several study schools have placed on the use of interim testing results to modify and target instruction to improve student achievement. Navy High School in

the Rigorous Tests study provides an example of widespread use of PBL, which starts with a problem or situation that requires students to acquire new knowledge and skills. Teachers help students to identify what they know and what they need to know and guide their learning and application of new knowledge. PBL uses relatively little direct instruction. The full Rigorous Tests technical report discusses Navy's implementation of PBL, including how the transportation POS at Navy starts with the study of energy and how it is controlled by different systems instead of the traditional approach to beginning automotive programs.

The Six States study also found the use of PBL as an important instructional strategy. Project Lead the Way and HSTW were also cited as examples of good instructional programs. PBL was also used in some of the Personal Pathways schools. The degree of horizontal (academic-CTE) alignment in schools varied, and preliminary observations point to the fact that school structure can play a role in this. In the schools organized around SLCs, horizontal alignment seems to occur more naturally. In schools in which students take CTE courses at an off-site career center, alignment of academics and CTE is much more challenging. Although not a teaching and learning strategy per se, several of the teachers interviewed for the Personal Pathways study noted that the legislated requirement of IGPs and career counseling for all students has resulted in "better" students (as measured by academic performance) taking CTE courses. Teachers have also reported that they have more interested and focused students "who want to be there" because the courses fit their career goals. Career inventory tests, as well as counseling, were cited by some schools as helping students recognize their interests and aptitudes. A corollary of these observations is that the stigma of taking CTE courses appears to be diminishing in some of these schools.

A challenge found in the Mature POS study is that academic faculty are not included in POS curriculum meetings; thus, vertical alignment between secondary and postsecondary occurs more frequently than does horizontal (academic/CTE) alignment. Administrators and counselors showed the researchers documents showing which academic courses POS students were recommended to take, but the researchers saw no evidence in the classrooms they visited that the content was truly integrated.

Technical Skills Assessments

In the Rigorous Tests study, West District's state plans to use third-party technical assessments to provide more uniform measures across programs. It planned to pilot test selected measures in several programs during the 2010-2011 school year, but the lack of funding has delayed the effort. East District's state has developed and is using its own technical assessments. Included in these are measures of embedded academics that teachers are expected to teach. As noted under the discussion of Accountability and Evaluation, above, both of these districts stress the use of test results to guide instruction. The Mature POS and Six States studies encountered many references to industry-based skill assessments, such as those from National Institute for Machining Standards (NIMS), National Automotive Technicians Foundation (NATEF), ProStart (for culinary), and various NOCTI assessments. In interviews at two schools in the Personal Pathways study, CTE teachers reported using technical skills assessments to identify areas in which students might be weak or in need of remediation. Based on assessment results, teachers modify or add units to address student needs.

Closing Thoughts

We label this section "Closing Thoughts" because we do not yet have sufficient evidence to draw firm conclusions regarding POS and their effects at this time. We have more information on how POS are being implemented than on the effects they are producing, but even with regard to implementation, most of the programs we are studying, with the exception of the programs in the Mature POS study, are still in the developmental phase. In general, we can say that in all sites, at least some of the mandated components of POS are in place or are in process, but it is still too early to determine if these components will produce students who are: more likely to graduate high school, prepared to continue their education or training and earn industry-recognized credentials or postsecondary degrees in their fields of interest. The implicit theory underlying POS is that a clear career focus increases engagement and improves academic performance so that students experience a smoother transition between educational levels and to employment.

Our longitudinal studies have been designed to complement each other and to test portions of that underlying theory by focusing data collection and analysis on student and school outcomes at varying stages of the POS process. At the time this report was being written, the Mature POS study was the only one that had collected information on transition from secondary to postsecondary, and the information was limited due to low student survey response rates. Newly collected enrollment data for that study suggest that even in well-established sites, only a small percentage of graduates enroll in the same POS at the postsecondary levels that they studied in high school. Additional coding and analysis will enable researchers to determine whether students stayed in the same career cluster.

When viewed from the perspective of career development theory, the low rate of continuation is not surprising. When high school students study POS, they are exploring careers at least as much as they are preparing to enter them. To understand what occupations involve, it is necessary to engage in the tasks that they require. No amount of occupational literature, job shadowing, guest speakers, or counseling can substitute for actually performing the tasks of specific occupations and being exposed to real-world tools and problems. Among young people in the exploratory stage of their careers, the study of an occupational area often causes them to change their plans as their interests crystallize. Such changes do not imply a failure on the part of either the programs or the students (Kosine & Lewis, 2009). Participating in POS theoretically increases students' understanding of the occupations they study and how well their skills and interests align with what these occupations require. Thus, changes in direction are expected. Substantial majorities of the college students surveyed by the Mature POS study gave favorable ratings to their high school CTE courses, even though few continued in the same career pathways at the college level.

The Personal Pathways study found that guidance counselors were named most frequently by students in sample schools as being the most helpful in the development of their IGPs. In response to similar survey questions in the Rigorous Tests and Mature POS studies, students indicated that they found their parents most helpful in course planning. The higher percentages of students naming counselors in Personal Pathways study sample schools suggest that state

policy specifically targeting the role of counselors can enhance their influence on career choices and possibly provide a more systematic process for career planning.

All of the sites being studied are actively addressing the alignment of secondary and postsecondary instruction. Efforts to increase the academic rigor of CTE courses were evident, but initiatives to coordinate academic and CTE content were less frequently observed. Both alignment and coordination are longstanding issues rooted in cultural, structural, and historical differences between secondary and postsecondary and the academic disciplines and CTE. The findings of the four studies indicate that POS requirements in Perkins IV have resulted in increased attention being directed toward secondary-postsecondary alignment, but the evidence on academic-CTE coordination is more mixed. Participants in the Six States study reported many initiatives to foster academic-CTE integration, and in South Carolina, EEDA mandates such coordination. Almost all the integration observed in the Rigorous Tests and Mature POS studies, however, occurred in CTE classes.

Opportunities to earn postsecondary credit through dual or concurrent enrollment are available in all of the POS being studied, but data collected to date indicate that relatively few students are taking advantage of such credits. Many dual enrollment courses do not yield transcripted credits, and even if they do, these credits may only be recognized by the college that awarded them and are not transferable to other institutions in the state. When credits are not directly awarded upon successful course completion, students typically must meet the criteria of articulation agreements at the postsecondary level before receiving them. Surveys of students have found that at some sites, only about half know that certain of their courses can yield postsecondary credit, underscoring the need for improved guidance and advisement. Graduation requirements, budget restraints, and POS course sequences can make it difficult to schedule dual credit courses. This was especially the case in South Carolina. At high schools in the Rigorous Tests study, students can earn college credit online, but evidence of student success in these classes is limited, according to those interviewed. Our research suggests that there is still widespread lack of information about POS and POS students. Even when articulation agreements exist, not all stakeholders are aware of them, as was seen at the Mature site where the counselor was not aware of the POS in her school. A group of college administrators and instructors at another site (that was ultimately not selected to participate in the Mature POS study) told researchers that they had no idea which students from the feeder high schools had taken the articulated courses. Greater dissemination of information, more training, and better quality data systems could combat these issues.

The sites for the Rigorous Tests and Mature POS studies were specifically selected because they were implementing POS, but the Personal Pathways and Six States studies provide a more diverse sample of state and local efforts. Our overall judgment to date is that all sites are actively implementing some form of POS that incorporates most of the components required by Perkins IV. Although many challenges remain, many programs are moving in the direction of OVAE's Design Framework (2010), and those developing POS and providing technical assistance are aware of most of the issues that need to be addressed.

Across all four studies, it was frequently noted that initiatives similar to POS have been going on for many years. The authorization of Perkins IV, and in South Carolina both EEDA and Perkins

IV, brought these efforts to the forefront of educators' agendas and therefore made them more tangible and concrete. Instead of just written articulation agreements, real connections are emerging between high school and college faculty and between course content at all levels, and relationships have developed that are encouraging a spirit of collaboration. Businesses are more actively connected to program development and instruction, and efforts to define meaningful assessments of student knowledge and skill are serious, rigorous, and on-going.

Areas that appear to require additional effort on the part of the states, districts, and schools are the coordination of rigorous academic and CTE content, increasing awareness and participation in dual enrollment courses, and better coordination of secondary and postsecondary data systems. It is too early to say whether these efforts will result in improved engagement and academic performance, increased high school graduation rates, increased numbers of students continuing in the same POS from the secondary to the postsecondary level, or more students earning industry-recognized credentials or degrees. The longitudinal studies being conducted by the NRCCTE will track these outcomes and report on whether POS do accomplish the objectives they are attempting to achieve.

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APPENDIX

Career and Technical Programs of Study: A Design Framework[18]

The Carl D. Perkins Career and Technical Education Act of 2006 (Perkins IV) calls for states to offer "career and technical programs of study," which may be adopted by local educational agencies and postsecondary institutions, as an option to students (and their parents as appropriate) when planning for and completing future coursework. These programs, at a minimum, must:

- Incorporate and align secondary and postsecondary education elements,
- Include academic and CTE content in a coordinated, non-duplicative progression of courses,
- Offer the opportunity, where appropriate, for secondary students to acquire postsecondary credits, and
- Lead to an industry-recognized credential or certificate at the postsecondary level, or an associate or baccalaureate degree.

Each local recipient of Perkins funds must offer at least one career and technical program of study.

To help states and local recipients meet these requirements, the Office of Vocational and Adult Education (OVAE), in collaboration with major national associations, organizations, and states, have formulated a "career and technical programs of study design framework (framework)." The framework identifies a system of 10 components that, taken together, support the development and implementation of effective programs of study. Although all 10 components are important, they are neither independent nor of equal priority: State and local program developers must identify the most pressing components for state or local adoption, taking into consideration their relative need within their educational context.

PROGRAM OF STUDY (POS) COMPONENTS AND SUBCOMPONENTS

1. LEGISLATION AND POLICIES

Federal, state, and local legislation or administrative policies promote POS development and implementation.

Effective legislation and policies should:

- Provide for state and/or local funding and other resources, such as professional development and dedicated staff time, for POS development.
- Establish formal procedures for the design, implementation, and continuous improvement of POS.
- Ensure opportunities for any secondary student to participate in a POS.
- Require secondary students to develop an individual graduation or career plan.

[18] See Office of Vocational and Adult Education (2010).

- Provide resources for long term sustainability of POS.

2. PARTNERSHIPS

Ongoing relationships among education, business, and other community stakeholders are central to POS design, implementation, and maintenance.

Collaborative partnerships should:

- Create written memoranda of understanding that elaborate the roles and responsibilities of partnership members.
- Conduct ongoing analyses of economic and workforce trends to identify statewide (or regional) POS to be created, expanded, or discontinued.
- Link into existing initiatives that promote workforce and economic development, such as sector strategies and other activities supported by the Workforce Investment Act.
- Identify, validate, and keep current the technical and workforce readiness skills that should be taught within a POS.

3. PROFESSIONAL DEVELOPMENT

Sustained, intensive, and focused opportunities for administrators, teachers, and faculty foster POS design, implementation, and maintenance.

Effective professional development should:

- Support the alignment of curriculum from grade to grade (9-12) and from secondary to postsecondary education (vertical curriculum alignment).
- Support the development of integrated academic and career and technical curriculum and instruction (horizontal curriculum alignment).
- Ensure that teachers and faculty have the content knowledge to align and integrate curriculum and instruction.
- Foster innovative teaching and learning strategies (see #9 below).

4. ACCOUNTABILITY AND EVALUATION SYSTEMS

Systems and strategies to gather quantitative and qualitative data on both POS components and student outcomes are crucial for ongoing efforts to development and implement POS.

Well-designed accountability and evaluation systems should:

- Include the "10 Essential Elements of A State Longitudinal Data System" identified by the Data Quality Campaign.[19]
- Provide for administrative record matching of student education and employment data (i.e., Unemployment Insurance (UI) wage records).

[19] The 10 elements are: (1) statewide student identifier; (2) student-level enrollment data; (3) student-level test data; (4) information on untested students; (5) statewide teacher identifier with a teacher-student match; (6) student-level course completion (transcript) data; (7) student-level SAT, ACT, and Advanced Placement exam data; (8) student-level graduation and dropout data; (9) ability to match student-level P-12 and higher education data; and (10) a state data audit system.

- Yield valid and reliable data on key student outcomes (indicators) referenced in Perkins and other relevant federal and state legislation.
- Provide timely data to evaluate and improve the effectiveness of POS.

5. COLLEGE AND CAREER READINESS STANDARDS

Content standards that define what students are expected to know and be able to do to enter and advance in college and/or their careers comprise the foundation of a POS.

Rigorous college and career readiness standards should:

- Be developed and continually validated in collaboration with secondary, postsecondary, and industry partners.
- Incorporate essential knowledge and skills (i.e., academic skills, communication, and problem-solving), which students must master regardless of their chosen career area or POS.
- Provide the same rigorous knowledge and skills in English and mathematics that employers and colleges expect of high school graduates.
- Incorporate industry-recognized technical standards that are valued in the workplace.
- To the extent practicable, be internationally benchmarked so that all students are prepared to succeed in a global economy.

6. COURSE SEQUENCES

Non-duplicative sequences of secondary and postsecondary courses within a POS ensure that students transition to postsecondary education without duplicating classes or requiring remedial coursework.

Well-developed course sequences should:

- Map out the recommended academic and career and technical courses in each POS.
- Begin with introductory courses at the secondary level that teach broad foundational knowledge and skills that are common across all POS.
- Progress to more occupationally-specific courses at the postsecondary level that provide knowledge and skills required for entry into and advancement in a chosen POS.
- Offer opportunities for students to earn postsecondary credit for coursework taken during high school.

7. CREDIT TRANSFER AGREEMENTS

Credit transfer agreements provide opportunities for secondary students to be awarded transcripted postsecondary credit, supported with formal agreements among secondary and postsecondary education systems.

Well-development agreements:

- Provide a systematic, seamless process for students to earn college credit for postsecondary courses taken in high school, transfer high school credit to any two- and

four-year institution in the state that offers the POS, and transfer credit earned at a two-year college to any other two- or four-year institution in the state that offers the POS.
- College credit should be automatically transcripted at the college for high school students so that they can transfer seamlessly into the postsecondary portion of a POS without the need for additional paperwork or petitioning for credit.
- Describe the expectations and requirements for, at a minimum, teacher and faculty qualifications, course prerequisites, postsecondary entry requirements, location of courses, tuition reimbursement, and credit transfer process.

8. GUIDANCE COUNSELING AND ACADEMIC ADVISEMENT

Guidance counseling and academic advisement help students to make informed decisions about which POS to pursue.

Comprehensive guidance counseling and academic advisement systems:

- Are based on state and/or local guidance and counseling standards, such as the National Career Development Guidelines.[20]
- Ensure that guidance, counseling, and advisement professionals have access to up-to-date information about POS offerings to aid students in their decision making.
- Offer information and tools to help students learn about postsecondary education and career options, including prerequisites for particular POS.
- Offer resources for students to identify their career interests and aptitudes and to select appropriate POS.
- Provide information and resources for parents to help their children prepare for college and careers, including workshops on college and financial aid applications.
- Offer Web-based resources and tools for obtaining student financial assistance.

9. TEACHING AND LEARNING STRATEGIES

Innovative and creative instructional approaches enable teachers to integrate academic and technical instruction and students to apply academic and technical learning in their POS coursework.

Effective teaching and learning strategies should:
- Be jointly led by interdisciplinary teaching teams of academic and career and technical teachers or faculty.
- Employ contextualized work-based, project-based, and problem-based learning approaches.
- Incorporate team-building, critical thinking, problem-solving, communication skills, such as through the use of career and technical student organization (CTSO) activities.

[20] See http://cte.ed.gov/acrn/ncdg/ncdg_what.htm.

10. TECHNICAL SKILLS ASSESSMENTS

National, state, and/or local assessments provide ongoing information on the extent to which students are attaining the necessary knowledge and skills for entry into and advancement in postsecondary education and careers in their chosen POS.

Well-developed technical skills assessments:

- Measure student attainment of technical skill proficiencies at multiple points during a POS.
- Employ industry-approved technical skill assessments based on industry standards, where available and appropriate.
- Employ State-developed and/or approved assessments, particularly where industry-approved assessments do not exist.
- Result in the awarding of secondary credit, postsecondary credit, or a special designation on a student's high school diploma.
- Incorporate performance-based assessment items, to the greatest extent possible, where students must demonstrate the application of their knowledge and skills.

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