

Programs of Study: A Cross-Study Examination of Programs in Three States

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Table of Contents

Executive Summary	i
Programs of Study: A Cross-Study Examination of Programs in Three States	1
Organization of the Report	2
Method	3
The Site Visits	5
Discussion of the 10 Elements of Programs of Study	15
Themes Across Sites	56
Recommendations	60
References	62
Appendix A: NVivo9 Analysis of Nodes/Thematic Words	63
Appendix B: Interview/Focus Group Protocols Used at Each Site	65

Executive Summary

In 2006, Congress enacted the reauthorization of the Carl D. Perkins Act (also known as Perkins IV), which changed the name and broadened the scope and purpose of career and technical education (CTE). The initial charge of vocational education, established under the Smith-Hughes Act of 1917, was to separate vocational education from academic learning and focus it primarily on preparation for jobs and employment. Perkins IV expanded that purpose to prepare individuals for both college and career, connecting academic learning with job skills and knowledge and connecting secondary and postsecondary education. The goal of Perkins IV was to develop a seamless system allowing all students the opportunity to prepare for work, college, and life.

One of the main components of Perkins IV was the creation of programs of study (POS), required for all states accepting Perkins IV funding. A major goal of POS was the development of a systematic connection of secondary and postsecondary programs through four components that, according to the law, should:

- Incorporate secondary education and postsecondary education elements;
- Include coherent and rigorous content aligned with challenging academic standards and relevant career and technical content in a coordinated, non-duplicative progression of courses that align secondary to postsecondary education;
- Lead to an industry-recognized credential or certificate at the postsecondary level or an associate or baccalaureate degree; and
- May include opportunity for secondary education students to gain postsecondary education credits through dual or concurrent enrollment programs or other means.

POS should provide non-duplicative courses that are aligned with academic standards, lead to industry-recognized certificates or college degrees, and offer opportunities for dual credit, allowing secondary students to work at the college level while still in high school. These major components represent a continuation of decades-old initiatives intended to reverse the separation of vocational and college or academic preparation started under the Smith-Hughes Act. POS seek to link academic and vocational learning and secondary and postsecondary institutions. An additional goal of POS may be said to be the preparation of individuals to assume roles as contributing citizens in a dynamic, 21st-century workforce and democracy.

The National Research Center for Career and Technical Education (NRCCTE) has been conducting field-based studies of POS for several years. Three research efforts are longitudinal studies focused on the development and implementation of POS at the high school and college level. These studies examine the effects of POS on student secondary and postsecondary outcomes over time and the types of policies or processes in place that contribute to successful POS outcomes. A now-concluded fourth study, a qualitative case study of six states, attempted to explain how POS were developing at the state level and determine common elements and themes involved in the production of technical assistance systems produced to implement such programs as viable CTE initiatives.

This report describes a separate project, *A Cross-Study Examination of Programs of Study*, which was designed to examine selected programs and sites from each of the three field-based studies

that had the most mature, well-established POS relative to other study sites as a means of identifying common elements or attributes that led to the successful implementation of POS. It was deemed critically important to the development of high-quality programs that we develop an understanding of the cross-study factors contributing to successful POS. It was suggested that such a study include the 10 elements of POS deemed by the U.S. Department of Education, Office of Vocational and Adult Education (OVAE) to be important to high-quality program development (OVAE, 2010). In pursuit of this goal, a team of researchers conducted visits to three of the sites identified by the three longitudinal studies' researchers as strong implementers of POS. The goal of the current study was to review each site's strengths, identify the contributing factors to their development of POS, and examine their implementation of the 10 elements of POS defined by OVAE. Using the six state study as a starting point, the research team developed five interview protocols and used those instruments to interview and observe key stakeholders in the identified POS sites.

More than 40 interviews were conducted with teachers, administrators, counselors, and business and industry representatives at these three sites, which were visited from December 2010 through February 2011. Interviews were transcribed and analyzed using conventional analytic approaches (Maxwell & Loomis, 2002; Miles & Huberman, 1985), as well as through the use of qualitative software (NVivo9). The results of these analyses produced several themes and recommendations.

Six Themes

Six themes arose from our analysis of the data collected at the three sites. The first theme was ***engagement***. At every site and in many interviews, people talked about the power of POS to engage students in learning, primarily through connecting academic learning to meaningful learning through work and other applications. NVivo9 analysis confirmed that *engagement* was the most frequently mentioned concept in the data.

The second theme that emerged from the data was a ***strong focus on student learning***. POS in these sites were established to ensure that learning, both academic and skills-based, was the primary activity of students. Systems were put in place to aid in this process. At every level and in every situation, discussion focused on how each program and course could promote learning.

The third theme was the ***certification of knowledge and skills***. At these sites, the career and technical components of the legislation were clearly intended to result in some kind of certification from business and industry. However, interviewees believed that academic knowledge also had to meet levels of certification or generate outcomes that could be measured against a set of standards. This was part of sites' efforts to ensure articulation and rigorous academic learning in which all forms of learning could be verified through the demonstration of knowledge and skills.

The fourth theme was ***connecting secondary and postsecondary systems***, with the goal of making CTE a seamless system, starting early in students' educational careers and focusing on both academic and skills-based learning. Career education was much broader and more generic than job training, spanning a longer period of students' lives and requiring planning and coordination for students to develop career goals.

The fifth theme indicated that ***POS raised the understanding of and respect for CTE among stakeholders***. Although CTE has traditionally been perceived as a “dumping ground” for less able students, POS appeared to reverse that perception. Interviewees reported that students of all abilities were increasingly attracted to CTE, especially when several dual credit systems provided parity with highly regarded academic programs. At one site, POS dual credit courses counted the same as grades earned in Advanced Placement (AP) courses, providing an extra point on the grade point average (GPA) scale and increasing students’ ability to earn higher GPAs. POS efforts in these three sites appeared to raise the status of CTE to a level more equal with other academic programs.

The sixth theme derived from the data indicated that ***high-quality teachers made a difference in the delivery of programs***. Such teachers were described as understanding how to integrate academic and CTE instruction, being able to establish comfortable and trusting relationships, being knowledgeable about their subject area, and being able to deliver instruction through project-based, integrated instructional programs.

Five Recommendations

Based upon the themes derived from our interviews and observations, we offer several recommendations for future POS implementation. First, ***continue developing POS models***, because when implemented well, they demonstrate a strong potential to deliver on all major areas of outcomes and impacts, including improved attendance, improved grades, improved achievement scores, improved retention rates, and improved engagement of students to learn academic and technical skills and plan their future occupations.

The second recommendation is for the CTE field to consider ***expanded opportunities for funding through alliances with other educational reform initiatives***. Some of those mentioned in the study, including civic education, service learning, and place-based education, all require academics to be integrated into community-based projects, involve coordination between schools and community learning settings, and require students to be active participants in the planning of their futures.

A third recommendation is to ***develop a more flexible system of measuring the outcomes of POS efforts***. Requiring students to move directly from secondary to postsecondary education without any opportunity to obtain a job right out of high school creates a system that is too rigid and does not allow for some of the other positive outcomes that materialize for students in CTE programs. Participants at all sites discussed the difficulty of tracking students from secondary to postsecondary education and identifying those who were CTE concentrators and who had enough exposure to CTE to benefit from its programs and activities.

A fourth recommendation emphasizes the importance of continuing to ***concentrate on involving students in meaningful learning experiences***. Developing more PBL initiatives that allow students to connect hands-on learning with academic applications and allow schools to employ block scheduling and community learning should aid in reaching more students and assisting schools and community colleges in connecting with all students.

A final recommendation is to focus energies on ***generating relationships***. All sites identified the importance of relationship building as a means of fostering collaboration between educational

systems and business and industry partners. Further, relationships between students and teachers, teachers and administrators, teachers and community college faculty and staff, and business and industry personnel and teachers or faculty all made programs operate more effectively and created environments that produced the integration and alignments that made curricular adjustments work.

Conclusions

This study of three sites selected from the NRCCTE's field-based longitudinal research projects has produced important knowledge about how POS work and what needs to be done to continue positive trends in program outcomes and operations. The study has captured many of the strengths of the programs that contribute to engagement, learning, collaboration, and cooperation. As we contemplate the future renewal of the Carl D. Perkins legislation, the findings from this study may help inform future efforts in the expansion of POS and the creation of an integrated, seamless system of learning that will engage students in training for work, college, and life.

Programs of Study: A Cross-Study Examination of Programs in Three States

Programs of Study (POS) represent an effort by Congress and the U.S. Department of Education to clarify and support career and technical education (CTE) students' transition from secondary to postsecondary education and to the workforce. POS are designed to help students become college and career ready.

This research study began as an attempt to combine observations from three longitudinal, field-based studies of POS being funded by the National Research Center for Career and Technical Education (NRCCTE) and has evolved into a stand-alone analysis of POS as implemented in three very different state and local contexts. As described below, the three sites visited illustrate the potential strengths of thoughtfully implemented POS.

Background

The Vocational Education Act of 1917 (also known as the Smith-Hughes Act) created a separate funding program for the occupational training of high school students. Although the act was designed to promote vocational education in public schools, several of its elements separated vocational education from academic education. Funds could be used for the salaries of vocational teachers but not for academic teachers; students who received instruction from teachers paid with vocational education funds could receive no more than 50% academic instruction; and students were to be taught job-specific skills but not theoretical or academic skills. Although emphasizing vocational education, these provisions actually worked to separate vocational education from academic education (Oakes & Saunders, 2007).

Since then, efforts have developed to reverse that separation and to place vocational education more in the mainstream of public programs. From the Vocational Education Act of 1963, to the career education movement of the 1970s with Experience-Based Career Education, to the development of programs that connected vocational and academic learning, such as the High Schools That Work (HSTW) initiative of the Southern Regional Education Board (which began in 1987), federal legislation has promoted different kinds of vocational education. Through an entire series of federal bills (passed in 1983, 1990, 1998, and 2006), named for Kentucky Representative Carl D. Perkins, vocational education has been transformed from its early separate funding and program agenda and reconnected with academic learning and postsecondary education, evolving into a more robust system of learning.¹

The 2006 Perkins legislation officially changed the name of vocational education to career and technical education (CTE) and instituted a series of reforms that mandated a new type of model, POS. POS embodied many of the earlier initiatives with some distinctive components. Under Perkins IV, POS are required to include three major elements and strongly suggest the inclusion of a fourth. That is, a POS:

- Incorporates secondary education and postsecondary education elements;

¹ For more information on the history of the CTE and POS movements, see Lewis and Kosine (2008).

- Includes coherent and rigorous content aligned with challenging academic standards and relevant career and technical content in a coordinated, non-duplicative progression of courses that align secondary to postsecondary education;
- Leads to an industry-recognized credential or certificate at the postsecondary level or an associate or baccalaureate degree; and
- May include the opportunity for secondary education students to gain postsecondary education credits through dual or concurrent enrollment programs or other means.

So configured, CTE thus promotes a renewed vision of secondary and postsecondary institutions working together to develop articulated curricula and seamless connections between academic and technical learning. Added to this collaboration is more engagement with business and industry and the validation of learning through external certification and attachment to the world of work. POS appear to be the model for future program designs, and thus require us to learn more about them in order to ensure their successful growth. As such, the purpose of this three-site study was to learn about important and common elements of POS efforts that were deemed by researchers to have qualities that exemplified good practice.

The Current Study

In order to track the progress of POS, the National Research Center for Career and Technical Education (NRCCTE) commissioned four field-based studies that focused on efforts being made to implement POS in several parts of the country. Three are on-going longitudinal studies. One study is examining mature, well-established POS; a second is using rigorous research methods to examine the outcomes of POS; and the third is focusing specifically on a model of career pathways-focused school reform being undertaken in South Carolina (i.e., the Education and Economic Development Act, or EEDA, passed in 2005). The fourth study, now concluded, focused on the development and implementation of POS in six states, investigating issues of technical assistance and general program trends.²

To ensure strong triangulation of process measures across the three studies and explore the possible lessons that could be derived from them, the NRCCTE initiated the current cross-study research project. NRCCTE leadership convened the primary researchers of the four POS studies to design and conduct a cross-study research project that would examine key measures of implementation, processes, and success of POS at selected sites around the country. Using one site each from each of the three ongoing longitudinal studies, the researchers designed a cross-study project at three sites that were identified as executing POS components particularly well. The cross-study POS project was thus launched with the goal of comparing common elements across sites, examining what made these sites function so well, and uncovering key components that could be shared with others actively involved in developing better and more effective POS efforts.

Organization of the Report

What follows is a full report on this study's methods, processes, research findings, and implications for further investigation. First, we describe how the study came to be. We then describe the processes and protocols that framed the investigation. In this section, we refer to the

² For an overview of these studies and their current findings, see the POS Joint Technical Working Group (2011).

research designs that helped organize the study and how its processes unfolded. We then describe basic findings from each of the three sites visited and frame those findings within the context of the 10 elements defined by OVAE and the NRCCTE as important to the delivery of high-quality POS. Included in this discussion are NVivo9 analyses of each of the 10 elements, combined with explanations or exemplars that elaborate on our basic findings. Last, we comment on the implications of this study for the field more generally and for the future of POS as a CTE initiative. We have used multiple information sources to consider the impact and progress of POS as a viable educational reform and improvement effort. The results merit reading because of the potential of POS to function as an educational change initiative that is worthy of continued development and implementation.

Method

The cross-study project's research design was developed through a group process in which the study's primary team members (Shumer, Stringfield, and Stipanovic) developed procedures and protocols based on those already in use in the three longitudinal studies with modifications derived from *Six States* study instruments and processes (see Shumer & Digby, 2011). Representatives from each of three on-going study teams provided input on study protocols and logistics and agreed on a final version of the cross-study project's instrumentation after consulting with the NRCCTE. Final interview protocols (see Appendix B) were developed for use with state and district personnel, teachers and faculty (secondary and postsecondary), local school site and community college site administrators, guidance and counseling personnel (secondary and community college), and business and industry representatives participating in these sites' POS.

Sample

Three sites were chosen for this study using the following criteria:

1. A *site* was defined as one or more high schools and the local community college from which high school students took dual credit courses and/or matriculated post-high school graduation. One site included both a high school and a career center at which many of the high school's students took additional technical courses.
2. Sites were selected to include collaborative efforts between each high school and their local community college.
3. Each site was deemed by the researchers leading each of the three on-going longitudinal studies to be a good implementer of POS components relative to the other sites in the particular study.
4. The sites were in different states and regions of the country.
5. In each case, the leadership of the high school and the community college agreed to accommodate an additional round of interviews and observations from the cross-study research teams.

Negotiations with sites regarding visitation schedules were successfully completed during the fall and winter of 2010.

Site 1 was a large urban school district in the western United States that was connected to the large community college in the area. The school visited was one of the district's career and technical high schools (CTHS), which serve as specialty magnet schools focused on CTE. The visit to Site 1 included interviews with personnel from the community college, secondary school business and industry coordinators, guidance counselors, secondary school teachers, a school principal, business and industry partners, district CTE supervisors, and state-level CTE coordinators.

Site 2 was located in a small-city/rural community in the middle of the United States. The community has a strong business and industrial base. Fourteen school districts serve the city and surrounding area and feed into the local community college. At Site 2, researchers interviewed staff from the community college programs connected to POS, college faculty, several high school staff, the county superintendent, two state-level CTE coordinators, and a representative of the local economic development agency. Plans to visit one of the local high schools were cancelled because schools closed due to severe weather during the site visit.

Site 3, in South Carolina, was a medium-sized city situated in a metropolitan area of 250,000 people. The area included a strong business and industrial base with excellent interaction between the educational and business communities. The site visit included a high school, a career and technology center, and the area community college that served several school districts. Administrators, counselors, teachers, and faculty were interviewed at all three institutions. Interviews were also conducted with the state superintendent for CTE and several business and industry representatives, including a member of the state business and industry advisory board.

Procedure

At each site, the research team consisted of the three core members of the cross-study research team, a minimum of one member from each of the NRCCTE's three on-going POS study teams, and an administrative representative of the NRCCTE, with a range of seven to nine members serving on each team per visit. Researchers from the three on-going POS studies were included in the cross-study site visits for several reasons. First, these individuals were highly familiar with their own sites and the individuals associated with them; they thus served to introduce members of the cross-study research team to those associated with each of the sites. Second, they clarified the functions of each site and the roles and relationships of the interviewees. Third, they were able to expand on observations made during their own previous site visits. Fourth, they served to verify the extent to which qualitative terms, such as the definitions of POS, were being used across each of the studies. This approach established dependability or a stepwise replication procedure (Lincoln & Guba, 1985) in order to determine whether findings could be generalized across sites and studies (Maxwell & Loomis, 2002).

All site visits were conducted between December 2010 and February 2011. Each visit was convened for a period of two to three days, with the first day and a half spent visiting local high schools, career and technical centers, and/or community colleges and engaging in interviews with personnel located at these sites. Phone interviews were conducted with individuals not located at the sites, including state-level CTE administrators.

Interview responsibilities were divided among members of the research team during each site visit. Further, the same team members were assigned to interview the same populations at each

site. For example, those who interviewed counselors at Site 1 also interviewed counselors at Sites 2 and 3. This was done to increase the internal consistency of the study and to allow for consistency in the comparison of data between sites. Interviews were audio recorded and transcribed for subsequent analyses. In addition, each member maintained field notes for the interviews in which they engaged or observed. At the end of each two-day visit, the cross-study research team, joined by at least one person involved in the ongoing longitudinal study at that site, debriefed. Debriefings were audio recorded and transcribed.

After the third and final site visit, the research team spent an additional day and a half reviewing the data compiled during the last visit and then analyzing the information obtained from all three sites. Members spent time discussing their field notes and general findings and concluded by evaluating the 10 elements identified by OVAE as essential components of POS. All participants took notes during the final debriefing, and the debriefing itself was audio recorded and transcribed.

Each interview and debriefing session was analyzed. A total of 42 transcripts were included in this analysis. Transcript analyses were conducted manually by the three lead researchers for the project, with further analyses performed using NVivo9 software. NVivo9 analysis was conducted by searching for the most commonly used terms and concepts, as well as by subjecting the 42 transcripts to searches using the 10 elements identified as important components of effective POS programs (U.S. Department of Education, Office of Vocational and Adult Education, 2010). NVivo9 analyses produced numerical and percentage representations of the incidence of terms and concepts, as well as ranked occurrences of topics or words in the transcript data. Such analyses produced themes not discovered through the manual review of data, as well as perspectives that supported the less formally structured reviews conducted earlier. In the section describing the 10 elements, below, NVivo9 results are included separately. Appendix A shows the frequency of important terms and concepts derived from NVivo9 analyses.

Final written comments were shared among the cross-study research team, who then independently evaluated all data at their disposal and collectively drafted the final report. The draft report was submitted to the team members who had attended one or more of the three site visits for feedback and comment, and then forwarded to the NRCCTE for revision and feedback.

The Site Visits

In the following pages, observations from the three sites involved in the cross study project are presented. The information is arranged in the chronological order in which the on-site data gathering efforts were conducted.

Site 1

Site 1 is located in a metropolitan area in the western United States. A site visit was made to one of the *Rigorous Tests* study school sites, a CTHS that functions as a CTE magnet school for the district. Several other high schools also operate as wall-to-wall career academies in this large district. Entrance into any of the district's magnet CTHS involves making a formal application. To be eligible for admission, students are required to meet specific entrance criteria, including a GPA of 2.0 or higher in eighth grade, no serious or repeated minor discipline events on their

educational records, and a declared interest in one of the career tracks offered by the CTHS. Because most of the career groupings are significantly over-subscribed, final admission decisions to the district's CTHS are conducted by lottery.

Site 1's school, like the district's other CTHS, was organized around academies that focused on a particular career cluster or theme. The school's academies were organized around popular career clusters or themes. Open for several years, the school had a varied group of community partners. Each of the career-focused programs in the school had its own advisory board with excellent connections to the business and industry community. Despite these strong ties to business and industry, however, it was explained that it was sometimes difficult for students to engage in internships in work-based settings due to legal restrictions in certain occupations. Interviewees gave specific examples in which students had to be either 18 or 21 in order to be on the premises and perform various work functions.

The school's ties with business and industry helped it maintain many industry-recognized certifications in a variety of fields, including media, engineering, and auto technology. In addition, the community college was developing a program for nursing assistants and was working on a similar certification for respiratory health in the following year. Such certifications were not recorded on high school students' transcripts.

Students were assisted in developing their long-term educational and career plans at this school. Students were required to take courses that defined a major or program emphasis, helping them to align their efforts with graduation goals and possible postsecondary college or career activities. These courses appeared to be well developed within the high school program and had some connection with community college programs, although these connections were not yet as fully articulated as the school wished.

One of the unusual features of the school was its organization of physical space; academic and CTE teachers worked together and taught in the same area of each school. This, according to the teachers, provided daily opportunities for interaction. One teacher said that professional development occurred on an informal basis with teachers sharing information about curriculum and project-based learning (PBL) approaches "all the time." Teachers had common planning periods each month, and academic and CTE programs had many connections. For example, the social studies teacher taught about the Civil War and coordinated with the school's culinary arts program to help students prepare foods that were eaten during that conflict and era. The computer arts teacher supported all academic disciplines in her program area. She taught word processing in support of English and taught Excel, graphing, and charts in support of math and science. Both of these teachers gave numerous examples of integration of academics and CTE.

There was a strong emphasis on PBL at the school. One teacher provided workshops and training opportunities for all teachers on PBL. Almost all of the teachers referenced Project Lead The Way (PLTW)³ as an exemplary model of what good programming looks like and noted that PLTW emphasizes the use of PBL in its courses.

³ See <http://www.pltw.org/>.

The school, like other Site 1 CTHS, used 4x4 block scheduling to allow for more unbroken time to work on various projects and spend more time covering subjects. Block scheduling was cited at both the school and district levels as being a necessary element for effective POS delivery. Plans to expand POS to more comprehensive high schools were curtailed when the district failed to provide funds to develop block scheduling at these additional schools.

Interviews with Site 1's community college staff generated mixed findings regarding collaboration and cooperation. As a result of regular meetings between community college and district and school administrators over multiple years, the district and the community college had worked out many examples of articulated courses and career clusters in several occupations. The community college coordinator helped to develop and monitor these programs, suggesting that many of the initiatives were developed through personal relationships between teachers, business representatives, and community college staff. There were many occupational areas that had a certification as the end point for the high school or articulated high school-community college program, although the postsecondary coordinator indicated that getting a certificate wasn't always a direct ticket to a job. Frequently, personal relations between teachers and specific industries helped facilitate the process. Many of the CTE teachers we interviewed in the two high schools came from local industries, so they were able to respond directly to requests from potential employees seeking competent, focused employees. In some fields, there were no clear-cut certification systems that measured student achievement and accomplishment. The community college dean gave an example of the professional photography program, which required a portfolio of work, indicating that there were no standardized measures of knowledge and skill in the field. Other occupational areas faced similar dilemmas. In such cases, the requirement that POS lead to industry-recognized certificates may not be attainable.

Site 1 offered numerous opportunities for students to earn dual credit (both high school and college credit) while taking high school and community college courses. Both educational systems worked together to identify courses and content that would align with college-level work. In some areas, this dual-credit arrangement allowed students to earn up to 21 credit hours toward a community college degree while still in high school. The quality of the connections, however, was described by one participant as being a "bit episodic and chaotic," suggesting that the school system and community college needed to work more on effective communication and collaboration channels to create more consistently connected programs. The connections were fundamentally personal. Community college faculty and administrators trusted the judgment of specific high school teachers and had worked with them over time; they (sometimes explicitly) did not trust the judgment of other teachers at other schools. This was not just an institutional issue, but a reflection of the value of personal relationships and colleges' skepticism, sometimes justified, about the quality of work being done in some high schools.

A community college dean also indicated that professional development was not always as consistent as it might be. Much of this professional development was industry-driven and involved connecting secondary and postsecondary instructors through the advisory committees to develop aligned curricula and coordinated programs. The dean reported that progress in this area was developing across the college, but was slow.

The community college dean also observed that there was a divide between secondary and postsecondary educators. His observation was that secondary teachers were still addressing pedagogical issues like helping students acquire basic skills in the context of CTE fields.

Postsecondary faculty members were much more concerned with course content related to CTE subjects and alignment with actual job placement. Although some progress was being made in connecting the two systems, issues of alignment remained a challenge. The CTE coordinator at our CTHS site suggested that the community college and school district were making progress, “moving from POS 1.0 to POS 2.0.” There was improvement, but it came slowly.

One of the strengths cited by all of the research team members participating in this site visit was the impressive levels of knowledge, skills, and roles of the business and industry coordinator and school principal. Both were seen as contributing greatly to overall program success and contributing unique resources and abilities to assist teachers, students, and staff in making POS work. The business and industry coordinator, for example, had excellent connections with teachers and the school’s business and industry advisory boards. He made constant communications between the school and the community and eased the process of collaboration for the two entities. He was also knowledgeable about the school’s courses and programs and able to inform the business community about the school’s educational activities and its desire to be intimately connected with the world of work.

The principal was particularly well connected to the entire POS process. He worked with his teachers to ensure that their courses were articulated with the community college and that dual credit was available. He also emphasized that good communication was the key to successful implementation of this educational effort. He described his role as “getting out of the way,” ensuring that his teachers had all the resources they needed to be successful and would not have to deal with administrative red tape and other district issues that might curtail their success and creativity in the classroom and in the workplace.

Teachers and counselors suggested that it was the school climate that helped all to achieve. The school’s atmosphere was focused on producing successful student learning and ensuring that students were engaged in their courses and their programs. It appeared that the school’s administrators and teachers believed that student engagement was the key to student learning and growth, and all members of the school staff were committed to using PBL—active, hands-on learning—as the dominant form of instruction.

One of the most impressive aspects of the Site 1 visit was the success of CTHS school students on achievement measures. Although acknowledging that the CTHS school visited, like all other CTHS in the district, was selective in its admissions, its achievement scores were exemplary. The attendance rate at the school was 97%, and its dropout rate for the class of 2010 was less than 1%. The school’s 2010-2011 achievement test scores far surpassed district averages for the percentage of its students exceeding standards in reading (72% school vs. 45% district) and math (41% school vs. 18% district). Such results make a strong argument for the proposition that when CTE and POS are done well, with a group of students who want to be in school and believe in the school’s programs, excellent results can follow.

Site 1 summary. The Site 1 visit produced valuable information about POS. Interviews and observations at the CTHS and the community college, as well as interviews with district, community college, and state personnel involved in CTE, demonstrated that POS, when done well and conducted with a school district and community college that actively support collaboration on dual-credit and CTE issues, can produce impressive results. Site 1’s educational agencies had been implementing components of POS well before the passage of Perkins IV, but

they were further supported by Perkins IV and have used it to move significantly forward in making the goals of POS a reality.

Dedicated and knowledgeable people committed to CTE were able to develop PBL-focused POS that featured strong ties to business and industry and collaborative, articulated, non-duplicative courses and programs connecting CTE and academic instruction in unique and creative ways. Although there were challenges, strong relationships between secondary, postsecondary, and business and industry personnel clearly made a critical difference in implementing programs that met the four legislated requirements of POS.

Interviewees, including students, teachers, counselors, and administrators, reported enjoying their work at the schools. Consistently, adults reported a strong conviction that the schools were producing students who were achieving at high levels academically as well as in the applied or technical fields. All involved appeared to be well aware of PBL and appeared to practice effective forms of instruction and monitoring to produce programs that align with Perkins IV goals and objectives. It appeared that Perkins IV made a distinct impact on the implementation of CTE in these high schools and this community college. In general, Site 1 provided a compelling model from which to identify the necessary components to develop strong POS in secondary, postsecondary, and business and industry settings.

Site 2

Site 2 was chosen from the group of sites participating in the NRCCTE's longitudinal study of mature POS (Alfeld & Bhattacharya, 2011). The core of Site 2 is a community college located in a small city with a sizeable manufacturing industry. The city's school system serves fewer than 4,000 students. The surrounding county systems serve just over 11,000 students, and the 12 outlying school systems that are affiliated with the community college serve over 15,000 additional students.

The community college articulates with most of its 14 feeder school districts by housing an early college high school (High School College, or HSC) that provides opportunities for high school students to take dual-credit courses on the community college campus. One county superintendent stated that one goal of his district was to have every student acquire at least some type of college credit before leaving high school. Another goal was to have all students gain awareness that they can both go to and succeed in college. Each semester, over 600 high school students take at least part of their high school curriculum at the HSC; these are mostly students who have succeeded in basic- to mid-level technical courses in their home high schools. Located across the street from the community college is a branch of a large state university. Some of the community college's programs are connected with this university, and this branch has worked with the HSC and the community college to articulate credits from many courses. Community college counselors were aware of which dual credit high school and community college courses were and were not eligible to convey university credits to the students in the community college.

At Site 2, interviews were conducted with the superintendent of the largest school system in the area being served by the community college and several members of his staff, the coordinator of the community college and school districts' HSC program, several community college guidance staff, technical course instructors, and a representative of the local economic development

agency. Interviews scheduled with the county system's three high schools had to be cancelled after a snowstorm cancelled classes for all schools in the region.

Site 2's school districts and the community college are very committed to the POS concept. The result is that every semester, 2,200 to 2,400 high school students from the 14 school systems (including city, county, parochial, and a less formally organized group of private schools, plus a small number of home-schooled students) receive dual credit for courses taken either at their home high schools, at the HSC, or at the four-year college adjacent to the community college. Community college and HSC staff reported keeping a close count of how many students enrolled in varying dual credit classes. They estimated that approximately 75% of the students each semester are enrolled in technical classes, with the remaining 25% enrolling in general education (more traditionally academic) classes.

As noted, the county superintendent reported that the district's goal was to have 100% of their high school students graduate with at least some college (community college or four-year college) credits by 2012. He stated that given the district's successful associations with its various partners, the district was on track to achieve that goal.

This particular school system reported substantial success in other areas as well. For example, in the 2009-2010 school year, the district had the lowest high school dropout percentage in the state (under 3%), and its total number of high school dropouts was exactly 17 students, down from over 100 per year a decade earlier. It was reported that the district personnel knew each of these 17 students and had made each aware of options for either returning to school or obtaining a GED. Further, part of the district's strategy for keeping students in school involved meaningful engagement, and both CTE and opportunities at the HSC played a key role in those efforts. Guidance counselors in the county school system's three high schools engaged in efforts to ensure that students are prepared for "college and/or career." Over 80% of the district's students take one or more AP or dual credit courses, with the goal of 100% for 2011-2012.

For many students, the college experience is a community college CTE sequence taken through the HSC. We interviewed community college teachers in the mechatronics and industrial maintenance areas. These faculty members were unanimous in declaring that they treat the high school students exactly like their adult students, and that the large majority of the high school students perform at the same high levels as adult students. They also stated that on occasion they have experienced a teenager who wasn't prepared for the focused rigor required in their sequence, and they have simply sent that student back to his or her home high school.

One guidance staff member said she was clear that her ideal—and one that she sees herself consistently approaching—is to have all students complete dual-credit courses in high school, some in specific technical areas, and some in the general education requirements for obtaining an associate's degree. Guidance staff members were also clear that increasing numbers of the "certificating" sequences—such as machine tool and cosmetology—now require at least one general education English course in order to obtain a technical area certificate. Hence, there was a conscious push to have high school students obtain dual credits in both technical and general education classes.

The guidance staff provided multiple, practical examples of how this arrangement works. In one example, students wanted to complete their POS in carpentry. In their sophomore year, these

students take Carpentry I at their high school. In their junior and senior years, they spend half of each day at the HSC. Each year, the HSC students build a Habitat for Humanity house from scratch. Over a two-year period, students take advanced carpentry and classes in electrical and mechanical issues in home building. They can take a college-level English 101 class, and after graduating from high school, they can transition seamlessly into more advanced work at the community college.

Site 2 summary. Although a snowstorm cut our site visit in half and meant that we did not visit any high school POS classes, we were very impressed with the ongoing educational work we did see and with the district and community college personnel we interviewed. As reported by our interviewees, the schools were using CTE and POS to keep students engaged. Two results of these efforts were an extremely low high school dropout rate and high student rates of continuation into postsecondary educational opportunities. The community college technical teachers were well-trained, using up-to-date equipment. The creation of the HSC on the campus of the community college, and the building of a branch of a state university across the street from the community college, further provided students with multiple opportunities to explore both college and career while still in high school. We were told that even during the current recession, students completing their technical courses were finding well-paid positions.

Site 3

The Site 3 visit was conducted in a metropolitan area of South Carolina with a diverse population and wide-ranging socioeconomic status. This visit provided the team with a view of CTE programming instituted by state legislation—the Economic and Education Development Act (EEDA, 2005)—that required a strong level of engagement between the local school district, a centralized technology center, and the local community college. This visit lasted three days and included interviews with personnel from a high school, a community college, a technology center, and state-level administrators. At the high school, interviews were conducted with high school principals and vice principals, high school guidance counselors, and teachers from several academic departments. At the community college, interviews were conducted with faculty and program directors, the academic dean, a dean and a department chair in the college of health, administrators from academic affairs and student affairs, and the counseling director. At the technology center, interviews were conducted with the school’s director, the principal, the vice principal, the guidance counselor, teachers from a number of departments, a member of one of the focus teams, and several members of local business and industry. Finally, two telephone interviews were conducted with state-level administrators, including the CTE director and a workforce development manager who is also a member of the state’s business and industry advisory board.

This visit provided a unique perspective on the implementation of POS due to a state-legislated school reform model that includes a strong emphasis on career-focused education. This legislation includes all of the basic requirements of Perkins IV in addition to other elements that support the implementation of POS, such as the organization of high school curricula around three career clusters, an enhanced role for school counselors, and increased support for at-risk students. Additionally, regional education centers play a central role in facilitating business and education partnerships, and an emphasis has been placed on greater articulation between secondary and postsecondary systems. Further, during the eighth grade, all students are required to develop an Individual Graduation Plan (IGP) with the help of a school counselor and parental

input. Finally, upon entering high school, all students declare a career major and choose electives that align with that major.

At the time of our visit, the state legislation had been implemented for nearly five years. A part of the NRCCTE's on-going longitudinal study, the high school observed during this visit was identified as a relatively high POS implementation site in which students are offered 13 POS across 12 career cluster areas. Using their career majors as a guide, students develop their IGPs with a minimum of four electives that relate to their career goals and should lead to readiness for postsecondary education or work upon graduation. In addition to the coursework students complete at the high school, they are offered the opportunity to complete courses at the local technical center and the local community college, with several options for earning dual credit.

The high school utilizes a block schedule system, which gives students the opportunity to take advantage of longer class periods. This is helpful to students taking courses at the local technical center or the community college. Further, both the technical center and the community college are not far from the high school, with transportation provided between the high school and the technical center, making taking courses at the technical center relatively convenient.

High school students may obtain dual credit through three channels. First, students are able to take courses from teachers who work at the high school and are certified to teach at the community college level. Second, students can take courses at the technical center that are designated as dual credit courses, including 14 courses in various career areas. Finally, students can earn dual credit by taking courses designated as dual credit courses at the local community college. Courses identified as dual credit include those in which the community college and the high school have developed necessary memoranda of agreement. Dual credit provides a head start toward a degree at the postsecondary level or toward certification; it is also a means of increasing the rigor of high school coursework. In addition, students who take college-level courses are rewarded "quality points" toward their GPA, usually only available for AP courses.

It was reported that the high school included in this site visit benefited the most from the services offered by the technical center due to block scheduling and a reliance on the technical center for providing technical and vocational area courses. High school personnel suggested that the technical center played a pivotal role in the development of a comprehensive POS system among the three educational entities—the high school, the community college, and the technical center. For example, they increased the rigor of their coursework, developed opportunities for dual credit, worked closely with the community college in the development of courses, and provided training to high school teachers to increase their knowledge of the CTE curriculum in an effort to improve student's math and science skills.

Teachers, administrators, and guidance counselors also cited the availability of many different programs in areas ranging from computer repair and automotive technology to digital electronics and welding. Several of the teachers had dual certification (high school and community college teaching certifications), meaning that a number of their courses could provide dual credit. Accelerated learning courses were also provided in order to improve and enrich students learning.

The technical center personnel are organized into five focus teams that serve to ensure quality services to students, centering on such areas as school climate, data collection and accountability,

and curriculum and instruction. Each team works to enhance the services that the school provides and communicate and promote the school's mission within the community. As an example of team goals, one team seeks to foster collaboration between teachers and expand parent and community involvement. The other teams provide similarly focused work.

The technical school has close ties with local business and industry members. Business and industry representatives sit on advisory committees for each program within the school. Teachers also play a pivotal role in developing their respective advisory committees, choosing members who hold positions in the community that align with their programs. Some teachers reported recruiting former students to sit on their advisory committee due to their knowledge of both the technical center and the local business and industry communities. Advisory committees provide important information to the technical center by identifying (a) current issues in their fields, (b) relevant information for students to learn within the school's curricula, (c) courses that need to be offered, and (d) needed equipment or software.

The community college serves a significant role in preparing students for entrance into postsecondary education or work and provides many associate's degrees, diplomas, and certificate programs across all 16 career clusters. The community college has a long history of working with the local high schools in developing articulation agreements and non-duplicative programming. Also, as a result of a statewide articulation agreement, 86 courses offered by the community college are transferable to other two- and four-year public colleges and universities in the state. The community college was identified as a place for "early college" for many of the local high school students—allowing them to gain college credit while in high school. Dual credit is an important recruiting tool in the seamless transition process from secondary education to the four-year college system, with the community college serving as the intermediary between the two. The community college boasts an automatic connection program that provides a platform for the community college faculty and staff to work closely with a major university in the state. This system also provides a "one stop shop" for students to register for classes, apply for financial aid, and transfer credits between the two systems.

The community college has worked to extend its role in preparing students to progress through the POS system by educating students and parents about the benefits of POS and dual credit opportunities. The college conducts school and community awareness campaigns, targeting students in elementary and middle schools and working with school guidance personnel as a means of getting school administrators on board in promoting early college work. The community college uses the technology center as an intermediary to introduce students to college-level coursework and give them opportunities to earn quality points toward their GPA. Further, the college actively promotes the financial benefits of its services. Students taking at least two courses at the community college receive scholarship funds for one of the courses, essentially providing a two-for-one course package.

Although the three institutions have developed a system of working together to enhance the implementation of POS, several areas were noted as needing further development. First, the integration of academics and CTE was not highly implemented. Although efforts have been made to inform academic teachers of the role of CTE and to expose them to the curriculum and activities of the CTE courses, there was no strong, visible effort to integrate academic content into CTE classrooms or vice versa. In general, it appeared that students would have to rely on their own problem-solving skills to transfer learning from one setting to another. Second, several

community college faculty indicated that students had preparation in math, writing, and reading that was too inadequate to allow them to function effectively in college-level courses. Many needed intensive remediation, especially in math. Additionally, some college faculty indicated that students had a difficult time in college courses; some students weren't prepared for the cognitive flexibility and abstract thinking required. Third, the role of work-based learning (WBL) was limited due to legal or liability issues. Teachers reported difficulty in placing students in WBL sites due to their age or lack of experience. Fourth, funding limitations hampered proper implementation. Teachers didn't have enough equipment or the required up-to-date equipment and software to train students properly. More teachers were needed in order to keep classroom sizes manageable and to serve more of the student population. Facilities, especially the technical center, were also identified as not having the necessary infrastructure (e.g., space or electrical wiring) to support the needs and activities required for the equipment used in courses.

Site 3 summary. Despite these limitations, the implementation of POS appeared to be successful at this site. Collaboration between the three systems—high school, technical center, and community college—was a key element of the development and success of POS in this region. Implementation of the state legislation brought legitimacy and a sense of legal authority to longstanding working relationships. The collaboration prepared students for postsecondary education, with each system playing an important role in getting them to that point. The high school work provided students with an academic foundation in subjects such as math, science, and English, helped them think about and plan their career goals through the development of IGPs, and provided a head start on earning a college degree by offering dual credit courses and weighted GPA credits. The technical center provided rigorous course content that connected with real-world applications, engaged the knowledge and expertise of local business and industry leaders in future workforce preparation, served as an intermediary between the high school and the community college by providing college credit, and prepared students for college, the workforce, and needed certifications and training along the way for either path. The community college provided students with early entrance into the college system, served as a vehicle toward associate's degrees, diplomas, or certifications in many career pathways, and partnered with the four-year college system to provide a seamless transition from the community college to the four-year system through advisement, credit transfers, and similar programs.

Although much of the work undertaken by these three groups occurred before the implementation of the state legislation, Perkins IV aided in the growth of POS and CTE. One school administrator said the “legislation altered peoples’ attitudes about CTE, making it seem more appealing to parents and students.” It was suggested that dual credit during high school saved time and money toward a college degree and was appealing for students and parents. The weighting of dual credit courses provided an extra incentive for students who would not normally take CTE courses to do so, allowing them to expand their interests beyond AP courses and remain competitive with their more traditionally college-bound peers. Finally, the legislation helped engage business and industry in the design and implementation of POS. Business and industry members served on advisory boards, sharing their expertise in advancing POS and providing an increased degree of relevancy and legitimacy to the role of CTE within the high school curriculum.

Discussion of the 10 Elements of Programs of Study

As noted, one of the goals of this study was to examine existing POS efforts in context with the 10 elements determined to be important to the high-quality development and implementation of POS initiatives. The U.S. Department of Education's Office of Vocational and Adult Education (OVAE), along with the National Association of State Directors of Career Technical Education Consortium (NASDCTEc), the NRCCTE, and other affiliated organizations produced a field-based document that outlines 10 essential elements of good POS practice (U.S. Department of Education, Office of Vocational and Adult Education, 2010). Data collected from this study of exemplary POS in three states has helped to ground our understanding of POS and how they operate in real applications around the country. This section of the report states what we have learned about each of the 10 elements from our observations and interviews in the three sites described above.

Our discussion of each of the 10 elements is supplemented with findings from analyses completed using the NVivo9 qualitative research software. This program allows for more detailed analyses of the transcripts produced at all three sites and provides more "quantitative" descriptions of themes and trends in the data. There were a total of 42 separate transcripts analyzed from the three different site visits. Findings from the NVivo9 data are reported as a supplement to each section.

1. Legislation and Policies

Although all three sites had been implementing something resembling POS for many years, every site said that Perkins IV legislation, especially the provisions for POS, made the process more tangible. It created a sense that programs had to move from existence "on paper" to existence in reality. The federal legislation, built on the years of vocational policies that strengthened state involvement, required connections between academic and technical learning, and formal, articulated, serious connections between secondary and postsecondary systems. It also required better communication between educational systems and business and industry interests that resulted in the unification of academic and career knowledge and skills and in demonstrable end points of industry and business certification and employment.

The focus on legislation dealing with increased counseling (as in South Carolina) was developed specifically as a result of Perkins IV and POS. It was designed to engage youth, families, and counselors in identifying a career pathway that identified courses and programs in secondary school—and hopefully college, too—that would focus students on planning their futures with career outcomes in mind. Even though earlier legislation (such as the School-to-Work Opportunities Act of 1994) required students to develop career plans as early as seventh grade and to have the plan completed by eleventh grade, the South Carolina legislation, EEDA, led students to focus on courses and sequences of classes that would lead to career outcomes and plans for adult life.

NVivo9 analysis. An NVivo9 review of the transcripts using *legislation* as a search term revealed much more interesting information. This review suggested that although not everyone knew about the legislation, it clearly had affected students, systems, and many areas of program operation. The following quotes from various transcripts illustrate the various nodes, or themes, that emerged from this review.

Not everyone interviewed knew the specifics of different legislation, or even whether they were implementing federal or state legislation or school district policy. However, although the nuances of specific legislative initiatives were not known by all, legislation did affect practice at all levels and with all stakeholders. One person stated it this way:

“So, I don’t think that the public themselves or the mom or dad, or the students themselves may not necessarily be thinking EEDA, ‘that’s what I need to focus on,’ but they are aware of that part, that there is something out there, that ‘there is a model I am supposed to be using or focusing on if I intend to be over here going to college with this particular degree.’” (Site 3)

Benefits. The data that pertained to additional themes connected to the legislation revealed several benefits of legislation, as described below.

Impact on graduation rates. Interviewees described various positive effects of legislatively inspired changes on student graduation rates.

“The other impact we’re having now, resulting from legislation, is that we’re graduating now about 2,500 more students than we were, you know, 6 years ago. Our graduation rate now is sitting at about 73.7%. So it impacts more students graduating. You know the majority of the students are now in a situation where they focus on the area of study of a least three courses or more.” (Site 3)

“Actually we’ve been running that through Perkins money that we get, grant money, that we’re teamed up, actually went to career centers, and some of their students who are taking our dual credit can actually take those tests and get kind of like ahead. They can take one of the online tests. It’s a good incentive for them since they’ve already earned the credential. Say ‘Oh man, I’ve already earned a credential. I can apply this toward graduation.’” (Site 3)

Impact on collaboration. There was a general feeling that the legislation improved collaboration among teachers in a particular school, among secondary and postsecondary institutions, and among schools and community partners.

“The legislation opened the door for closer communication and collaboration, and collaboration with postsecondary two-year and four-year that we’ve not... you know, it was hit and miss in the past, I think it’s much more... it’s a firmer relationship now than we’ve had in the past.” (Site 3)

“We do use our Perkins funds for secondary, what limited we get is used for [professional development], for bringing them together, college faculty and high school faculty. So for example in December we had, I can’t remember what it was called, was it Holiday Extravaganza against this year, where our counselors and teachers had the opportunity to come out and make Christmas ornaments using our machine tool technology, so, we bring them here, you know on campus.” (Site 2)

“EEDA came in and said, ‘Public schools, middle schools, junior highs, high schools: You need to get on the band wagon.’ And I think it pretty much forced junior high counselors, middle school counselors, to go out and find out what’s going on at your

career centers, because if they were having to provide for the students these opportunities of exploring careers, and what better than to see what's being offered at your career center and put in that four-year plan and making sure you communicate with the student and the partner at that level." (Site 3)

Clear agreements and articulations. There were also impacts on the agreement process and articulation with postsecondary institutions.

"We have a real strong agreement with the community colleges. We have two agreements. We have a state articulation agreement which is system to system, and for dual credit, a memorandum of understanding which is systems connected, two individual colleges and their local agreements, which are pretty well standardized now." (Site 2)

"[This state] has 16; the legislation identified 16 career clusters. And from those the secondary schools were required to offer a minimum of so many majors to their student population. So what we did, we've aligned our programs to the clusters." (Site 3)

"Our system of community colleges [is] pushing to make that more systematic, so I think in the long run the advantage will be that a dual credit student will have the luxury of having that system-wide alignment, so when they come from high school to us, they may be able to have a broader choice. 'I want to go x, y z.'" (Site 2)

Easier for students and families. It was clear that the relationships developed between secondary and postsecondary led to articulations and course curricula that were concrete and clear to all involved. POS formalized the relationships and connections, making them more "contractual" than before.

"Well, yeah, I think the state policy of the legislation... has provided kind of an importance for greater formalization, more attention, to getting things on paper and then to publicizing with our students specific things that are available." (Site 2)

Blending academics with career and technical training. The legislation has led CTE and academic teachers to collaborate more closely than before. Although in the past they worked quite separately from each other, each group is increasingly coming to value what the other can offer students.

"I would say, too, you know we've talked about blending academics in the form of math and English reading with technical, and our funding mechanisms as a state, and even the Perkins legislation as the funding makes it happen doesn't really support a student blending the two. It's really strictly, if you can afford general education you can take them, if you have the technical inclination and there's a career path for that, and we hope you can pay for the [general education] on the path, too.... Our school districts have been great in working with us and helping as much as they can, but the legislation itself really doesn't support the two from a financial standpoint working together for the student." (Site 2)

"Something to add to that, as far as the impact of the EEDA, I think there's maybe a different mindset among all teachers at the high school many times. They understand better what benefits students can gain by coming to career and technology courses and

how what they teach in math, and science, and language arts, and history enables students to gain the skills here.” (Site 3)

“Perkins helps to fade our silo and the silo has gotten us in trouble sometimes. And I think more states are looking at integrating career technical education, like [our state] has, in its organization trying to bring it more to the forefront and having career and technical career representatives at the table when they are talking about academics as well.” (Site 2)

Increased emphasis on marketable skills for students. There was clear impact on the connections developed for POS in the various sites. They focused on developing the sequences of courses that would eventually lead to some kind of measurable, marketable outcome.

“And we, of course, only implement or approve programs for career and technical education that follow that course sequence that’s required for a course through Perkins law, and we really hold our schools accountable to a solid sequence of courses that lead to actual marketable skills.” (Site 2)

“You know one of the things we’re faced with all of the time, that we’re faced with here, is this technical skill level needed for a worker is so detailed now compared to what it was 5-10 years ago. It’s difficult for somebody to get everything they need to be trained for the 21st century through a high school program. It almost means they are going to have to get some certificate or second, postsecondary level of skill before they’re really ready to work, whereas that wasn’t the case 10 years ago.” (Site 2)

Increased staffing. POS has helped to increase demand for positions to fully implement the efforts required by the program.

“We added a position two years ago to round out, so we had a technical focus component and a general education focus component, and through Perkins we have brought on an additional person who is kind of coordinating STEM efforts, and that person has been at this point the only Perkins that we have currently, or I have used with regards to the programming of High School College. So I think what we’ve done in the last three years is we’ve institutionalized the positions, the program; we have institutionalized a budget for the program, we’ve given it more, shall I say, permanency.” (Site 2)

Challenges. Several challenges related to legislation were identified in the transcripts, including the following topics.

Time. The legislation forced people to find time to make the connections between teachers and faculty and teachers and parents.

“I think it also enabled, not necessarily always a positive acceptance because of the time constraints, but in the legislation is that the guidance counselor, or a counselor, parent, and student have to sit down face-to-face in a session at least annually to review their plan, and to be involved in those discussions. I do know that many of them do use group sessions as a part of that process so the information to all the parents that would need to know have an opportunity to hear that, and then they represent all of the one-on-one sessions that the legislation says needs to occur.” (Site 3)

Funding. No matter what legislation mandates, work can only occur if funding supports it. It was clear that the economy—including the national, state, school district, and local hiring economies—was a prominent issue on people’s minds and played a role in the fidelity of POS implementation.

“I think there have been some pieces of legislation, like the legislation creating some dual credit opportunities for students... you know it’s slowly coming, but everybody is wanting to avoid that big issue of funding.” (Site 2)

“Of course like everything else in public education, the legislation, it drives the bus basically. And right now, with the budget situation being the way that it is, you’re looking at the potential to lose instructors. You’re looking at the potential to increase class size. You’re looking at the potential to have to limit your course offerings because of such factors. And of course, that will have a great impact on the clusters that we’re able to serve our students in, limit the amount of opportunities that our students have.” (Site 3)

Grade level constraints. There are also limits to what can be funded with Perkins money.

“Our postsecondary Perkins doesn’t fund us working with anybody below ninth grade. Unfortunately, the decision threshold is middle of the eighth grade here.” (Site 1)

Competing school requirements for No Child Left Behind (NCLB). Although the CTE programs are focused in large part on EEDA and Perkins, NCLB is still a driving force.

“Four percent of our budget is federal funding, just 4%. And even though we’re 51% poverty, the majority of our funding is state funding. The second highest tier funding is local funding. So we get 4% of our budget from federal funding, but what wags the tail [is] NCLB, and so it’s like the tail’s wagging the dog here. You know, I mean we’re chasing NCLB for 4% of the money. I always used to say to my previous superintendent, ‘Let them have their 4% of the money if we can quit.’ I know some of the districts actually tried that.” (Site 2)

Graduation requirements. There is also a movement in schools to increase graduation requirements, often by requiring students to take a certain number of courses in each content area and passing end-of-course assessments (EOC). This has an impact on the classes that students take and on the school schedule as a whole.

“The district has had a work experience program as you know it for many years. In fact it was so strong in this school district that we—Perkins provided for support staff positions in most all the large high schools just to handle all the records for those students. Now what’s happened in the last few years is two things. As graduation requirements have become stiffer, we lost the eight block schedule, then suddenly now I have no time in my day to do work experience.” (Site 1)

Politics. There are sometimes tensions between competing authorities for control of the program.

“The issue that we have now is that there’s two different offices vying for—I don’t know if it’s a pat on the back, or control—we have the career and tech office that oversees curriculum development, offers career and tech classes obviously, and then they help us with tools and equipment—things of that nature. We have the Superintendent of Schools that oversees the operations of the schools. So those two entities have to have a meeting of the minds to make us run appropriately, and from time to time we don’t see them playing fairly.” (Site 1)

Opportunities. Several people spoke about the unique opportunity that EEDA and Perkins have presented for putting forth a model for educational reform that reinvents the way high school and college are conceptualized.

“And at some point, I hope this initiative that we’re involved with is going to really significantly... I mean it’s just going to reinvent the whole notion of what a high school student is and what a college student is and how this whole thing works.” (Site 2)

“So, I think that trend, Perkins looking at that transition, looking at more... removing the line between secondary and postsecondary, making it a little bit more ambiguous, I think is something that would be helpful as we move into, and I’m talking about the career technical end.” (Site 2)

2. Partnerships and Collaboration

Each of the three sites was developing a broad range of partnerships between secondary and postsecondary, business and education, teachers and community members, and students and teachers. One of the most dominant forms of partnership observed in all three of the sites was advisory committees or councils composed of business and industry personnel who met regularly with teachers and community college faculty to design courses and curriculum, identify certifications and approaches to employment, and provide teachers and faculty with up-to-date information on local or regional employment needs and requirements. Each program had advisory groups that met a few times a year (or quarterly or monthly) and reviewed the quality and content of the program so that both classroom and work-based experiences were of high quality and responsive to the realities of the work world.

Interviews with business and industry personnel at all three sites suggested that these partnerships helped keep the educational programs focused on business needs for the 21st century. They not only supported instruction in academic areas, such as reading, math, critical thinking, computer knowledge, and science, but also reinforced the importance of learning the necessary soft skills that students need to be able to work in teams, solve problems, and conduct themselves in a work environment.

Important partnerships were also developed between secondary and postsecondary institutions. Although CTE programs implemented prior to Perkins IV POS similarly produced articulation agreements between secondary and postsecondary, POS seem to help both groups make that articulation agreement more than just a paper exercise. At our sites, secondary teachers met with postsecondary faculty to align course content and to ensure that courses, especially those that allowed for dual credit, were rigorous and consistent in their content. Such partnerships were perhaps best highlighted in Site 2, where the community college had organized a program that

was modeled after the LaGuardia Middle College concept, and held courses on its campus for high school students. One of the purposes of this organizational structure was to acquaint secondary students with the community college and help them to discover the value of and opportunities available in higher education.

Partnerships among teachers, faculty, and business members also helped school-based personnel understand the increased needs of students to spend more time in training for 21st-century jobs. Because many of the trades now include computer-assisted machines and equipment, the training periods required to master necessary skills and knowledge have extended well beyond the traditional two years that used to occur in high school CTE classes. Students need longer, more intensive educational programs, and these partnerships help to ensure that adequate training is available.

One of the other partnerships noted in the three visits was the connection between secondary programs and student organizations. All three sites indicated that they had active connections with national career and technical student organizations (CTSOs) like SkillsUSA, Future Farmers of America (FFA), and the Health Occupations Students of America (HOSA), among others. Such organizations further engaged students in career-related activities, allowed them to make better connections with professionals in the field, and provided opportunities to make active, hands-on use of the knowledge and skills they were learning. At Site 1, the health careers teacher was the HOSA sponsor and encouraged her students to be active members of the organization. Because of this connection, two of her students went on to become state and national leaders, enhancing their leadership knowledge and skills and further engaging in professional activities.

NVivo9 analysis. NVivo9 analysis of the 42 transcripts suggested that the partnerships category was one of the most important in the study. As Table 1 shows, all transcripts mentioned collaboration or partnerships at least once. Interviewees spoke more about partnerships with non-school entities and between secondary and postsecondary institutions.

Table 1
Analysis of Themes

Theme: Partnerships and collaboration	Transcripts (n)	Transcripts (%)
Total number of transcripts describing partnerships and collaboration	42	100
Number of transcripts describing partnerships and collaboration:		
...with non-school entities	27	64
...between secondary and postsecondary	26	62
...within school or program	22	53
...at the district level	7	17
...between students and adults	7	17
...at the state level	6	14
...with parents	5	12

Partnerships and collaboration with non-school entities. Analysis indicated that a majority of partnership discussions revolved around interactions between schools and business interests.

Sixty-four percent of the transcripts discussed partnerships with non-school entities. These included local businesses and community organizations. Such partnerships are considered central to a high-quality, high-functioning POS. Some of these partnerships were formally institutionalized through advisory councils and others were more informal. But regardless of the type of partnership, the roles these organizations played in the schools were far-reaching, ranging from assisting with curriculum design, programmatic, and instrumentation decisions; providing professional development, internship, community service opportunities, and job placements for students; and serving as revenue streams.

Advisory councils. Of the interactions with community members, advisory committees and programs were the most commonly mentioned interactions in terms of community advising and suggestions.

“Each program has an advisory committee, so that industry members will come twice a year and meet with our instructors, and a lot of times on that advisory committee we will use those high school teachers if they’ve been in the industry for a while because they bring a different perspective.” (Site 2)

“Well, we have our, we have what’s called a joint advisory committee meeting where we meet two or three times a year with industry who support both the career center plus our program. And you know we discuss things at that particular time, where the needs are... what they desire for us to put in the curriculum, and so forth, so we have a pretty open relationship and I’ll make two or three visits per school year to speak with the students and with their instructors and see how things are going and see what the numbers look like; what the prospects are coming our way.” (Site 3)

Curriculum development. Partnerships were used effectively to connect business and industry with educational institutions to develop program curricula.

“All of our programs that we have are reviewed every three years by independent committees that include secondary and postsecondary representation along with business and industry looking at the curriculum in terms of what needs to be changed on the career-technical side, making sure that we are current and up to date.” (Site 3)

Instrumentation. Some of the partner discussions involved the development of instruments for measuring outcomes.

“Our academic dean or division chair will know, or I go to meetings that say, ‘Okay, our industry was saying we need something in instrumentation. We really have to do this.’ So, we figure it out. Another need... that we are still working on was a power plant industry. Power plants never lay off. We always need power plants. We need power, so there is a power plant out there for a diploma or certificate, so that’s something that the academic dean and division chair sit down and look at and look at other schools and see what the need is.” (Site 2)

Program relevancy. Partner input helped to make program activities more relevant to both business settings and student applications.

“We... ended up changing some of the program areas and even dropping—I dropped a cabinetmaking program from my building because... we don’t have that industry actually here in [this area]. We don’t have factories here so it made sense to make some modifications... with programs that can be supported by our local colleges and industries.” (Site 1)

“What they do is they review our curriculum and they review our equipment, and let’s say that there’s a new trend; for example, we’re in the development of a medical coding program right now. We will be pulling together an advisory board because in the future that’s going to be informatics and in a lot of places [it] is already becoming important... we would be looking at what are some things that we need to be putting in that program.” (Site 3)

Professional development. Some of the partnerships resulted in development of teacher and counselor knowledge about what business and industry need and how these needs connect with academic learning.

“And so this last semester I took about fourteen teachers and counselors around to three of our largest employers and just spent the day with them. Math teachers are the hardest sometimes to come along and teach real-world application. And it absolutely blew away some of the math teachers that, you know we were in the plant, it was an automated line. And there was a guy, most of these math teachers have pigeonholed as being one of the non-math people in their math classes, taught, kind of a country guy, you know, I could see in their mind, what was kind of running through their minds and ... he stopped and went over and did something and he pulled out a little notebook, like one of these things, and he was doing algebra. He went over there and showed the guy and the guy did the programmable control thing, and so the math teacher asked the guy what he did, and the guy explained what he did. But it was an ‘aha’ moment for a lot them that you know they started to saying, ‘Well, you use algebra. How do you do this? What do you do?’ You know, it was just kind of an interesting opportunity for them to see everything kind of come together.” (Site 2)

“The teachers that are teaching carpentry at the high school or whatever, business and personal finance, we try to invite them if we’re going to provide more training on campus or if we’re having some other training, you know. They may not be able to come because there’s something that they have to be at the high school, or whatever, but they have access to our [professional development] on campus, just like any other faculty member here would have, because they’re considered adjunct.” (Site 2)

Internship or out of school work experiences. One of the more important partnerships allowed teachers to connect with businesses to actually learn what they did and how their knowledge could be shared with students.

“Yeah, we like them here using our machines and seeing how things work in our labs. We had what we call Teachers in the Workplace where teachers from high schools and colleges go out, literally, to the workplace, you know, be it a technology facility or the hospital, to see you know what’s going on there. So, we have a lot of joint things that we try to do together.” (Site 2)

Additional sources of revenue. Some of the business partnerships actually produce collaborations that create funding for schools as well as additional service-learning opportunities for students.

“We restructured so that ... at our greenhouses at our X campus we’re doing ... plant propagation. Now our outside activities are with large agency buyers and other organizations and they’ll come to us and say, ‘Hey, we need 10,000 and whatever for this plant.’ And we’ll do the plant propagation and have contractual relationships with them. That way our students get that end of the field, not necessarily the retail operations. So where it’s practical, we do it.” (Site 1)

“We have a community partner in Dairy Queen—he’s a manager. We sell Blizzards every Friday for lunch, the small ones—not the big ones—and it’s a fundraiser. That’s how we raise money for the club. Well, he opened up a new Dairy Queen store and he needed cleaning because it wasn’t ready to pass inspection. So guess who volunteered? So the club went over on a Saturday morning, starting at 7 a.m., and we worked until 12 to clean up the front half of his store, and I mean really clean, and all of that was done for free. And so he saw that the kids weren’t just using him for the fundraiser—that they actually really cared for him as well.” (Site 1)

Job placement for students. Partnerships with businesses also produce opportunities for students to get direct hires from businesses and industries in the local area.

“So they get the certificate and our business partners in the field will reflect on that certificate and it even has my email, it has my phone number on it, it has my direct line. So if they want to call and say ‘You know I just got Mikayla in here and a life certificate—how realistic?’ And I say, ‘You know what? It’s a shadow below—but I think she’s good. You’re gonna find a solid worker and practitioner right here.’” (Site 1)

“The YMCA is a really good partner and they love to have our students. They hired all of ours from the school that applied out of—that was maybe about one-eighth of those who applied. Yet, all of our students applied and all of ours got hired.” (Site 1)

Partnerships and collaboration between secondary and postsecondary. Although collaboration between secondary and postsecondary institutions was happening before Perkins or EEDA were mandated at sites, legislation seems to have improved the amount and quality of collaborative efforts.

“We’ve still got some hurdles to go, but I think us having signed the first statewide articulation dual credit agreement ever in the history of the state for a two-year or four-

year articulation dual with secondary is a landmark that would not have occurred without the legislation.” (Site 3)

“I go in and meet with the principal, kind of to go over programs of study—why we need to be moving in this direction, etc., etc., and then a coordinator in my office then calls a meeting with the curriculum principal, the head counselor, CTE chairperson, and then goes back in and gives them detail on programs of study. We actually say, ‘Let’s look at your programs of study. We think that this is not a program of study. We think you need to... we recommend you go in this direction.’” (Site 1)

Administration. Collaboration was important for such administrative responsibilities as providing consistent guidance, permitting easy access to grades and transcripts, and assigning the right credits to students.

“Well, of course, the non-duplicative issue is taken care of through our close coordination with our postsecondary partners, making sure that students are getting credit for whatever postsecondary work that they can complete on the postsecondary level through articulation and dual credit agreements.” (Site 2)

“Each one of the counselors here are assigned a high school that we work with, so the high school counselors have our name, and also we are assigned a technology center we work with, so that gives that counselor a name and a face, and we’re usually out there testing, but also when they have, they’re working for a student and have a student in their office, the counselors many times will call us and say, ‘Okay, this young lady says she has applied. Has she applied? What does she need to do to complete the admissions process?’ So we have that relationship going on.” (Site 3)

College and career ready. Increased collaboration between secondary and postsecondary institutions is also helping high schools get the feedback they need to prepare students who are college and career ready.

“They had our college faculty come in and see student projects and give feedback, and they did writing rubrics together [that] show that ... by the time they get to college, it’s on a higher level, but the kinds of things that are being assessed are the same, so the student is familiar with the expectations.” (Site 3)

“Whether it be a dual credit, articulation agreement... there are postsecondary people always at the table with our secondary curriculum folks whenever we make changes, or additions, or reviews to that curriculum, those people are present to make sure that we are aligning to it and that students are ready to move to that next level based upon what they’ve achieved in the secondary level.” (Site 2)

Consistency. One of the challenges with having students take courses at two different sites (high school and community college) is making the experience cohesive and consistent. That cannot happen without collaboration and communication. Some ways that sites have done this is by intentionally offering scheduling that makes it easy for students to take classes at both

the high school and the community college, aligning the material taught so that there is a natural progression in the curriculum, and sharing professional development so that staff at both sites are receiving similar high-quality training. Consistency in scheduling is one way different educational institutions were able to partner with each other and with various businesses.

“Other colleges, there are one or two other colleges [that] have managed to get their districts to coordinate activities a little better so that, for instance, they can schedule some courses and have, like [one county], for instance, they have scheduled it so those districts have realized it to their advantage to load the buses with kids and come on the campus.”
(Site 3)

Partnerships and collaboration within schools or programs. Collaboration within a school is essential. Teachers need to work together whether they are CTE teachers, special education teachers, or academic teachers. Teachers also need to have good working relationships with administration and guidance counselors. Such collaboration allows for a richer and more supportive learning environment for students.

Collaboration between special education and mainstream teachers. Teachers demonstrated that CTE reached out to other areas, such as the teacher who:

“...is the special needs teacher at [the] high school. So she wanted to have a relationship with the teachers to let them know, you know, ‘This is an open door policy. Call me anytime if you have problems with any of our students and I can work with you.’” (Site 3)

Collaboration between CTE and academic teachers. Clearly some of the best partnerships were between the career-oriented or applied learning teachers and teachers who were more concerned with theory.

“I go and I talk with the other instructors to see what they’re doing so I can see what’s related to what I’m doing in my classroom. And so if I’m doing precision measurement, I’ll also make sure that the teacher who’s in math or the teacher who’s in English knows what I’m covering so that we can work together and coordinate our lesson plans. And that’s how we make sure that the rigor is there, but at the same time we haven’t got away from the purpose and the goals. The kids have to see ‘Why is it that I need to practice this math concept over and over again and really learn it, because I’m never gonna use it again.’ And then all of a sudden I walk in, ‘Yes, you are gonna use it again.’” (Site 1)

“So I had to take literally one of my engineering reports, that my students had done in my classroom, to the English teacher and show her ‘OK, this is what the focus was. Look at the way he wrote it.’ And they said ‘OK, it looks like he’s writing a technical document, almost like a dictionary.’ I said, ‘Yes. But does it have to be that way?’ And she said ‘Well no. Writing can be fluid.’ I said, ‘OK, can you help me?’” (Site 1)

Collaboration between teachers and administration. Administrators were also included in the partnership process.

“ And like I said, I mean, even though we are growing in size and... the relationship between the administration, teachers, and the counseling staff, the dean’s staff, is still pretty intimate. And I know who they are, they know who I am, through ... just regular conferences—parent conferences—[IEP] conferences—things like that. And the counselors know who I am, and they know what I do.” (Site 1)

Collaboration with guidance counselors. POS helped promote better connections between teachers and counselors.

“There’s much more engagement between teachers and counselors in regards to, for example, where teachers now are willing for guidance counselors to come in particular at certain times of the year, to talk about ... career decision-making and providing data and having visibility with students and sharing information as to the support and resource services they have in the guidance offices for students in terms of looking career options and so forth.” (Site 3)

Partnerships and collaboration at the district level. Partnerships with schools and colleges at the district level required a lot of resources, particularly time, but had some extraordinary benefits for students, including a wider array of available coursework.

“Then the kids can take different courses at the community college. We’re a small rural college and you don’t have to have a cohort... So this kid is in science, this kid’s in English, this kid’s in math, and they get back on the bus and they go back to their high school. And that was actually less expensive for those small rural communities than trying to find a teacher for this class, and a teacher of that one, and what have you. But that meant that those districts had to collaborate on timing and scheduling because if you have a bunch of different schedules... it just doesn’t work.” (Site 3)

Partnerships and collaboration at the state level. There were benefits to collaborations at the state level. At least one of the administrators in Site 3 described having a state EEDA peer group. Another interviewee discussed sharing curricula with partnering states. One example of state-level collaboration is described below.

“The major state organization was an important player in this. I mean, I involved them early on. As the outgrowth of that relationship, there were businesses and companies and CEOs who took on leadership roles in support of education and in support of the legislation. Now the [Employment Commission], you know, basically all of the state agencies were at the table, but I would say this organization was primarily the leader.” (Site 3)

There were many examples of challenges with partnerships at the state level. The quote below is an example of one such challenge.

“I think you’ll find a lot of discrepancies in the state, center to center, too, when it comes to funding. Especially with the way you can read laws many different ways. It all comes

down to how the districts want to read the laws. So my colleagues...some of them have a budget as few as a thousand dollars a year for 50 students to try to teach culinary with perishable foods. Another friend has a \$25,000 a year food budget. There's a huge discrepancy." (Site 3)

Partnerships and collaboration with parents and students. Rarely were authentic partnerships described between parents ($n = 5$) and students ($n = 7$), and when partnerships did occur, they seemed to be isolated incidents that were a result of a relationship formed with a particular teacher or staff person. For example, one teacher stated:

"I have parents that love me. I've had parents that have been more involved and involved every year. Have bought dissection materials for all three sets of classes that are very expensive. They're like 'You need this? Here. It's yours.' And they're here all the time. I mean they're just here." (Site 1)

Twenty-seven transcripts described parent involvement as parents being participants in conferences with guidance or career counselors, motivators of their students, and the people who ultimately make the decisions about which school or program their child will attend.

Parent conferences. POS efforts assisted in bringing parents more actively into the educational process.

"I think it also enabled, not necessarily always a positive acceptance, because of the time constraints, but in the legislation is that the guidance counselor, or a counselor, parent, and student have to sit down face-to-face in a session at least annually to review their plan, and to be involved in those discussions. I do know that many of them do use group sessions as a part of that process so the information to all the parents that would need to know have an opportunity to hear that." (Site 3)

Parents as student motivators. Parents were sometimes involved in actually encouraging the interest in various career paths.

"I think some of the changes start at home in my opinion. Parents that get behind the student's education and steer them in that path and start training at home, it, you know, flows over into our classroom." (Site 3)

Parents as program decision-makers. Parents were also involved with their children in deciding what course of career their children would pursue or whether they would enroll in POS.

"We all know that parents, we can spend thousands of dollars on marketing and recruitment, but your best tool is the recipient of the program." (Site 3)

"A lot of them came here because their parents wanted them to. I'm not gonna lie." (Site 1)

Although there were many instances in the data of students collaborating with other students, or working closely with adults, there were few instances of students truly collaborating with adults in a shared leadership role. Two strategies for collaborating with students noted by interviewees were to have them come back after graduating and work with current high school students and to have them serve on advisory boards.

3. Professional Development

All three sites planned professional development. In some sites, professional development occurred more informally, whereas in others, professional development was well supported by the school district and the community college system.

At Site 1, there was evidence of both systems in operation. As noted, academic and CTE teachers taught near each other, so they were able to share information about curricula and instructional delivery on a regular basis. All of the teachers knew about PBL, High Schools That Work (HSTW), and Project Lead The Way (PLTW) and were able to draw on these models. The school district had a structured plan to provide workshops and trainings to help teachers understand how to deliver integrated academic and CTE instruction that was connected to employment skills and content area needs. The Assistant Superintendent responsible for helping to coordinate CTE programs spoke of one or two workshops a week on related topics, especially directed at helping comprehensive high schools include more active learning methods in their programming.

The other two sites did similar things, although not quite to the extent of Site 1. They, too, had helped to introduce trainings in HSTW, PLTW, and more generically in PBL. At Sites 2 and 3, there was an effort to have CTE teachers provide workshops for academic teachers, who in Site 3 had requested more opportunities to see just “how academic subjects are applied in work-based settings.” There was also an effort at all three sites to engage counselors more actively in the process of understanding and sharing CTE program knowledge, and information about POS particularly, with students and parents. Counselors, like teachers, expressed an interest in learning more about the actual courses and career goals connected to various occupations and career clusters.

Professional development seemed to be more focused on secondary schools than on community colleges. As indicated, part of the difference between the two was that secondary programs focused more on pedagogical concerns and integration of academic knowledge and skills with applied learning. Postsecondary faculty were more concerned with the quality of the content; in many instances, they assumed that students would come to college with adequate academic skills and were less interested in providing support for increasing academic connections. At Site 2, for example, the community college was interested in bolstering students’ academic knowledge, but chose to approach this goal through the means of a tutoring center that provided more rigorous work in the academic content area; it did not seek to integrate learning through projects.

NVivo9 analysis. Professional development was mentioned in 18 of the 42 transcripts, or almost half of all transcribed conversations (43%). Data from these transcripts provide more understanding of the nature and importance of the role professional development plays in ongoing efforts to improve and expand POS.

Collaborative summer professional development. One strategy mentioned was to hold professional development over the summer, with school and community partners training together.

“During the year, we have professional development, but our major focus is our education and business summit in the summer where we deliver the professional development to focus on all of these initiatives, and we have secondary, postsecondary, and business leaders there as well. We have about 2,500 people attend. We have about 170 different sessions that occur. At our summit we have a track at the summit for the High Schools That Work, the Middle Grades That Work, or Technologies Centers That Work, as well as guidance counselors, so we have different paths for professional development of these different groups. We expose them to cutting-edge programs.” (Site 3)

Project-based learning (PBL). When PBL was embraced by the school community, this was supported and enhanced by professional development and ongoing support.

“But the CTE teachers, the teachers who have come onboard at the career and tech academies have a pretty intensive introduction to project-based learning and then they continue with that for the next 18 months, with a trainer of trainer model, and they each have mentors.” (Site 1)

“What I see from the interactions I have with the teachers, because that’s one of the things I do, I spend a lot of time in the classroom and being around the teachers and the students and I... I probably get a better view of the real activity in the classroom and the curriculum. I’m impressed by this Project Lead the Way because it does focus on a more disciplined, stricter curriculum, and... it is structured, which is the good part. When you get into the college level of engineering—applied engineering—it’s a very disciplined curriculum. So taking this group of teachers that we have and put them through this training, they’ve got an advantage over everybody else I see. One, because they have a different exposure of positive training. How to do it in a team setting. Plus all the high technical knowledge that’s in this curriculum. I’m impressed with it.” (Site 1)

Work site visits. In order for teachers to stay current with technology and the needs of their particular fields, some school leaders felt that teachers must interact with industry professionals to see how current work sites operate.

“There was actually a summer class offered for teachers, and I don’t know if it was specifically in the county, but I remember several of my colleagues signed up for it, but it was like educators in industry and they literally would spend whatever... six days during the summer on a bus going from one industry to another to go through it. Which, you know, it was an easy class for education tech, but it was a great experience to go out there. I know at ABC High School, our math department, science department, was given the full tour of a local plant not long after it was opened.” (Site 3)

Professional credentials. Many professions require people to hold specific certifications or

credentials. Some of the schools used professional development resources to support their faculty and staff in maintaining these credentials.

“The college, a lot of colleges will say, the faculty member will have to have X number per year. We do not have a certain number, but because my folks are licensed or credentialed in a particular area, their accreditation, or their licensing body may say you must have 12 credits per year, 9 credits per year, 24 credits, or whatever a year. So based upon that we do not pay for them to go get their license or get their certificate, but we will pay for them: The college will provide up to \$500 per faculty member to get professional development.” (Site 3)

Programs of study. Part of professional development activities included actually getting the word out to school teams that POS had the potential to make school and college reform real and effective.

“We solicited involvement from high schools and school districts and colleges, and we asked each high school to send a minimum of a lead administrator for curriculum, a counselor in a leadership role, and a department chair... as a minimum, team of three. And so most schools sent four to six individuals, and total we had... we captured 65 high schools, 66 high schools between the two workshops. And the whole purpose was to—to get the ‘what’ out there. What are Programs of Study?” (Site 1)

Respect and understanding. Several of the CTE teachers spoke about using professional development opportunities and other events to get people to see what happens in a CTE classroom. CTE programs can gain respect and understanding when people see the rigor and complexity of the material.

“With a requirement, as a requirement every year to come and go through all of our programs, just so they could understand, because every time they come, it’s like they learn something different. And we even invite the superintendent... because when they see the fact that, ‘Wow, in machine tool they actually have to know how to measure. They have to break all of these measurements down and know the equivalents.’” (Site 2)

“And when we’re doing presentations... we talk about, ‘Do well in English, do well in math. And here’s an example of how machine tool uses math. Hey, they’re going to use trig, okay? What your math teacher is teaching you is extremely important.’ And those teachers have, I think, accepted more of that and they’re starting to see more and encourage more students. On the 28th of February, we’re having math and science teachers come over after school... we’ve been working on this for a while, and going into our pre-engineering classes where they use a lot of math and science. So I think that’s a real plus if they could come over here after school and see the latest equipment and talk to our teachers.” (Site 2)

“So that is... would probably be an issue that we had to address, like you heard today, in educating the counselors, of the middle school teachers, industry, whoever our partners

are, about what these kids are actually learning. They're learning a lot more about alternative fuels and things of that nature. Human-powered vehicles, you know wind, solar, water, they learn all about that. But the name *transportation* cannot really... it's hard to find a name that tells people what you're doing. So these types of events where we kind of educate them on a more—a deeper level—is how we address that, and that's why this was an event that hospitality put together with the counseling department.” (Site 1)

4. Accountability and Evaluation Systems

Each community had an accountability and evaluation system in place, but interviewees reported that it was hard to collect information on program participants and even more difficult to track students as they transitioned from secondary to postsecondary education. Secondary programs at Site 1 had some impressive evaluation data to indicate how their programs were doing. Because they were involved in just one school district, in just a few schools, it was easier to track student progress than in other places that had multiple feeder districts and less exact descriptors regarding who was actually a CTE or POS student. In one CTHS school in Site 1's district, measures of engagement and achievement were fairly impressive: Attendance (one measure of engagement) was 97%, dropout rates were only 2%, and measures of student academic achievement indicated that students were performing well above the district averages. For example, in reading, the district average for students exceeding the state standards was 47%; for this school, 68% exceeded standards. In writing, 82% of students in the district met state standards; in this school, 93% met those standards. In math, 54% of district students met standards and 16% exceeded standards; in this school, 60% of students met standards and 27% exceeded standards.

Schools in Site 1's district could gather good data because students were required to take four or more courses to complete their career-related four-year graduation plans. This gave students the background in CTE that would make a difference in their overall programs.

All three sites attempted to indicate the level of participation in their descriptors for CTE concentrators, majors, participants, and non-participants. This was easier to accomplish when programs defined participation in POS as three or four courses in a sequence, making it easier to understand exactly what the CTE program consisted of in the school. These requirements largely self-defined POS participants as having taken or planned to take a specific number of courses—such course definitions provided good access to data tracking.

Communication at the community college, as in the secondary programs, was better and more effective within the institution than between secondary and postsecondary programs. All three community colleges visited at the three sites could identify who was involved in POS but had less data on who had been involved in POS at the secondary level. As one interviewee put it, with counseling load ratios standing at one counselor for every 2,500 students, it was difficult for counselors to monitor information about career and course progress.

NVivo9 analysis. NVivo9 analysis indicated that assessment is complicated, with multiple layers and multiple sets of standards and systems of measurement. Further, methods for holding programs accountable are in constant flux and negotiation. Six of the 42 transcripts, or 14% of all transcripts, described various ways in which programs are assessed and held accountable.

“We have to support the high school and all of the issues related to accountability, the average yearly progress, the No Child Left Behind, and now we’ve got new measures we’re putting into place. We had math and science with the national standards, but we also hold our programs accountable to a fairly evolved sort of assessment process that involves all of the stakeholders. We measure all of the programs pretty carefully on 17 standards, which really is the foundation for our national accreditation through AdvancEd. But our accountability is a fairly broad measure of all aspects of what we call a good career tech program in addition to all of the Perkins standards and things that are planned.” (Site 2)

“We also have now, although the state level, we have a state report card for the career centers separate from the high schools, and there are many of those. They have their own report card and we try in all the indicators that we have at the federal level for accountability, we try to mirror that with the state level.” (Site 3)

“The career technical centers actually are getting a double whammy because they’re actually being evaluated at the federal level as well as the state level in regards to their performance. So we look at completion rate, we look at the standards of 2.0 in the academic core. We look at the technical skill level and the assessment. We look at non-traditional participation. We also look at the placement. So all of those standards are a part of, we have the state plan, then as well as the local plans.” (Site 3)

“It was only the industry credentials because we’re having to get over some hoops of, the Commissioner doesn’t want to use the state standards exclusively because it is not what he refers to as externally evaluated, but he charged our ... group to develop a measure for career readiness that we would move forward with in the future, and that measure is going to have various things that students could show their abilities under technical skills, academic attainment, and employability skills, and then a student would have to earn a, or have to pass an appropriate, if it falls under say two of three of those areas to be considered ready. And they are going to have our state assessment as one of those as long as it’s coupled with something that is externally validated.” (Site 2)

Assessment of individual students. The impact of standards, assessments, and evaluation on curriculum and instruction was discussed in 81% ($n = 34$) of the 42 transcripts. As one teacher said, “Well, we have the Perkins skills and standards or federal standards we’ve got to meet that include the assessment of technical skills as well as academic.” Participants discussed Perkins standards, career readiness standards, and state standards; they also discussed individual technical curricula as well as district-mandated curricula. Assessments included certification assessments, AP exams, EOC tests, state tests, college entrance exams, the SAT, and the ACT. The intense focus on sometimes competing standards, curricula, and assessments made things more rushed, more prescribed, and less flexible.

To prepare students for certifications. Part of the purpose of the emphasis on assessment was to ensure the tests were well connected to business applications and had a reasonable chance they were applicable.

“In my program, and this is the reason we switched to the online program, they are more up to date. Their ability to prepare students to be able to pass A+ certification tests is a true indication and the whole curriculum is geared toward passing that test.” (Site 3)

To prepare students for the state assessment and college entrance exams. Focusing on assessment processes help prepare students for future assessment.

“I think maybe my second year here was when the state tests were implemented so I guess my teaching has been kind of formed by what the state is expecting. So I haven’t had a longer time to teach any differently than what I do now.” (Site 3)

“And one of the high schools is actually taking that score from the ACT, and they have created classes, if you scored on your ACT between 15 and 18 in English, this is the English class you’re going to take next year. And they are addressing those benchmarks there to try to get those scores up.” (Site 2)

To prepare students for end of course EOC exams. Part of the purpose for developing rigorous curricula is to prepare students for various kinds of tests, including tests developed at the end of a course (EOC tests) to measure specific learning objectives.

“But, you know in Miss S’s situation, she’s got an EOC, an end of course test. She’s got to provide those kids with all the background and what it needs for them for the end of course test. As a Math Tech Four I do not. And so I have a lot more liberty. We still have state standards to cover but I’m not restricted to that material that an EOC is required. I can branch out a little bit more with freedom than what she can.” (Site 3)

“We have end of course test in biology and I’ve taught with it and I’ve taught without it. And, to me it’s much more flexibility without it. I cover the same things. I cover the same standards but if we need to stay in one place a little bit longer, we can. So, it does make it more difficult to incorporate career education into your class when you are, when you have a specific score on a test.” (Site 3)

Drawbacks of increased assessments. The focus on standards and test preparation was cited as an obstacle to providing real-life or applied learning situations and collaborative learning opportunities.

“Because I guess I should have said because we have, we are concentrating so much on standards, and a lot of standards. Sometimes it’s a little difficult to pull in, you know, real-life situations. Of course when we do cover areas such as translating from a real-life situation to an algebraic expression then they get to see also. For instance, you know, talking about distance, how fast you need to drive to get to a certain place based on the time period and how fast you’re going.” (Site 3)

“But see there again, because of the EOC, the drive of those end of course tests, I would love to do that but with 28 and 32 in a class I don’t have time to let them have their time to share. Do you see what I’m saying? I’m driven by those tests.” (Site 3)

Benefits of increased assessments. There were perceived benefits to increased assessments, including increased student engagement, increased diagnostic information, and job placement.

Engagement. Sometimes assessments drive students to concentrate specifically on learning objectives.

“Just in the last year, I’ve seen a difference in students in the mindset, because all of them have to take that ACT test, and so it’s not just the ones that are going to college [that] have to take it. It’s all of them. And now that score to them is real, they realize that score is being attached to them; we look at that score.” (Site 2)

Diagnostic information. Other times assessments are used for assessing initial knowledge and skills and for appropriate placement in programs.

“Personally last year, I actually did some adjunct things with the community college. Our kids... take ASSET diagnostic tests and they get their scores back and what we found is that a high percentage of the kids weren’t going to be ready to go directly into a college-level course. They were going to have to do a remedial class, so I actually, we targeted some kids here and I did some tutoring for those kids to be ready again to take the test again. And I think only out of that group of kids that I had, maybe two went back to reattempt it so they would not have to take the remedial math course when they went over there.” (Site 3)

Job placement. Some assessments help get students jobs.

“So they go to the downtown campus, they take a diagnostic test and they input the scores into a database, and the companies...can go in and access anybody that’s taken the test and hire from that pool.” (Site 2)

Alternative assessments. Despite the preponderance of multiple-choice assessments, some programs are finding alternative ways of assessing their students, including the use of rubrics with performance-based assessments and portfolios.

Performance-based assessments. Of the many assessments used, performance-based assessments were deemed to be very effective.

“Because we’ve been doing problem-based learning—they’ve been doing it for years. And the handbook is really nice because it has the rubrics and how you do that so if you’re a beginning person, that’s a good resource for you.” (Site 1)

“Besides using the rubric, I have a lot of performance tasks that the kids have to perform. That’s how I test their skills. So to give you an example, I have a task where the kids have to go out and dismount a tire and after they dismount the tire they have to tell me the parts of the wheel and the parts of the tire. Like what is the tire size? They can’t just say ‘Oh it’s a 13-inch.’ No. It has to be a 13-inch, 175 by 235 radial tire or bias ply tire. They have to tell me specifically. Then they have to tell me what type of wheel they took it off of. Is it a drop center wheel or is it a flat surface wheel? Is it aluminum or is it steel?”

Once they have shown me that and actually given me the correct answers, then I ask them to remount the tire and inflate it properly and tell me what it has to be inflated to before you actually put the air in. And so they'll say, 'Mr. C, it says here on the side of the tire, "maximum inflation is 55 psi" but I have to know what car it's going on to tell you exactly how much air is supposed to be in it.' That's the correct answer. If they go for the tire and say 'I have to fill it up to 55 psi,' they fail. OK? So those are the type of technical tasks that we have them going through over and over, week after week, and they – they get sick of me when I say 'It's performance task time.'" (Site 1)

Portfolios. The use of portfolios demonstrated students' ability to collect information about their progress. Portfolios can help to document learning and certify outcomes, especially for fields that don't have national standards.

"For example, a portfolio assessment for a photography student, we do it with a rubric that's been generated by this local board. It's the closest thing we can get to an outside assessment. Some of our others, again, that we're struggling with... landscape and horticulture. National standards don't exist and frankly they wouldn't apply very well to our location anyway." (Site 1)

"But that's something that I've thought about and I've read about other schools doing is kind of the exit portfolio. And some do it completely electronic, and I think that's a great idea." (Site 1)

Informal assessments. There was no discussion of a formal evaluation of teachers by any program, school, district, or state, but interview data showed that many teachers and personnel reported holding themselves to very high standards and using various informal assessments of their instruction. Some of the respondents discussed how the most important measure of success is how students perform once they are working in the field. This is not typically tracked by schools, and several people talked about how they use this informal measurement of their teaching.

"We've talked about how we can assess how they do after they leave us—you know going on to a postsecondary education, going to work. We're still working out some of those, that's why I've kept in very close contact with my seniors, because that feedback is so important to... my personal assessment of the program area and what we're offering them." (Site 1)

"But I've seen that they spend a lot of time—what appears to me—analyzing what they've done and how they can do it better. And they do that yearly. I don't know if that's typical at all schools, outside of here, but again... the time, as I see, the investment that they've put in here to me seems out of the ordinary, which to me would lead to changes are being made and the need for change is recognized." (Site 1)

5. College and Career Readiness Standards

The concept of "college and career ready" was addressed in all of the sites in different ways. Each site viewed college and career readiness standards as (a) including preparation for academic knowledge and skills and (b) providing career and technical skills and knowledge so

that every student would graduate with some kind of career plan that involved connections to higher education and employment. From the counseling emphasis in one state, where every student completed a graduation plan that included post-high school activities, to other sites that encouraged students to complete dual enrollment courses and graduate with college credits and college connections, there was a concerted effort to make sure students had options, and one of those options was to continue with higher education.

Models differed by location. At Site 1, the CTHS connected instruction in both areas, academic and career, in all phases of instruction. Students learned about these connections through their projects, ensuring that they mastered the subject knowledge and skills in academic disciplines such as language arts, math, and science, as well as acquiring applied skills in such CTE fields as culinary arts, medical careers, and design. In addition, students did some job shadowing, internships, and apprenticeships, although these were not found as frequently in all programs, especially at the secondary level.

Site 2 had an optimal design in their community college, where secondary students actually attended the postsecondary institution and received their academic credit as they studied in CTE fields. This design guaranteed students would be college and career ready because their educational system was conducted as part of a college model.

Site 3 offered multiple options, especially through a career academy, to connect secondary and postsecondary work simultaneously. Teachers at the career academy were CTE certified and taught dual credit courses that required students to perform at college levels as they learned about how academic learning was integral to all learning, especially the learning that occurred as an outcome of career preparation.

All of the sites adhered to standards, often set in the academic agenda of the state, to ensure that students who were pursuing CTE and POS projects covered and completed higher-level work in the academic disciplines. The tension between these academic standards and POS—particularly the need to ensure that academic learning was being carried out through applied CTE activities—proved to be an issue at a few of the sites. The focus on achievement as measured by standardized tests proved to be a barrier, at times, to the integration of academics and CTE.

NVivo9 analysis. Seventeen of the 42 transcripts (40%) discussed preparing students to be college and career ready. Eleven of these transcripts (24%) also discussed the challenge of working with those students who need remedial education upon transitioning from high school to college. Assessment was an important factor in helping to demonstrate that CTE was affecting learning in academic areas and in applied, workplace contexts.

CTE and academic integration. One of the key ways that schools and teachers worked to prepare students to be college and career ready was to blend academic and CTE content and material.

“[In our programs] academic standards are aligned and met. All of our courses that we adopt in our state relative on the technical side [have] to be, they all have to be aligned with the core academic standards before we launch those, and to give you some inside on the career and tech options at work, we’re seeing significant reduction in the need for

remediation, because they focus on literacy, math, and English language arts literacy.” (Site 3)

“With the career pathways, we’ve seen schools offer courses on the academic side that support career majors that maybe they didn’t offer before. For instance, offering teaching anatomy and physiology for nursing students and that kind of thing.” (Site 2)

Early intervention. Some schools test students early and often, with the goal of ensuring that any academic needs are identified and addressed quickly. This allows staff to talk with students about the realities of admission requirements or certification requirements.

“We take that, but . . . right now we’re in the process of having all of the high schools send busloads of kids over here and Compass testing them. So, when we go out in March to all of the high schools and register, we already have those scores in front of us, and we’ve got to break the news, which they’ve already been warned [about]. ‘Okay, your score is not high enough. You want to go into this program, but you don’t have it so I’m going to put you up on the skills tutor and bring your skills up. You can retest, but come fall, you will not be admitted into this tech program unless that score is up.’” (Site 2)

“Well, that’s some of the pilot programs we have in the high schools and they are offering remedial class in their school. They are offering the lowest two math courses right now at the high school. So the high schools are trying to take some responsibility on, trying to get them more college-ready.” (Site 2)

Collaborations. Connecting with community organizations and governmental departments provided additional support to demonstrate the actual learning taking place.

“We’re getting some help from the Housing Bureau . . . We’re getting the housing folks to help us do some testing using the state standardized testing [for] HVAC, electricity, and plumbing, and also help us find sites for these students to get work . . . In part, really, it’s coming about because of this requirement, finally, that students have to be college and career ready and that industry certifications count. So, now we’ve got local superintendents calling the housing board and asking them to help us.” (Site 2)

Remediation. The high need for remediation of student skills when students enter college was a heated, frequently discussed topic.

“What happens is you have high schools who are funded to educate them and prepare them for what’s next, and then they exit and they go and take a test that demonstrates that a large percentage of them, a third probably, and probably more than that that are coming to—the community college is probably 60%—are not ready, so you have a whole department here and all community colleges have them, in remedial developmental education that are supposed to basically do what the high schools are supposed to do, so you’re basically taking additional funding in many cases from the taxpayer, and also from the person who is paying money to have that done.” (Site 2)

“It is not good and those students are considered successful high school students. They graduated and they got their diploma, which means they passed a proficiency test. The

markers for academic attainment. They got the grades and they're still in need of remediation. So we have our work cut out for us." (Site 1)

"And it's not just medical laboratory science that has the problem. Nursing has that problem as well. And we've all had to put into place such high standards even to get to our programs so the students will be successful that they're actually having to go to school four years or more to get an associate degree, because they're having to do all of these remedial courses on the front end. You know... we have a bunch of students in courses we call transitional courses. They're high school courses. If I were a parent and I had sent my child to high school and I had to pay because those courses are not covered under their financial aid, so you're having to pay for a high school education when they went to high school, but they're not getting that education in high school, I would be upset." (Site 3)

6. Course Sequences

Sequencing of courses was a functional component of POS at all three sites. At Site 1, students actually planned their high school curriculum by connecting the sequence of courses in their school that specifically prepared them for a particular career. In part because students had to participate in a lottery in order to receive one of a limited number of seats in their chosen POS, it was not easy for them to change their POS once enrolled. POS course sequences often spelled out the names, number, and types of courses required for the program's aligned career objectives. At Site 2, courses were co-taught on the college campus so students knew exactly which courses were being offered for specific purposes in their career sequences. Courses with dual credit status had been aligned so that secondary and postsecondary instruction was connected to ensure non-duplicative elements and to ensure that content was arranged in a logical sequence of growth in knowledge and skills. At Site 3, the secondary school, career academy, and community college similarly collaborated to align courses in a sequence that ensured continuous growth and movement through a sequence of skills that led to the next level of education and career competence.

Sequencing occurred in at least two forms across sites. In one form, teachers from secondary and postsecondary levels met to discuss course objectives and content. Courses were taught by different teachers, often at different educational levels. In the other form, courses were taught as dual credit entities where the instructor was actually the same person—this might be a secondary teacher teaching at the community college and certified in CTE or a postsecondary teacher or member of the faculty who was responsible for the development of a course that was actually offered at the secondary school level.

NVivo9 analysis. NVivo9 findings suggest that interviewees at each of the sites referred to formal agreements that were put in place to articulate course sequencing. The degree to which the courses are sequenced seems to have improved since the passage of Perkins IV.

"And we, of course, only implement or approve programs for career and technical education that follow that course sequence that's required for a course through Perkins law, and we really hold our schools accountable to a solid sequence of courses that lead to actual marketable skills." (Site 2)

“We have had formal agreements. We have moved away from very specific program-driven agreements with our career centers and high schools. Now we have just an MOA with each of our nine school districts. It doesn’t eliminate anything that we’ve done, but really, in many ways, gives us more flexibility... I mean, it’s just a memorandum of agreement that the resources we have that we will do whatever we can do to promote the partnership and move our students through the educational process.” (Site 3)

Challenges of course sequences. Even with improvements being made to course sequences, there are significant challenges to designing and implementing them. Among the challenges described in interviews were student retention, challenges in rural areas, teacher credentials, student flexibility, and funding.

Student retention. Some factors made it difficult to maintain students in a full, multi-year sequence. Students sometimes dropped off before the final year of courses.

“The numbers of students that stay in a four-year sequence, well it tails off tremendously in that senior year. And that’s another thing, what... we’re changing is a three-year sequence is much more viable in terms of students being engaged and staying in. And we’ve determined most of our standards can be met in a three-year course sequence versus a four. And we’re making some changes in our accountability system where, well, what happens to that student who wants to stay in that sequence in that fourth year?” (Site 1)

Harder for schools in rural areas. Some students needed to have options when their home schools didn’t provide all of the courses for a given sequence. In some cases, online opportunities helped provide appropriate courses, especially for schools in rural areas that didn’t have direct access to many technical areas.

“Just last week our health sciences consultant, the one I was just talking about, for a lot of her sequences in health sciences—not hers, ours—but programs of study, medical terminology is a course and—and we’re exploring having that course done through an online program from here in Southern Site 1. We thought... what a perfect course to do online.” (Site 1)

Limited by teacher credentials. Not all schools had teachers credentialed to teach in all the career fields, which created problems for students who were hoping to continue their sequence of courses.

“So once they have those classes at [high school X], then they’re able to come on campus with those courses already under their belt here and take the next courses in the sequence. However, if I go to [high school Y], which is the other high school in the next county district, I don’t have that opportunity, so then they have to come here and get those because we don’t have a teacher that’s credentialed at that particular school to teach that course. (Site 2)

Limits flexibility for students. Commitment to a specific occupation in order to maintain program consistency sometimes limited student choices; they couldn’t easily move from one occupation to another because there might not have been a teacher in that area to accommodate

them.

“Once they get into that sophomore year, it’s much harder for them to flip because of the fact that they cannot take all of the classes in their program area and get a complete certification that they’ve done this whole program because there’s not time to do it, and there’s not room in a lot of cases. But I think our programs work very well together because they do—once they take the intro classes, its all of a sudden, ‘Well, I like to cook, but I really don’t want to just cook. I want to do front-of-the-house things as well.’ And the same with my students. They’re like ‘Well I really like more of the back of the house things so I’m gonna switch to culinary.’ So we do offer that option, but after they’ve, you know, gotten into that first part of the sophomore year, it’s kind of hard to change after that period.” (Site 1)

Limited funding. Financial limits were perceived to be a problem, especially in providing the kind of articulations required between secondary and postsecondary institutions.

“Additional monies need to be appropriated under Perkins, and I don’t know what that number needs to be, five million, ten million, additional dollars; I really don’t know, but if they could set money aside where states could apply, as we did before, for the rigorous programs of study for grants up to \$275,000, and I think that number would work out fine, and it basically requires that kind of funding to build these seamless pathways in the most effective way.” (Site 3)

7. Credit Transfer Agreements

Credit transfer agreements existed at all three sites. The most common form was a list of courses that qualified for dual credit at both the secondary and postsecondary level. Every community college involved had specific courses identified that carried credit transfer or dual credit and were taught at either the community college, the secondary school (frequently a CTE high school), or both. Often the secondary school instructor had dual certification to teach at the community college and was thus qualified to teach the postsecondary course on the secondary school campus.

A unique feature of the dual credit arrangement at one site was the availability of the dual credit secondary course counting for the same number of credits as an AP course. This course provided a student with an additional point toward his or her grade (considered a five on a typical four-point scale, where an A in a traditional class gets four points, and an A in an advanced course gets five points). This arrangement proved very attractive to both students and parents, allowing students to take CTE courses with the same advantage given to traditional AP students. It was attractive to parents because it allowed secondary students to enter postsecondary programs with college credit already obtained through high school, thus decreasing both the length and the expense of the college experience.

NVivo9 analysis. NVivo9 analysis suggested that the combination of legislation and related funding opportunities have made the landscape ripe for credit transfer agreements. One person described it this way:

“We’ve still got some hurdles to go, but I think us having signed the first statewide articulation dual credit agreement ever in the history of the state for a two-year or four-year articulation dual with secondary is a landmark that would not have occurred without the legislation. And I think, too, with the grants that came through the rigorous programs of study have helped drive that.” (Site 3)

Benefits for students. Interviewees felt that there were clear benefits for students, such as increased student motivation and retention, reduced costs to students, increased rigor, and easier college transitions.

Increased student motivation and retention. Options to earn credit, especially dual credit, gave students an incentive to continue their education and earn actual credentials that they could use to later enter an occupational field while still in high school.

“Actually, we’ve been running that through Perkins money that we get, grant money, that we’re teamed up, actually went to career centers, and some of their students who are taking our dual credit can actually take those tests and get kind of like ahead. They can take one of the online tests. It’s a good incentive for them since they’ve already earned the credential. Say ‘Oh man, I’ve already earned a credential. I can apply this toward graduation.’” (Site 2)

“I started doing dual credit three years ago. I’ve been very successful as far as retaining good students. Not because they know that they’re not potential for... high class rank at graduation or scholarships or that’s going to help their average just as much as the AP English class possibly could. But if they’re planning on going to college, my classes are going to be more beneficial than an English class would be in many cases.” (Site 3)

Reduced student cost. Being able to earn college credit while in high school can help reduce the amount of time spent in college, which can cut college costs.

“One thing if they go to community college, they’re going to have to pay the admissions fee. They’re going to have to pay for the course. So the fact that most of these dual credit courses are free or reduced even with the, right now the math and English course where the community college actually send their own instructor, kids [are] getting a reduced rate for those courses and the districts are picking up half the book cost so that’s helping them skew it out too.” (Site 3)

“As a matter of fact, around 8,000 kids a year receive credit for dual credit in [this state]. Now we’re talking about dual credit that’s not charged to them at this time. Some kids get as much as 30 hours. We have students that get halfway through an [licensed vocational nursing] program.” (Site 2)

“[Dual credit] helps sell the program, especially to parents. You talk about taking two free classes that is probably saving my student \$1,300 and parents are interested.” (Site 3)

Increased rigor. Connecting with college allows students to take college courses before they graduate from high school, so they get a chance to experience real college requirements and understand the need for college-level learning.

“You know some of them are pretty strong students who if they didn’t have this choice would be taking another PE course and they’d spend their day in the gym, but instead they pay the money, buy the books, come out here and take English 101, and they get a little bit of the campus. They get a little bit of freedom. They get a taste of what a college professor does in their classroom.” (Site 2)

Easier transition to college. Dual credit and college credit transfer programs simply provide students with the opportunity to experience college before they officially get there. Such experience ensures an easier transfer to the college world.

“And if nothing else, if they go through the program and decide ‘Well, you know what? This isn’t for me.’ They’re not gonna waste a minute in college doing something they don’t want to do.” (Site 1)

“Basically what it does for our students, it connects. I mean they come here for two years, but you register one time. You do financial aid one time. I mean you are admitted to both entities at the same time. And it’s a progression program, so that as you move into the program, you start receiving benefits of the four-year campus, like library, sporting events, advisement. But it’s a progression for that student. They start here, but they are enrolled, they’re recognized, at both campuses.” (Site 3)

Challenges of credit transfer agreements. There are also real challenges to implementing a statewide dual credit system, including competition with other school initiatives, scheduling, inconsistent credit agreements across campuses, how to measure student impact, transportation, and student age.

Competition with other school initiatives. Because of the improved status of CTE, it now competes with those programs perceived to be more rigorous at the traditional high school, like AP.

“Because they saw it as highly competitive with AP, and we never intended it that way. What we see in our schools here, that there are those AP students, and it would not matter, and if they’re bound like to these Ivy League or certain schools, they, if they are advised properly, there would never be in contention for dual credit anyway. That’s how I see it, and I think that’s one thing that I’m beginning to see strength in. I don’t think the advisement in the schools was where it needed to be at the time for us to be able to sell dual. I do see a change in the right direction there.” (Site 3)

Scheduling. Because some programs are offered during the regular school day, students don’t always have the freedom to leave the high school campus to access the community college.

“A lot of our high schools were not allowing students early dismissal to do dual credit—I’m seeing that.” (Site 3)

Inconsistent credit agreements across campuses. Articulations are not always effective because of multiple school systems. Sometimes private schools aren't always included in the development and articulation of courses.

“They have their own special courses, and if you take 101 and 102 in high school, they will kind of let you pass, but they want you to take their 104. And a lot of our private schools have their own English classes. So, we are mindful of those and know how those kind of align.... For example, if a student says they want to be an engineer my first question to them is, ‘Where do you want to go?’ Because if they want to go to [a particular school], I actually have a checklist of classes that will transfer to [that particular school] and the ones that won’t.” (Site 2)

Measuring student impact. Some of the positive outcomes for programs, especially those connected with industry certification, are difficult to capture and report. It is also difficult to track students from secondary to postsecondary programs.

“Market your successes based on qualifying students for credentials for industry certifications; we have a huge selling point that we’re not capturing. And you’ve heard the conversations out there about our ability—our inability to capture the data for students that sit for industry credential tests, which is bunches of them, and we’re trying to figure out how to do that. We want to capture that data to show what this impact is.” (Site 1)

“Between secondary and postsecondary, we haven’t come up with a good way of tracking students and first of all helping them and making sure that they matriculate and use that credit. And then even if they do, we haven’t done the work to follow those students and find out how successful they were and what the return on investment is for the college for providing that dual credit currently at no cost.” (Site 2)

Transportation. Some students are limited because they don’t have transportation to the community college.

“I think it is [difficult] for some of the students because logistically they are not able to travel from their campus... to our campus.” (Site 3)

Student age. Legal restrictions in certain occupations, such as students under 18 or 21 not being able to participate in occupational areas that feature gambling or serve liquor, can limit student opportunities to enter particular programs.

“They can’t [enroll in the program] because most of them are not 18 and once they turn 18 they have to show they have two years of work experience to take an automotive certification test.” (Site 1)

“A lot of business and industry now are questioning the age. They want them to be 18 before because most of the career fields here, unless it’s health science or something like

that, if you're dealing with machinery now that you can get hurt on very severely, they do not want these young people in those environments." (Site 3)

8. Guidance Counseling and Academic Advisement

Guidance counseling and academic advisement were present at all sites, with common themes voiced by interviewees including early intervention, the development of four-year plans, and CTE teachers serving as career resources. At each site, students were exposed to career exploration activities while in middle school or earlier. Career exploration included completing career assessments, receiving information on career clusters and POS, and engaging in high school tours to view program offerings. Further, high school counselors routinely visited middle schools in an effort to provide information about the POS available at their schools and to recruit students into their programs. At the community colleges, college-level personnel provided career guidance and program information to high school students in an effort to recruit students into their programs and to encourage students to take dual credit courses.

All three of the sites provided students with computer-based four-year graduation plans. The plans varied in their level of depth and use across each of the sites; one interviewee claimed that high school counselors did not know "anything" about career areas. Nevertheless, the central goals of the plans were similar: (a) to assess students' career development and interests, (b) to engage students in identifying career goals, (c) to provide a format for students to plan their courses throughout high school, (d) to begin the resume-building process, and (e) to identify and plan for postsecondary education or training opportunities. Further, students at all sites were provided with the opportunity to review and revise their plans on a yearly basis, typically by meeting with school counselors. Additionally, Site 3 included the engagement of parents in the process of plan development and annual renewal.

A final commonality across the three sites was that CTE teachers served as a valuable resource in providing career guidance to students because of their intimate knowledge of and experience in their fields. School counselors reported that they often referred students to talk to CTE teachers about their field of study in order to provide students with a real-world view of work and to provide guidance about postsecondary education, training programs, and other field-related opportunities.

The involvement of counseling staff in the development and implementation of POS varied from site to site. Counseling staff at all three sites reported knowing about their respective schools' POS and knowing how to advise students about necessary coursework. In Sites 1 and 2, the school counselors' role in POS development and implementation was limited. Conversely, the school counselors in Site 3 had a strong level of involvement in the development and implementation of POS. They also engaged in training academic faculty so that they could provide effective career and academic guidance to students. This site also staffed career development facilitators (CDF) who held a special certification in career development and whose primary goal was to expose students to the world of work. These individuals provided several services, such as arranging work-based learning activities for students, working with academic staff to include career information in their classrooms (e.g., informing students about different careers that are heavily reliant on particular academic topics), and bringing in individuals from local businesses and industries to inform students about careers within their region and related educational and training requirements.

NVivo9 analysis. NVivo9 analysis across sites and within sites revealed wide variation in counselors' official titles, roles, and duties. Interviewees also noted a number of challenges associated with their roles.

Duties of guidance counselors. Duties included holding meetings with parents and students, advising students on a classes or a POS, testing, preparing students for college, tracking students after college, transitioning students to college, building relationships across institutions, and professional development. Although interviewees did not discuss behavior management and discipline, these are presumably also duties of some counselors.

Meetings with parents and students. The POS legislation helped to connect families with the school counselors on a more regular basis.

“Yeah, they are and their parents have to sign off on it and they meet every year with their counselor to renew them so they are updated yearly.” (Site 3)

Advise students on classes or POS. Counselors are more involved in monitoring the progress of students in classes and programs.

“But the counselors, definitely they're the ones that make sure like when you get in originally what classes you're gonna be in, and cause there's – they're very specific strands and... where you need to be, you know, and so... they have—that's really their role with the kids is to make sure they're on task, doing what they need to do, taking what they need to take to be prepared.” (Site 1)

Testing. Counselors continue to address issues of providing services while carrying large caseloads that are often driven by testing needs.

“Over the years, we have promoted, financed, and supported career development centers in every high school. We have promoted career development as one of the key components of any guidance and counseling systems in a school. Fully aware of the wall we're up against with... student-to-counselor ratios and the burdens of testing requirements. That's a huge issue.” (Site 1)

“The superintendents obviously were concerned about who was going to do the testing, who was going to do the IEPs, and all of these other things that counselors sometimes get involved in.” (Site 3)

College readiness. Counselors have many responsibilities related to providing seniors with information about college and the completion of various forms necessary for college financial aid.

“The senior [counseling] curriculum is based on what is going to happen in your future. What about the FAFSA form? We show them where those websites are and take a look at them—what kinds of things do you need to fill that out? There's a college planning thing. 'Hey here's a worksheet. What does it cost for room and board and things like that?' There's all those kinds of materials in there for the seniors as they prepare to go out into the real world.” (Site 1)

Tracking students after graduation. Schools' assessment of progress requires counselors to track students after they leave their secondary school.

“Our guidance tracks students after graduation and I know you all are probably talking to guidance. They track them for a period of time after to keep up, where did they go, how long were they in school, or did they go into the workforce, did they go into the military.” (Site 3)

Transition students to college. Counselors have to monitor the appropriate placement of students in courses by analyzing student test results and courses taken.

“Okay, now for the students who are actually here on campus, again, the testing is involved. We look at whether they meet the requirements for the courses that they want to take. We also help those students with the registration process. If those students state that they've already taken all of their courses to meet their graduation requirements at high school and they just want to go ahead and get a start on courses that are going to transfer at the college they are going to, with the information they give us as to which college they are going to we look at what the general education courses are needed for that college and match it up with the courses needed here.” (Site 3)

Build relationships across secondary and postsecondary institutions. POS help to promote cross-institutional connections and relationships between counselors and teachers.

“We all have great relationships with our guidance counselors within the schools. We have, those are our partners, so we don't get in without them, but it's just a little bit different when I am one person in the high school and I have 500-600 students. I also have to worry about the ACT scores, I also have to worry about this, I also have to worry about drama in the high school.” (Site 2)

“And see, with EEDA, it's career awareness in elementary school working your way up a little more in the middle and then that spring of the eighth-grade year it's boom, you've got to start making some initial decisions, knowing you can change down the road, but you know our marketing department and my office stays pretty tight with the guidance counselors, and in most cases... my dual contact is a guidance person.” (Site 3)

Professional development. POS helps to promote professional knowledge of counselors so they can help guide students to various pathways to careers. They often work in tandem with teachers in learning about the career development process.

“As I mentioned earlier, how the district staff is working with each high school staff. We include the chief counselor, the entire counseling staff, whoever we can get to those meetings, because we realize that's a critical piece to this. And in these large high schools of 3,000 students, having worked in a large high school, I know a counselor has... it's a big job and you've got the performing arts folks who want you pushing their courses. You've got... everything. So it's important for counselors to understand what a pathway is and why it's important.” (Site 1)

“Like one will come to one event we do, and like at Christmas, we do this holiday thing where we invite them and they actually go to machine tool and get to make an ornament, so we get the counselors and the teachers are advocates actually in that field so they can see what the kids are doing.” (Site 2)

“We hold summits for teachers as well as guidance counselors. We expose them to cutting-edge programs and professional career paths.” (Site 3)

Challenges of guidance counseling and academic advisement. Some interviewees felt that some of the counselors that they worked with did not respect CTE programs. Other challenges noted by counselors included lack of adequate funding, incomplete understanding of CTE courses and programs, difficulty recruiting high-quality counselors, and counselors simply having too much to do.

Lack of respect for CTE courses. Remnants of past attitudes toward CTE, that it is not always appropriate for good students, still persist.

“The counselors here work so closely with all of us in the school that it would really benefit them to spend a couple of weeks down here in culinary. Sometimes I think they look at us you know—like older comprehensive high schools where the woodshop or transportation were kind of a dumping ground so to speak.” (Site 1)

“I believe that it has been a process of the last couple of years, but the counselors are starting to realize, ‘Okay, yes, this is still rigorous.’ And those advocates’ days and counselors’ days really have helped that just because they’re coming in and seeing ‘Wow, this is just not playing with a piece of metal. This is real. They’re actually building a house.’” (Site 2)

“But a lot of times, [guidance counselors] will say, ‘You don’t want to go over there. You’re too smart.’” (Site 3)

Funding. Responsibilities for all of the counseling functions sometimes interfere with the demands of appropriate career counseling. Counselors require more funding and support to do all that is asked of them.

“The high school counselors still spend much of their time making schedules and counseling, and really career counseling is not a major component in our state. We’re working on it. We’re nipping on it around the edges. We don’t have the money in our centers to have career counselors. We’re using some AmeriCorps money to leverage some folks.” (Site 2)

“This is a little contentious in the fact of the funding that’s going to be required, but when we had these discussions we decided that to divide off the funding for a certified guidance counselor to equalize the student counselor personnel 300 to 1, we would not be able to get that, probably, funded to be able to give us that level, so we went with the career specialist that would work under a guidance counselor and who would be required to... become a certified career development facilitator.” (Site 3)

Incomplete understanding. Because of the complexity of all the knowledge required to help students negotiate the various CTE program pathways, counselors don't always understand all of the specifics involved in developing connections with the world of work and with the integration of academics with work-based contexts.

“Like I had parents that were... signing their kids up thinking that I was teaching bus transportation. Seriously. So I had to go back and work with the counselors, by giving them a copy of my course expectations and explaining to them what we—what the goal was—and then they communicate it, as well as I communicate it, with the parents so that the parents would understand what this four-year track is really gonna look like. Because when they first came they had no clue.” (Site 1)

“Counselors are the same way. They don't always understand how careers have changed. You see it's almost unbelievable to, you know, just to see it in the last 10 or 15 years what's happening in the world.” (Site 2)

“We can talk to the guidance counselors. They can see our programs and hear our concerns. Because it really starts... at home with the parents but they are sort of that last line of decision making, the guidance counselors and they can steer them in either direction. And when the guidance counselor has a better understanding of what we do, it helps to place the student better and better service the student.” (Site 3)

Recruiting high-quality counselors. POS requires recruitment of counselors who understand the full impact of the CTE efforts to make connections between academic programs and work. It is difficult to keep up with the knowledge necessary to provide good guidance.

“There's a direct—absolutely—a direct correlation between the quality of the counselor they get and the alacrity at which they can address their program of study, and... also the accuracy of their knowledge about the program of study. I think there's an absolute direct, perfect positive correlation.” (Site 1)

“Because 9 times out of 10, the boy that they thought was going to go to auto really wants to be a nurse... It's better that the guidance counselors stay out of it, honestly.” (Site 2)

Too much to do. Some perceive POS as simply adding more work to the counselors' already heavy workload. The demands of POS are often simply overwhelming, given the number of programs that need to be monitored.

“We do have counselors that are, if you will, designated as kind of leads by departments. For example, at our [Center] there's one counselor who has been designated as the lead for the applied technologies department. The applied technologies department has 40 faculty, 100 part-time faculty, and depending on how you count programs, anywhere from 13 to 26 individual programs. That's an impossible task. So one of the things we're looking at is how can we get faculty involved in the advisory process? Not as college counselors but as advisors on the profession and industry counselors. We haven't solved that problem.” (Site 1)

“The counselors not only don’t but can’t know all the nuances of every program we have. They can’t deal with the massive numbers of students. We did have an issue just a week ago. A counselor told a student that ‘We don’t do network security and there’s no jobs in that anyway.’ Sorry. We do network security very nicely, thank you, and there are tons of jobs.” (Site 1)

“Right now, I don’t see any real systematic approach to advising students on careers. I think our elementary counselors have probably done a better job at doing some of that work on the elementary level of getting students to think about the future and think about careers on that level. The problem is when we get to the middle school level, they’re more focused on compliance accountability, test administration, scheduling, and just some social counseling, and then when we get to the high school level, again, they’re scheduling, they are test administrators, and that kind of thing.” (Site 2)

“And we found it was, you know we started taking a look at what we were doing and what we could do better, we found it was really silly for us to expect a guidance counselor that doesn’t work for the college to do our advising and know everything about our programs. It’s had enough for us to keep up with them as much as they change and placement changes, and teacher change, and books change, and, you know. We were putting an unfair expectation on guidance counselors.” (Site 2)

9. Teaching and Learning Strategies

At all three sites, interviewees referred consistently to specific teaching and learning strategies. Every site mentioned exemplary programs like PLTW and HSTW as models for their most important teaching strategy, PBL. Teachers and administrative staff felt strongly that involving students in projects, especially those that connected to real-world learning activities, helped motivate students to learn and provided a platform to ensure learning was achieved and used.

Teachers in both areas, academic and CTE, provided numerous examples of how they used PBL to instruct students in all areas connected to academic standards and career competencies. For example, a social studies teacher at Site 1 described how he worked with the culinary arts program to have students prepare meals that were eaten during the Civil War as he covered that unit for the social studies class. A Site 2 business and industry representative explained how they worked with a local bank to develop materials used to help students become better consumers of credit cards and learn how savings could affect the quality of their financial health. Site 3 teachers described several projects that helped students understand science concepts by repairing bicycles and giving them to local charities to raise revenue.

Teachers and other staff at all three sites expressed interest in curriculum integration instructional models, such as the NRCCTE’s Math-in-CTE curriculum integration model,⁴ as programs they wished to include in their teaching arsenal of available professional development. Getting academic teachers and CTE teachers to collaborate on developing creative ways to integrate academics into CTE courses was clearly on the agenda of all educational programs, especially at the secondary school level.

⁴ See <http://bit.ly/o1YJbM>.

NVivo9 analysis. NVivo9 analysis of these strategies illustrated the complexity of teaching and learning strategies, but it also demonstrated that there was still consistency about various forms of active learning approaches.

Project-based learning (PBL). PBL was used at all sites to present content in an integrated, hands-on fashion with the goals of increasing student engagement; developing non-academic skills such as time management, teamwork, and self-directed learning; and making conceptual links between course content and the real world. PBL's impact on teacher strategies represents a substantial shift from traditional teaching strategies. One teacher described it this way:

“Everything always has a purpose or a direction, and has an objective, and this school is different in our teaching style in that we're project-based... I feel like now, and it's been really difficult for me to go from English to this to give up all this control. Because an English teacher [says], ‘This is how you do it and da da da.’ And now I'm facilitating learning. Yeah, they ask me questions and I tell them what I think or say, ‘Let's go move in this direction,’ but I'm not up there ... They have to either teach the material or show me they understand it, or master it in some way.” (Site 1)

The result of PBL is more engaged students:

“We need stuff that, you know, is hands on... In order to keep them hooked you gotta have something where they can engage... their hands. They have to. Otherwise you know, the reason to go pay attention in English and math means absolutely nothing for them. It's just doesn't. [The hands-on] programs are what keep our kids coming here and enjoying school.” (Site 3)

Another teacher who uses PBL explained that the projects work best when they conclude with a culminating event.

“One of my philosophies, and one of the things that I pulled out of project-based learning—what I know about it—is that there needs to be some kind of a culminating activity or experience. That it's not enough to just do a project and then have a due date and then you grade it and then it just goes away. I like to have a culminating experience. and last year we did the evening program. And what we did with that is essentially invited the veterans who were the subject of the oral histories, we invited their families, the students and their families, and essentially just had an evening where we viewed the documentary videos.” (Site 1)

Internships and work-based learning (WBL). All of the sites used internships and other WBL opportunities as a part of their curriculum. The goals of WBL are similar to those of PBL.

“Well, I have students now who said to me—came to me after this experience just this year—because we didn't do it before—said, ‘I know I'm going into special ed. I know where I was meant to be.’ And I just sit there and I could just cry because it's like that – working with that one student with Down's syndrome or autism has changed their lives. That now they know, ‘No. I don't want to teach English or history. I want to teach these kids.’ And so that's one outcome that has just blown me away this year.” (Site 1)

“They will have one that’s kind of an internship where they work on their project. For example, the theatre arts might, they have a children’s theatre in the summer and they might... write the play, or select the students to participate and then put it on at different sites in the community.” (Site 2)

“When you take kids on a visit through a plant for a tour I think they get to understand that there is a reason why they need to know that math. If it’s real and it’s applicable and it’s something that they can see the practicality in, I think the kids are going to learn. The only way to get that validity is to do tours and have snippets from the workplace available in the schools in some way. I think kids need to see that it’s real.” (Site 3)

Challenges of teaching and learning strategies. It was one thing to have active learning strategies. It was quite another to do employ active learning strategies while paying constant attention to ensuring currency and relevancy.

Staying current and relevant. Making sure learning was connected to the demands of current contexts demanded more of teachers.

“Cause I told [the automotive teachers], ‘We can’t be teaching the same thing we’ve been teaching them 30 years ago. So we need to be doing something a little differently.’ And then they come up with some other course sequences and then we started kicking around this project. I said, ‘This is what I want to see happening at this school. I don’t want kids just to change oil.’” (Site 1)

“And the problem with the book is, that as soon as the book comes out, it’s already three years out of date. Especially in this field. And so we’re working online now with an online curriculum that updates every three months. So they’re coming to look at that and hopefully if they can get onboard with us, we will do the dual credit thing.” (Site 3)

Innovation. Making changes takes time and resources.

“We’re going to incubate projects at the secondary level that will enable students and teachers to develop projects that can be incubated, that I’ve got businesses available that will review those incubate-able projects and find out if in fact they are worthy to be marketed, and then those businesses would take them and get them to the market level. Then there would be a percentage of those funds that would go back to the students for scholarships, back to the teacher as a bonus, and back to the school, some funding back to the school for a period up to five years. So that’s the kind of innovation I’m talking about is really, truly creating innovative, innovation within a curriculum that builds entrepreneurs and innovators of the future.” (Site 3)

Getting community and industry feedback. Part of the time requirement involves communicating regularly and effectively with all partners, especially business and industry.

“And then when we’re developing new courses, new curriculum, like a CAM [computer-aided manufacturing] system, you know I get you input, ‘What do you want us to teach—

Master Cam, Gibbs CAM, Surf CAM, what do you want us to teach?’ And you know basically census survey and work around that, and you know I always ask them, I say, ‘What are you getting out of our graduates?’ Where maybe a weakness may be, or a strong point, and try to get feedback.” (Site 3)

Creating a new curriculum. Communication involves actually discussing what is relevant to teach.

“There really weren’t any schools like us when we started, and so I researched everybody’s curriculum... there’s not a lot of books written about this either. So I looked—I reviewed all of the different materials that were out there, and we knew that a part of... having the programs of study is having some kind of certification as well, so we went through the Hotel and Lodging Association. We looked at travel and tourism books, hospitality books; we looked at college-level curriculum, and we wanted to find a tie-in, especially for the freshmen and juniors that would give them the industry information but that the textbook writing wouldn’t be so far over their head that they would lose interest.” (Site 1)

10. Technical Skill Assessments

All sites provided examples of the many different kinds of skill assessments used to measure student competency and achievement. For example, all sites used NOCTI assessments to measure a variety of career skills and knowledge. In addition, some used occupationally specific skills or knowledge measures, such as the National Institute for Metalworking Skills (NIMS) system for machining and metalwork and the ProStart system for culinary arts. These were assessments developed by and for business and industry to measure student knowledge and skills.

All of the sites also described technical skill assessments carried out through after-school career and technical student organizations (CTSOs) like FFA and HOSA. These student organizations, supported by professionals in their related fields, conduct skills competitions (like those offered by SkillsUSA) that allow students to demonstrate their proficiency at the local, state, and national levels. Demonstrating skills through these competitions sharpens student knowledge and understanding and allows them to show how well they can perform the skills required in their professions.

NVivo9 analysis. NVivo9 analysis revealed a big push for certifications for students in many of the programs. Twenty-six of the transcripts (62%) discussed student certifications. As one administrator stated, “One of the other things that we’re increasingly focusing on is a greater expansion of certifications” (Site 3). An increased focus on certifications requires closer collaboration between educational institutions, programs that combine classroom work and field work, an alignment of the curriculum with certification tests, and increased standardization.

Collaboration between educational institutions. Developing appropriate certifications required good communication structures across institutions.

“We’ve got people at the community college that help us out as far as for the A+ certification testing, which is a national test. We work with them and they help get us

vouchers at a discounted price and... we feed into them so that the kids can get [dual] credit.” (Site 3)

Combined classroom and work experience. Many of the certification programs require a combination of classroom work, fieldwork, and satisfactory completion of one or more assessments.

“I did two certification projects with my students. It would be the ProStart, which is from the international restaurant association. It’s a high school-to-work or high school-to-postsecondary culinary curriculum. To earn a certificate, there’s a little more than the classroom work. They have to pass two exams, one each year, and they have to pick up 400 hours of industry work experience to hold a certificate.” (Site 3)

Increased standardization. Developing certification programs required a certain level of consistency and uniformity to have reasonable assurance that programs were essentially the same across the country.

“Our programs are accredited, so it’s not like we just pick something out of the air and say, ‘Oh, yeah, this particular individual should be able to do this, because this is what I learned [when I was a student].’ Each of our programs of study have a particular group of tasks or competencies or courses, and those courses are put in that curriculum. Whether I’m in the South, I’m in the East coast, or out in California, I should be able to perform those tasks, whether it’s a nurse or it’s a surgical tech individual.” (Site 3)

Certification of instructors. One of the hidden costs of certifying students is the corresponding certification of staff. Many of the technical programs require instructors to hold certain certifications, which require time and money on the part of the educational institution. Nearly a third (29%) of all transcripts discussed instructor certifications.

“We also launched a green engineering technology pathway that students primarily would move into continuing into an associate’s degree or go directly to the workforce, so all of those are supported with professional development. All of those courses are required that teachers have to be trained, and most of that training requires a 40-hour week for which they can get recertification credit, but they actually have to go through a week-long professional development and training in order for them to... have a certification to be able to teach those courses.” (Site 3)

“Mechatronics is a lot the same way, it requires certifications for the faculty, and that’s what makes it work at high school and college, which means training money, and then there’s specialized equipment, because to get those industry certifications you know that means there are standards, and there’re certain things that have to be done, and that doesn’t come without a cost.” (Site 3)

Benefits for students. Benefits for students noted by interviewees included increased scholarship opportunities, employability, and increasingly complex career opportunities.

Scholarship eligibility. Certification brought real financial benefits to students.

“The certificate does have some articulations that some postsecondary schools [accept], but it also, regardless of what school they choose to go into, it qualifies them to automatically receive a \$2,500 scholarship for any culinary school.” (Site 3)

Employability. Certificates sometimes led to direct employment.

“I’ve got welding students that walk directly out with their certificates and start a Titan and they’ve not completed the general education requirement of the degree, but they’ve had the state certification for welding and completed everything successfully, taken the state test while they were here, and go straight into industry.” (Site 2)

“Honestly, I think our program model is set up with an excellent opportunity, not only to learn foundational or fundamental skills, but also advance into CNC [computerized numerical control] because we offer three semesters of CNC programming plus we just put into the curriculum an opportunity for the student to come back a sixth semester and earn an advanced certificate in CNC programming with fourth and fifth acts of machining and more CAM and CAD work. So, we’re pretty much set up to give them an excellent opportunity to position themselves in the job market with NIMS, our associate degree, and plus now with the advanced certificate in CNC.” (Site 3)

Increasingly complex opportunities. Current jobs often require multiple levels of education and training.

“We end up making the program as multi-tiered, with multiple exit points. Where a student can do a short certificate and be skilled enough to do home air conditioning maintenance and repair. The next exit point would be skilled to do major institutional boiler, chiller. From the next one to specialized refrigeration components, walk-in freezers, or you know when they get narrow and narrower especially. So we actually end up with a program structure with three or depending on what kind of program, three or four exit points.” (Site 1)

“When they come to our carpentry class they actually get the OSHA [Occupational Safety and Health Administration] certification of safety when they finish, so there are some things built into that curriculum that are very much above what they’re exploring in the high school.” (Site 2)

“Then as they progress in the industry for higher levels of certification, they’re going to have to show documented work experience at higher levels, supervision, responsibility, and continuing education credits, and exams, too.” (Site 3)

Challenges of technical skill assessments. Certification of technical skills brought challenges, like competing certifications or certifications that were perceived as not meaningful.

Competing certifications. Sometimes certifications for related occupations clashed.

“Construction trades have certifications, but they’re kind of at odds with each other, and we definitely need a national dialogue to get those folks together to get that standardized.” (Site 2)

Certifications that aren’t meaningful. Interviewees questioned whether certificates were an assurance of important learning or whether they were designed more for simple control over occupational entry points.

“We’ve been discussing this a lot lately and that’s our contention, is [that] most of those, unfortunately, are money-driven. And so their verification and their validation sometimes comes into question as to, ‘Is this a real certification? Is this money-driven or is there something really, really valuable there?’” (Site 1)

“Some, you know, you have certifications for banking; bankers don’t care about it, but it’s a certification. Nurse aid is not necessarily a certification that matters if you’re going into an allied health field. We also have another program for pharmacy tech. It’s hard to find certifications for students at the high school level. We have some certifications where the students take the exam, like the National Health Educators certification in areas related to fitness [that] students have, but they’re not NHE-certified because they don’t, again, have the work experience.” (Site 2)

Themes Across Sites

Using standard analysis of qualitative data (Miles & Huberman, 1984), many themes were developed that were common across all sites. Such themes were developed by analyzing the transcripts to determine what people talked about and what they thought were the most pressing issues related to their programs.

Themes developed through our “human” analysis of the data were also reviewed using the NVivo9 software. The quantitative data developed through this approach served to triangulate our findings, indicating that there was additional evidence—judging by the frequency of the themes raised in the quantitative data—to suggest these were indeed important findings. Several themes emerged from the data that were noted at all three sites.

Engagement

The first theme was ***engagement***. The challenge to educators, as stated by one superintendent, was engaging students in meaningful learning. POS and CTE were about just that: helping students to learn by doing by getting involved in learning activities and environments that allowed them to acquire knowledge and skills they could use in their lives. This brought relevance to the learning process and helped teachers, business people, and educational systems create learning opportunities in which students could be active in the learning process. Students did not just learn things in a void. POS and CTE helped them understand not just why they were learning, but also why it was important to know and actually do things in the real world.

NVivo9 data reinforced this finding. The term *engagement* was the most frequently mentioned concept. It was found in 19 of the 42 transcripts, second only to *high school teacher* as a searchable term.

Consistent with this theme was the ability to ***connect academic learning to real-world situations in which the learning had context***. This theme was demonstrated across sites with the employment of PBL and teaching strategies that included real-world applications. As simply stated by one high school student at Site 1, “I came to this school because it lets me do things. I don’t have to sit and listen all day; I get to be involved.” Similar to this comment was a statement made by a superintendent at Site 3: “When it comes to good educational reform, it will look a lot like CTE.” Those involved in developing CTE and POS at these sites identified active learning and engagement as keys to educating students.

Student Learning

A second theme that supported this notion of engagement was a ***focus of all program elements primarily on student learning***. POS were established to ensure that learning, both academic and technical, was the primary activity of the student, and the system was designed to ensure that learning occurred. From the use of block schedules at all sites to allow students sufficient time to learn things in greater depth, to the statement made by a principal that his primary role was to “get out of the way” of teachers and students so as not to create barriers or impediments to the learning process, the emphasis was on ensuring high-quality learning for all involved. People at all sites talked about “blurring the lines” between levels of learning, between secondary and postsecondary, between academic and practical, and between young people and responsible, knowledgeable adults.

Certifications

A third theme that emerged was that learning in applied environments required some form of ***certification of skill and knowledge*** that students can actually do something competently when they finish their learning activities. These sites’ POS required students to demonstrate competence in a number of areas, both academic and career-related. For academic areas, students were asked to demonstrate proficiency in basic subject areas, such as reading, math, and science, through performance on standardized tests. The impressive data from our Site 1 school suggested that students performed effectively on such tests.

Students were also asked to demonstrate competence in academic subjects through proficiency in applying academic subjects in CTE contexts. For example, demonstration of math skills might include computing the angles necessary to effectively operate a drill press or computing the amount of material needed to build a wall in a masonry or construction class. POS and CTE teachers were constantly looking to ensure that academic knowledge and skills were being addressed in CTE contexts.

In addition to academic applications, POS also required students to demonstrate ***certification of competence in job-specific areas*** (e.g., knowledge of metalworking or welding through the NIMS certification tests). Such tests required actual hands-on demonstration of skills. Industry-recognized certifications also embody one of the major goals of POS: That is, that business and industry need to play an active role in ensuring that school curricula meet the needs of industry

and that educational programs produce knowledgeable and skilled workers who can successfully enter the world of work.

Seamless Pathways

A fourth theme derived from this study was that of *developing a seamless educational system* connecting primary and secondary education to college. POS at these sites linked secondary schools with community colleges, ensuring that students engaged in a series of courses and activities that taught them about careers and applications of academics in real-world contexts. POS also provided students with a chance to develop and complete a career and educational plan. Further, the end goal in this process was always some form of employment, qualification for employment, or pursuit of the next level of education that would eventually lead to college and careers. The planning involved in the counseling models at the three sites demonstrated that, as in the case of those programs requiring IGPs, support from counselors, teachers, business people, and parents were all necessary to ensure that students were ready for the next level of life's challenges, whether this was college or career.

Additional Themes

Two additional themes emerged from the NVivo9 analysis. Based on the number of transcripts involved and the level of discussion of these concepts in the conversations recorded, these two themes added to the richness of the findings from our more traditional analysis.

The fifth theme was *increased understanding of and respect for CTE programs*. Historically, CTE students have been perceived as having less academic potential; such attitudes were present in the debates surrounding the 1917 Smith-Hughes legislation and continued well into the 20th century. For many years, CTE was not considered on equal footing with academic programs, especially with regard to preparing high school students for future college participation.

However, at all three sites we visited, programs and schools were changing the image of CTE and appeared to be attracting students who could indeed become both college- and career-ready. The inclusion of academic concepts and academically aligned curricula, situated in programs that emphasized academic learning as well as career and applied learning, raised the expectations of program quality for both students and parents. At these sites, CTE academies, sometimes operating as magnets or specially focused schools, were perceived by interviewees to be of higher quality than traditional vocational schools or even comprehensive schools. Most notably at the South Carolina site, students enrolled in dual credit courses, those receiving both high school and college credit, were awarded the same grade point value as those enrolled in AP classes, clearly placing such programs on a par with the best academic models. This change in attitude is best illustrated in three quotes from the transcripts:

“And back in our time, I think ‘tech’ was looked at, and I don’t want to really use this, almost as for those that weren’t able to go on to college, and I see that mentality changing because the tech programs are very competitive now.” (Site 2)

“That kind of publicity has hit this city and therefore the general perception of a [CTHS] in this city is [that it is] probably better than a comprehensive high school. And that’s not always the case in some school communities. But here most folks have a very high

opinion of a [CTHS], and it's not seen as less than or 'He's not going to college.' It's 'He probably is going to college.'" (Site 1)

"What we have seen is an increase in interest by individuals from the secondary level. Before, it was, I would say probably marketed to those individuals who would say, 'I'm interested in going to a two-year institution only.' And now what we are seeing is that there is a more broad-based marketing effort through the secondary schools about the opportunities that are available at our institutions and the cost effectiveness of attending our institution as well as the quality of instruction. " (Site 3)

However, even though the stigma of CTE appeared to be lessening at these sites, it was still reported to exist. One interviewee noted that some teachers would tell students, "You don't want to go over there. You're too smart. You have a 4.0 GPA and you want to be an engineer, but you don't want to take that [CTE course]" (Site 3).

A sixth theme was that *high-quality teachers are critical to high-quality POS efforts*. Attracting and retaining high-quality teachers was considered essential to making the entire POS effort work. Many interviewees commented on the role and status of teachers, emphasizing the values and timing of instructional systems embedded in CTE programs that require higher levels of instruction, knowledge, and reflection. Quotes from the transcripts illustrate the kinds of quality issues that were deemed important. As one community partner stated: "That's where you need to get into teacher effectiveness research and know how important that individual is that sits in front of those students" (Site 2). He went on to describe what constitutes a high-quality teacher:

"And he tailors that math class to the industry. He worked in the industry and then he went back to school and now he's a math teacher. And so what he does, he actually doesn't teach with a book. He teaches to what they will see in the industry: 'How does this machine equate to this machine, and what are you doing? You're doing calculus when you're sitting right there, but do you realize you're doing it?' And he pulls that out and shows them that... That's why that class is so amazing, because he takes algebra, geometry, trigonometry, and brings that all together and shows them how they integrate and how they work together." (Site 2)

In a second example, a culinary teacher at another site described teacher competence as it relates to integration of CTE with academic subjects. Here we see how connecting academic subjects with CTE creates teams of teachers that attempt to "mesh their programs together":

"So if its history and I say to a history teacher, 'You know I'm studying this and I'm studying that.' Maybe if I'm studying sanitation, they start into the Dark Ages and they talk about the Black Plague or they talk about how disease is spread or they talk about how disease is gained and they do research on it. My students will come back in and go, 'You know, I understand what you're saying now. It's really ugly.' I'm like, 'OK, now we're talking.' Other schools I would imagine not so—there's not such, you know, cohesion, but here it is really strong. And on the other side, if I have something I'm having trouble teaching, I go to [the academic teachers] and I say, 'You know I really want them to journal in my class and I don't know how to do it.' The English teachers have come back and said, 'Here's how you do it. You know you need a smaller notebook

or you need something like this. You need to stipulate it this way.’ And so we have found ourselves as a team here in culinary working very closely with everyone out there in every area of academia, whether it is math or English or history or science, and really meshing our programs together.” (Site 1)

High-quality teachers collaborate, stay current on all of the technological advances in their fields, and engage students in ways that connect learning to real-world applications. These sites demonstrated that such teachers exist and thrive in POS.

Recommendations

Based on our analyses of the data collected from the three site visits, five recommendations can be made about the renewal of the Perkins legislation and the continuation of POS. Although several ideas were advanced, the following were most frequently mentioned in the interviews. We consider them to be the most important areas of concern.

- 1.** The research team conducting this study suggests that Congress should reauthorize the Perkins legislation and support the further implementation and development of POS and other CTE-related efforts. The integration of academic subjects with CTE lies at the core of preparing for both college and careers. POS focus student learning in both academic and technical areas, lead to the development of seamless systems that connect secondary with postsecondary education, and connect students with opportunities to engage in occupational and career planning.
- 2.** Federal, state, and local governments should consider additional systems for funding CTE. Clearly, CTE programs require special funding, including that needed for expensive, modern equipment that may be beyond the reach of typical school budgets for supplies and materials. Yet it is critical that such funding be available for educational programs that unite college and career preparation. One such alternative source may be found through service learning. In all three sites visited, and especially at two of the sites (Sites 1 and 3), service learning was considered an important component of POS that helped to expand CTE to include broader dimensions of educational reform. Such community-connected programs include elements of CTE and should be tapped to support the expansion of POS and CTE, along with other funding streams. Such options might include civic education programs that engage students in community-connected work, as well as funds directed at dropout prevention, for which CTE has proven to be an effective program strategy for retaining students in school.
- 3.** The field needs to find more effective and flexible ways of measuring the outcomes of POS and CTE. At the three sites, evidence indicated that POS generated multiple, positive outcomes, albeit not necessarily the kind of outcomes that fit current definitions of successful outcomes for POS. For example, interviewees noted that some students who did well in their POS were able to secure employment directly out of high school; if success in a POS is defined as making a direct transition into the postsecondary system, we might miss some of the effective instruction and business collaborations that have been demonstrated through good POS efforts that actually connect students with the workforce before they move on to postsecondary education. As an alternative outcome measure, electronic portfolios that demonstrate students’ skill, knowledge, and progress made in their career paths might help to capture the various positive outcomes that ensue from POS.

4. The field needs to increase opportunities for students to engage in hands-on learning, primarily through PBL. POS efforts are focused on student learning and student engagement, and interviewees at all three sites emphasized that the real challenge of POS was getting and keeping students engaged in learning. Models such as PLTW, HSTW, and PBL were key to student success. One administrator told us that one of his critical roles was “getting out of the way” of teachers in order to help them focus on keeping students engaged; another noted the necessity of “blurring the lines” that separate systems (e.g., secondary and postsecondary, academic and applied, education and business and industry) in order to make learning meaningful and to more effectively prepare students for college and careers.

5. A greater emphasis needs to be placed on developing relationships between all involved in POS. Relationships between teachers helped provide professional development, guidance, and support related to delivering active, integrated learning. Relationships between secondary and postsecondary teachers and faculty helped produce aligned and coordinated courses and curricula and dual credit opportunities. Relationships between educational teachers, faculty, CTE coordinators, and business and industry personnel helped create curricula that were current and necessary for employment and career outcomes. Teachers and employers also connected to place students in internships and actual employment, creating pipelines to careers for students. Finally, the relationships between students and their teachers or community college faculty helped them stay motivated and inspired to continue preparing for their futures, both in college and in careers.

Summary

The fields of academic and career-related education, separated in the early part of the 20th century, have spent the last 50 years trying to reconnect in meaningful ways. Federal legislation, from the Vocational Education Act of 1963 to the 2006 reauthorization of the Carl D. Perkins Act (Perkins IV), has dramatically affected the way we engage in and talk about CTE. The development and implementation of POS, an important component of Perkins IV, have focused the field’s attention on connecting academic with technical learning in ways that prepare young people for college, careers, and productive adult lives.

This study demonstrates that POS efforts in three sites across the United States are making progress toward integrating secondary and postsecondary education, connecting academic learning with CTE, and establishing viable systems that encourage and promote collaboration and the alignment of educational initiatives with the needs and standards of business and industry. Time will tell if this initiative continues to transform and expand opportunities for students to gain academic and career-related knowledge and skills and thus produce an effective, well-trained future workforce. Data collected from these sites indicated that there is evidence that POS are making progress in preparing every student to be college and career ready.

References

- Alfeld, C., & Bhattacharya, B. (2011, April). *Programs of study: Early findings from the student perspective*. Paper presented at the annual meeting of the American Educational Research Association, New Orleans, LA.
- Carl D. Perkins Career and Technical Education Improvement Act of 2006. Pub L. No. 109-270. (2006).
- Castellano, M., Sundell, K., & Overman, L. (2011, April). *Do career and technical education programs of study improve student achievement? An experimental study*. Paper presented at the annual meeting of the American Educational Research Association, New Orleans, LA.
- Hammond, C., Stipanovic, N., Sharp, J., Withington, C., Mobley, C., Drew, S., & Stringfield, S. (2011, April). *A longitudinal study of the South Carolina personal pathways to success initiative*. Paper presented at the annual meeting of the American Educational Research Association, New Orleans, LA.
- Lewis, M. V., & Kosine, N. R. (with Overman, L.). (2008). *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*. Louisville, KY: National Research Center for Career and Technical Education, University of Louisville.
- Lincoln, Y., & Guba, E. (1985). *Naturalistic inquiry*. Newbury Park, CA: Sage Publications.
- Maxwell, J. A., & Loomis, D. M. (2002). Mixed method design. In A. Tashakkori & C. Teddlie (Eds.), *Handbook of mixed methodologies for social and behavioral sciences* (pp. 283-296). Thousand Oaks, CA: Sage Publications.
- Miles, M. B., & Huberman, A. M. (1984). *Qualitative data analysis: A source book for new methods*. Thousand Oaks, CA: Sage Publications.
- No Child Left Behind Act of 2001, Pub. L. No. 107-110. (2001).
- Oakes, J., & Saunders, M. (2007). *Multiple pathways: High school reform that promises to prepare all students for college, career, and civic responsibility*. Los Angeles, CA: University of California, Los Angeles.
- Programs of Study Joint Technical Working Group. (2011, July). *Programs of study: Year 3 joint technical report*. Louisville, KY: National Research Center for Career and Technical Education, University of Louisville.
- School-to-Work Opportunities Act of 1994, Pub. L. No. 103-239, 108 Stat 568. (1994).
- Shumer, R., & Digby, C. (2011). *Six stories about six states*. Louisville, KY: National Research Center for Career and Technical Education, University of Louisville.
- South Carolina Education and Economic Development Act (EEDA) of 2005, SC Code of Laws Chapter 59, Title 59. (2005).
- U.S. Department of Education, Office of Vocational and Adult Education. (2010). *Career and technical programs of study: A design framework*. Washington, DC: Author.
- Vocational Education Act of 1917, Pub. L. No. 64-347; 39 Stat. 929. (1917).
- Vocational Education Act of 1963, Pub. L. No. 88-210. (1963).

Appendix A: NVivo9 Analysis of Nodes/Thematic Words

28-Apr-11			
Theme	Sub-Theme	# of Transcripts	# of References
TOTAL			728
Certification			
	Staff, teachers, counselors	13	18
	Students	19	59
Collaboration and Partnerships			
	Collab. district level	4	5
	Collab. between secondary and postsecondary	8	13
	Collab. state level	1	1
	Collab. non-school entities	13	21
	Collab. within school or program	15	27
College and Career Readiness, Rigor, Standards		9	17
Credibility with school districts and schools		1	1
Curriculum		4	6
	Alignment	4	5
	Assessment	16	38
	Basic Skills	0	0
	Development	8	10
	District	4	5
	English	1	1
	Math	7	9
	PBL, Project Lead the Way	16	29
	Scheduling	4	7
Dual Enrollment (DE) and Dual Credit (DC)			
	Challenges with dual credit	7	10
	Cost	4	7
	DE as a recruitment tool	3	4
	DE benefits for students	4	4
	General comments about DC	6	6
EEDA, Perkins, Politics, Legislation		6	9
Engagement		19	44
Enrollment		2	2
Evaluation and Accountability		15	27

Funding		3	3
	Creative Financial Solutions	3	5
	Funding Challenges	4	5
Impact		1	1
Internships, Apprenticeships and Work based learning opportunities		12	17
People and Players		0	0
	Career Specialists	3	5
	Community members, Businesspeople	4	5
	Coordinator, director	1	1
	Counselors, advisors, advocates	15	29
	Curriculum admin.	1	1
	Faculty (postsecondary)	3	10
	Parents	7	8
	Principals, assistant principals	4	4
	Students	8	12
	* Impact on students	9	10
	* Special education	1	1
	Teachers (high school)	31	118
PR, Media, Spreading the word, Recruitment		7	11
Professional Development		18	31
Programs of Study		1	4
	After school programs	1	2
	Alignment, articulation	5	6
	Challenges, areas for improvement	6	12
	Course sequence	5	6
	Definitions of POS	4	4
	Successes	1	2
Relationships		3	5
Respect, Understanding		8	14
Retention		7	8
Sense of belonging		1	1
Testing	(See assessment.)		
Timing of student decisions		2	2

Appendix B: Interview/Focus Group Protocols Used at Each Site

Cross Site Protocol: District/State Administrators

The following questions are designed to gather information about Programs of Study in states and/or school districts, and/or schools in order to compare how such efforts are developing in various parts of the United States. The goal is to discover common elements/attributes of those programs, as well as understand those things that make particular programs unique.

- 1. How do you **define or operationalize** the concept of program of study?**
 - a. How do you incorporate secondary and postsecondary elements?
 - b. How do you align rigorous (technical) content with academics?
 - c. How do you create and coordinate a non-duplicative progression that leads to an industry recognized credential/certificate/degree?
- 2. Legislative issues**
 - a. What have been the outcomes that have resulted from the state and local policies and how have they manifested themselves in your district or state programs?
 - b. Can you describe the professional development your teachers/faculty and administrators have had to help prepare them to implement POS?
- 3. Partnerships:** Can you describe the partners who are involved in developing and sustaining the POS? (business, higher education, district administrators, etc)
- 4. Guidance and Counseling**
 - a. What specific career-related issues do students face, both in high school and postsecondary settings that affect their participation in POS efforts? Provide a specific example where counselors have functioned as you might imagine they would in a strong POS program.
 - b. What academic issues do students face.... (e.g., math skills needed for advanced mfg). How do counselors address these issues?
 - c. Are there district or state policies that direct the development of Guidance and Counseling programs?
 - d. What specific recommendations would you make to expand/improve the role of guidance counselors in the POS initiative in your district/state?
- 5. Teaching and Learning**
 - a. How have academic and CTE teachers/faculty changed their teaching strategies with the implementation of POS?
 - b. Are there examples of curriculum integration where academic learning is delivered through career or occupational coursework?
 - c. Are there examples of curriculum integration where career, occupational learning is delivered through academic coursework?
 - d. Have you developed new curriculum/courses for the POS (describe, define, collect syllabi)? Do students in POS engage in co-curricular activities? (e.g., DECA, SkillsUSA, FBLA, HOSA, etc)? How many students? Describe the duration, intensity of experience.
 - e. Please provide specific examples of change in student outcomes that you attribute to the implementation of POS

- f. How are courses coordinated across departments at your local site? Who is responsible for the coordination and what are their goals/objectives for such efforts?
- 6. Professional Development: included in Legislative questions**
- 7. Accountability and Evaluation**
- How do you assess technical skills in your POS?
 - Are there state or district guidelines that define the areas to be assessed for POS efforts?
- 8. College and Career Readiness:** Please describe how the POS is linked to the career context that is the focus for the POS. For example, do students have the opportunity to engage in any of the following (if yes to any, please describe the amount and intensity):
- Job shadowing
 - (unpaid) Internships
 - (paid) coop or internship
 - Apprenticeships
 - School Based Enterprise
 - Other forms of experiential learning
- 9. Credit transfer**
- How do you sequence courses within the HS part of the POS? Between HS and postsecondary?
 - Do any of your HS courses earn dual credit? Articulated credit? Or, do you have other mechanisms to link secondary course taking to postsecondary course taking.
- 10. Technical Skills Assessment**
- Can students earn an industry recognized certificate or other form of employment validation? Indicate which certificates are available.
 - What assessments are used? Who conducts the assessment? (might have been answered in Question #7).

Cross Site Protocol: Business/Industry Representatives

The following questions are designed to gather information about Programs of Study in states and/or school districts, and/or schools in order to compare how such efforts are developing in various parts of the United States. The goal is to discover common elements/attributes of those programs, as well as understand those things that make particular programs unique.

- 1. How do you **define or operationalize** the concept of program of study?**
 - a. How do you incorporate secondary and postsecondary elements?
 - b. How do you align rigorous (technical) content with academics?
 - c. How do you create and coordinate a non-duplicative progression that leads to an industry recognized credential/certificate/degree?
- 2. Legislative issues:**
 - a. How did the POS begin in the state and/or in the district and how have the state and local policies guided your development and implementation of Programs of Study?
 - b. What have been the outcomes that have resulted from the state and local policies and how have they manifested themselves in your local programs
 - c. What challenges remain in developing policies that further the POS initiative? How are you addressing those challenges?
- 3. Partnerships**
 - a. Please describe the alignment between high school and postsecondary POS components. Can you describe how this alignment was developed?
 - b. How did relationships develop between educational systems and business/industry representatives? Can you describe how they work together?
 - c. How do these policies define/describe your college/career readiness system?
 - d. Provide an example or two of what you consider your best models of alignment/collaboration between secondary and postsecondary programs and academic and technical education courses?
- 4. Guidance and Counseling:** What role do guidance counselors at the secondary and/or postsecondary levels play in learning about and implementing POS efforts that are responsive to business/industry interests?
- 5. Teaching and Learning**
 - a. How have academic and CTE teachers/faculty changed their teaching strategies with the implementation of POS?
 - i. Are there examples of curriculum integration where academic learning is delivered through career or occupational coursework?
 - ii. Are there examples of curriculum integration where career, occupational learning is delivered through academic coursework?
 - b. Please describe how the POS is linked to the career context that is the focus for the POS. For example, do students have the opportunity to engage in any of the following (if yes to any, please describe the amount and intensity):
 - Job shadowing
 - (unpaid) Internships
 - (paid) coop or internship
 - Apprenticeships

- School Based Enterprise
 - Other forms of experiential learning
- c. Please provide specific examples of change in student outcomes that you attribute to the implementation of POS
- 6. Professional Development**
- a. Have you developed or assisted in the development of new curriculum/courses for the POS (describe, define, collect syllabi)?
 - b. Do students in POS engage in co-curricular activities? (e.g., DECA, SkillsUSA, FBLA, etc)? How many students? Describe the duration, intensity of experience.
 - c. How did relationships develop between educational systems and business/industry representatives? Can you describe how they work together?
- 7. Accountability and Evaluation:** What role does business and industry play in assessing the quality and effectiveness of the POS efforts in your area?
- 8. College and Career Readiness:** What industry recognized certificate or other form of employment validation is achieved in a sample POS program? How was the certificate/outcome developed and measured?
- 9. Credit Transfer**
- a. How has business and industry been involved in the process of sequencing courses and/or learning activities
 - b. How does course sequencing/alignment address issues of credit transfer? How is credit transfer handled between secondary and postsecondary systems?
- 10. Technical Skills Assessment**
- a. What industry recognized certificate or other form of employment validation is achieved in a sample POS program? How was the certificate/outcome developed and measured?
 - b. How did relationships develop between educational systems and business/industry representatives? Can you describe how they work together?

Cross Site Protocol: School/Community College Site Administrators

The following questions are designed to gather information about Programs of Study in states and/or school districts, and/or schools, and/or community colleges in order to compare how such efforts are developing in various parts of the United States. The goal is to discover common elements/attributes of those programs, as well as understand those things that make particular programs unique.

- 1. How do you **define or operationalize** the concept of program of study?**
 - a. How do you incorporate secondary and postsecondary elements?
 - b. How do you align rigorous (technical) content with academics?
 - c. How do you create and coordinate a non-duplicative progression that leads to an industry recognized credential/certificate/degree?
- 2. Legislative issues**
 - a. What have been the outcomes that have resulted from the state and local policies and how have they manifested themselves in your local programs?
 - b. Can you describe the professional development your teachers/faculty and administrators have had to help prepare them to implement POS?
- 3. Partnerships:** Can you describe the partners who are involved in developing and sustaining the POS? (business, higher education, district administrators, etc)
- 4. Guidance and Counseling**
 - a. What specific career-related issues do students face, both in high school and postsecondary settings that affect their participation in POS efforts? Provide a specific example where counselors have functioned as you might imagine they would in a strong POS program.
 - b. What academic issues do students face.... (e.g., math skills needed for advanced mfg). How do counselors address these issues?
 - c. What specific recommendations would you make to expand/improve the role of guidance counselors in the POS initiative in your district/state?
- 5. Teaching and Learning**
 - a. How have academic and CTE teachers/faculty changed their teaching strategies with the implementation of POS?
 - b. Are there examples of curriculum integration where academic learning is delivered through career or occupational coursework?
 - c. Are there examples of curriculum integration where career, occupational learning is delivered through academic coursework?
 - d. Have you developed new curriculum/courses for the POS (describe, define, collect syllabi)? Do students in POS engage in co-curricular activities? (e.g., DECA, SkillsUSA, FBLA, HOSA, etc)? How many students? Describe the duration, intensity of experience)
 - e. Please provide specific examples of change in student outcomes that you attribute to the implementation of POS
 - f. How are courses coordinated across departments at your local site? Who is responsible for the coordination and what are their goals/objectives for such efforts?
- 6. Professional Development: included in Legislative questions**

- 7. Accountability and Evaluation:** How do you assess knowledge gained and technical skills acquired in your POS?
- 8. College and Career Readiness:** Please describe how the POS is linked to the career context that is the focus for the POS. For example, do students have the opportunity to engage in any of the following (if yes to any, please describe the amount and intensity):
- Job shadowing
 - (unpaid) Internships
 - (paid) coop or internship
 - Apprenticeships
 - School Based Enterprise
 - Other forms of experiential learning
- 9. Credit Transfer**
- a. How do you sequence courses within the HS part of the POS? Between HS and postsecondary?
 - b. Do any of your HS courses earn dual credit? Articulated credit? Or, do you have other mechanisms to link secondary course taking to postsecondary course taking.
- 10. Technical Skills Assessment**
- a. Can students earn an industry recognized certificate or other form of employment validation? Indicate which certificates are available.
 - b. What assessments are used? Who conducts the assessment?

Cross Site Protocol: Secondary/Postsecondary Counselors

The following questions are designed to gather information about Programs of Study in states and/or school districts, and/or schools in order to compare how such efforts are developing in various parts of the United States. The goal is to discover common elements/attributes of those programs, as well as understand those things that make particular programs unique.

- 1. How do you **define or operationalize** the concept of program of study?**
 - a. How do you incorporate secondary and postsecondary elements?
 - b. How do you align rigorous (technical) content with academics?
 - c. How do you create and coordinate a non-duplicative progression that leads to an industry recognized credential/certificate/degree?
- 2. Legislative issues**
 - a. What have been the positive outcomes that have resulted from the state and local policies and how have they manifested themselves in your local programs?
 - b. Can you describe the professional development you have had to help prepare you to implement POS?
- 3. Partnerships**
 - a. Please describe the alignment between high school and postsecondary POS components. Describe how this alignment was developed? How well is it working and how might it be improved?
 - b. How do secondary and postsecondary teachers/faculty work together on the POS initiative?
- 4. Guidance and Counseling**
 - a. What role did guidance counselors play in the development of the POS? How are they engaged in the process now?
 - b. What role does state policy play in guiding the actions and activities of counselors in the POS effort? What support (e.g., training, materials) do guidance counselors need in order to work effectively in POS programs?
 - c. What specific career-related issues do students face, both in high school and postsecondary settings that affect their participation in POS efforts? Provide a specific example where counselors have functioned as you might imagine they would in a strong POS program.
 - d. What academic issues do students face.... (e.g., math skills needed for advanced mfg)? How do counselors address these issues?
 - e. What specific recommendations would you make to expand/improve the role of guidance counselors in the POS initiative in your district/state
- 5. Teaching and Learning**
 - a. How are courses coordinated across departments at your local site?
 - b. Who is responsible for the coordination and what are their goals/objectives for such efforts?
- 6. Professional Development:**
 - a. How are counselors involved in the professional development program for the state/region/district?

- b. How have POS and state initiatives changed the way counselors and teachers are prepared for connecting CTE with academic programming and employment certification?
- 7. Accountability and Evaluation:** How has POS affected graduation, college-going and job placement rates in your district/state? Do you have specific examples/evidence that POS and CTE have made a difference?
- 8. College and Career Readiness:** Please describe how the POS is linked to the career context that is the focus for the POS. For example, do students have the opportunity to engage in any of the following (if yes to any, please describe the amount and intensity):
- Job shadowing
 - (unpaid) Internships
 - (paid) Coop or internship
 - Apprenticeships
 - School based enterprise
 - Other forms of experiential learning
- 9. Credit transfer**
- a. How do you sequence courses within the HS part of the POS? Between HS and postsecondary?
 - b. Do any of your HS courses earn dual credit? Articulated credit? Or, do you have other mechanisms to link secondary course taking to postsecondary course taking.
 - c. Provide an example or two of what you consider your best models of alignment/collaboration between secondary and postsecondary programs and academic and technical education courses?
- 10. Technical Skills Assessment**
- a. Can students earn an industry recognized certificate or other form of employment validation through any of the POS programs? Please indicate which certificates.
 - b. How are technical skills assessed in your school/district? Who does the assessment?

Cross Site Protocol: Teachers/Faculty

The following questions are designed to gather information about Programs of Study in states and/or school districts, and/or schools in order to compare how such efforts are developing in various parts of the United States. The goal is to discover common elements/attributes of those programs, as well as understand those things that make particular programs unique.

- 1. Operationalizing POS:** How do you define Programs of Study? Explain what it means to you and what the implications are for course/program development and connection with other educational institutions/programs.
- 2. Legislative issues:** What outcomes in your local programs have you seen as a result of state and local policies regarding POS?
- 3. Partnerships:**
 - a. How do secondary and postsecondary teachers/faculty work together on the POS initiative? Are there alignments between your programs and those at the postsecondary level, and how did those alignments come about? Who was responsible for making them?
 - b. How are business, industry, and community interests involved in guiding or helping your programs develop?
- 4. Guidance and Counseling**
 - a. What kinds of career-related issues do your students face, both in high school and postsecondary settings that affect their participation in POS? How do guidance counselors help students with these issues?
 - b. What academic issues do your students face (e.g., math skills needed for advanced manufacturing)? Do counselors address these issues?
 - c. What recommendations would you make to expand or improve the role of guidance counselors in the POS initiative in your district/state?
- 5. Teaching and Learning**
 - a. How are CTE and academic teachers working together in your POS? Have academic and CTE teachers changed their teaching strategies with the implementation of POS?
 - b. Do your POS feature curriculum integration, in which academic learning is delivered through career or occupational coursework, or career/occupational learning is delivered through academic coursework?
 - c. Have you developed any new curricula or courses for your POS? (*Ask for documentation.*)
 - d. Are students in POS engaged in career-technical organizations like DECA, SkillsUSA, HOSA, or FBLA?
 - e. Have you seen changes in student outcomes since implementing POS?
 - f. How are courses coordinated across departments in your school? Who is responsible for the coordination and what are their goals/objectives for such efforts?
- 6. Professional Development:** Has the district or state provided any professional development to help prepare you to implement POS?
- 7. Accountability and Evaluation:**
 - a. How are technical skills assessed in your POS, and who conducts them?
 - b. What evaluation is done to assess learning in the POS program?
 - c. What evaluation is done to assess the POS effort itself?

8. College and Career Readiness:

- a. How do your POS connect to a career context?
- b. Do students have the opportunity to participate in: job shadowing; (unpaid) internships;(paid) coop or internship; apprenticeships; school-based enterprise; or any other forms of experiential or work-based learning? *(If yes to any, ask for amount and intensity.)*

9. Credit Transfer: Do any high school courses earn dual or articulated credit, or are there other mechanisms that link secondary course taking to postsecondary course taking? *(Ask for examples.)*

10. Technical Skills Assessment: Can students earn an industry recognized certificate or other form of employment validation through a POS program? *(Ask which certificates are available and for examples of how a certificate or employment validation can be achieved.)*



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