What Do Programs of Study Look Like? Mandated and Supporting Components of CTE POS Observed in a Mixed-Methods Longitudinal Study

Abstract

This paper describes how two school districts have interpreted and implemented Programs of Study (POS) as mandated by the Perkins IV legislation. The districts are part of a four-year longitudinal mixed-methods study examining the effects of POS on academic and technical achievement for students who entered ninth grade in 2008-2009. The study uses both experimental and quasi-experimental research designs and includes a qualitative component intended to generate rich descriptions of study schools' implementation of POS. Here we synthesize our qualitative findings—derived from site visits made during 2008-2009 and 2009-2010—related to the four mandated components of POS in addition to 10 supporting components identified by the Office of Vocational and Adult Education. We offer tentative conclusions about POS as they are being implemented in these districts.

The 2006 reauthorization of the Carl D. Perkins legislation (also known as Perkins IV) that funds career and technical education (CTE) modified existing practice by increasing program accountability in the areas of academic and technical skills achievement and alignment with postsecondary CTE in the form of programs of study (POS). According to the legislation, POS: (i) must incorporate secondary education and postsecondary education elements; (ii) must include coherent and rigorous content aligned with challenging academic standards and relevant career and technical content in a coordinated, nonduplicative progression of courses that align secondary education with postsecondary education to adequately prepare students to succeed in postsecondary education; (iii) may include the opportunity for secondary education students to participate in dual or concurrent enrollment programs or other ways to acquire postsecondary education credits; and (iv) must lead to an industry-recognized credential or certificate at the postsecondary level, or an associate or baccalaureate degree. (Perkins IV, Section 122[c][1][A])

This paper describes how two large urban school districts have implemented these four mandated components in addition to 10 supporting components of POS identified by the Office of Vocational and Adult Education (OVAE, 2010). The districts are part of a four-year longitudinal mixed-methods study examining the effects of POS on academic and technical achievement for students entering ninth grade in 2008-2009. The study uses both experimental and quasi-experimental research designs and includes a qualitative component intended to generate rich descriptions of the study schools' implementation of CTE POS. In other papers and presentations, we described the lottery and student selection processes used by these districts to place students in POS and reported ninth-grade academic, technical, and student survey results. This paper synthesizes qualitative findings related to the mandated and supporting components of POS observed during site visits made during 2008-2009 and 2009-2010.

We here present the conceptual framework underpinning the study, briefly outline its design, methods, and outcome measures, and provide short descriptions of study sites in both districts. For each district and condition, we provide synthesized findings related to the mandated and supporting components of POS. Last, we offer tentative conclusions about POS in the hope that our findings may contribute to the national conversation regarding the Perkins reauthorization.

Description of the Study

Conceptual framework. As an example of curricular programming that is relevant to students, CTE has been proposed as a means of increasing student engagement and reducing dropout rates (Castellano et al., 2007; Plank, 2002; Plank, DeLuca, & Estacion, 2005). Engagement is a precursor to student achievement in and completion of high school, which itself is a precursor to a successful transition to postsecondary education or work. The studies by Plank and colleagues concluded that a balanced combination of CTE and academic courses may reduce dropout risk. Research on the impact of CTE on student academic achievement has been mixed or shown no effect (Agodini & Deke, 2004; Kemple & Snipes, 2000; Silverberg, Warner, Goodwin, & Fong, 2004). However, recent experimental research shows that contextualizing academic subjects in CTE can improve student achievement (Stone, Alfeld, & Pearson, 2008). Because Perkins IV requires relevant academics to be included in POS, POS may improve student achievement. Regarding student transitions after high school, recent studies have shown similar rates of postsecondary enrollment and attainment between CTE and other high school students (Kemple & Scott-Clayton, 2004; Silverberg et al., 2004). Results from studies of labor market outcomes of CTE students are mixed, although career academies appear to have a positive impact for young men, especially those at risk of dropping out (Kemple & Willner, 2008).

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

Study design and measures. Two designs have been utilized in this mixed-methods study. An experimental strand includes three sites in one large district (West). We took advantage of a district-run lottery that assigned students to the POS or control condition to construct a randomized controlled trial. Our second design used quasi-experimental methods, including propensity score matching, to identify a well-matched comparison group in one site in another large district (East). Both strands employ a qualitative component intended to contextualize the quantitative findings. During annual site visits, we conduct interviews and observe classes in treatment and control schools. Interviews distinguish differences between POS and the control condition, how differences influence outcomes, and how programs prepare students for further education and work. Classroom observations allow us to discern program differences and verify the fidelity of treatment. All quantitative measures come from district systems data.

POS in West District

West District serves a large urban student population, over 60% of whom self-identify as ethnic minorities; over 40% are eligible for free lunch. West's magnet and POS high schools were designed to improve student achievement, promote diversity, and create an awareness of career

opportunities. POS were developed with the help of Joint Technical Skills Committees (JTSCs).

Treatment School: Navy. Navy is a new, green facility and the district's first purpose-built POS high school. Navy offers POS in the areas of alternative fuels/transportation, biotechnology, construction management, culinary, engineering, hospitality, media/journalism, medical/health, teacher education, and early childhood. Senior internships are available but not required for most POS. Career and Technical Student Organizations (CTSOs) are very popular. Project-based learning (PBL) is a guiding principle, and technology is omnipresent. Academic curricula are integrated into the program areas and teachers work together in small learning communities.

Treatment School: Sky. The district's former career center, Sky expanded its mission to focus on providing upgraded, intensive academics while maintaining its 40-year-old reputation for high expectations and high-quality CTE instruction. Sky's CTE program sequences mostly begin in the 10th grade. Sky offers traditional and technology-focused POS in areas like 3D animation, architectural engineering, automotive, business, computer networking, culinary, film and video, graphic arts, health, and welding. Sky's Career Center is being replicated at other high schools.

Treatment School: Azure Academy. Azure is a magnet high school of eight wall-to-wall academies: business and finance, computer graphic design, computer-assisted drafting and design (CADD), computer science, pre-engineering, information technology (IT), legal studies, and systems technology support. In previous years, these programs served as a high-tech complement to Sky's more traditional CTE. Azure's emphasis has always been more college than workforce preparatory. As a trailblazer for the other district POS high schools, Azure is now "retrofitting" its POS in order to measure up to the latest standards.

Mandated Components of POS in West District Treatment Schools

1. Incorporate and align secondary and postsecondary education elements. Secondary and postsecondary curricular elements have been aligned through the institutionalization of relationships between and across secondary and postsecondary institutions and industry. These relationships may be formal and district-wide, as in the case of the JTSCs for various POS, or localized, as in the case of programs that work directly with postsecondary to align curricula, standards, and texts. Alignment is also fostered by the tech prep system.

2. Include academic and CTE content in a coordinated, non-duplicative progression of courses. Much technical content is aligned with academics in study schools. All three study schools offer non-duplicate sequences that progress from broad-based introductions to more advanced courses to the most intensive, career-specific culminating or capstone courses. The schools differ slightly in when students begin their POS; most begin in either ninth or 10th grade.

3. Offer the opportunity, where appropriate, for secondary students to acquire postsecondary credits. West students in any year can take certain CTE classes and receive college credit if they pass with an A or a B. Students may only apply for that credit during junior or senior year. Many credits are transferable to the state university system. The numbers of tech prep courses vary across study schools and programs. Other credit-earning options include Advanced Placement (AP), dual enrollment, virtual high school, and summer school.

4. Lead to an industry-recognized credential or certificate at the postsecondary level, or an associate or baccalaureate degree. All POS lead to either an industry-recognized credential at the postsecondary level or an associate or baccalaureate degree program. Many industry certifications can be earned in high school. These include construction (NCCER), culinary (ProStart, ServSafe), IT (CISCO, CompTIA A+, Oracle), and health (CNA). The time, staffing, and monetary commitments required to establish and maintain such programs were often cited as problematic, as were the costs to students. Pre-recession, the district paid for student exams.

Supporting Components of POS in West District Treatment Schools

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

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

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

Accountability and evaluation systems. West prioritizes the use of data for program improvement in both academic and CTE areas. All study principals share student achievement data with program chairs and faculty and use data to adjust instruction. District data allow one to compare student performance across the school, region, and district on an item-by-item basis.

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

Course sequences. All study schools offer non-duplicate POS program sequences, as previously described. The schools differ in when students begin their programs and also in the number and type of upper-level courses offered. Most sequences start in the 10th grade. Students are expected to carry any postsecondary credits they have earned into aligned postsecondary programs.

Credit transfer agreements. Articulation agreements have been established at the district level

for courses eligible for tech prep credit. These agreements apply to all district schools.

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

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

Technical skills assessments (TSAs). The state's Perkins plan notes that it is working to develop a technical skill attainment measure that includes more uniform exit-level assessments. The state plans to use third-party assessments instead of developing its own and will pilot the program in several CTE programs soon. However, it faces budget, staffing, and planning challenges.

West District Control Schools

There are over 30 high schools serving our control students, so we decided to visit only those schools with large numbers of our control group. In 2010, we visited three of these.

Amaranth High School. Amaranth is a nearly brand-new school constructed on ecologically sound principles. Its course catalog includes "traditional" CTE like CADD, culinary, and automotive technology. Other career-oriented programs not listed as CTE in the catalog include business, photography, and broadcast journalism. CTSOs are popular. Among the control sites visited, Amaranth comes closest to meeting the mandated components of POS.

Vermilion High School. Vermilion is a nearly 50-year old comprehensive high school. Its CTE is mostly traditional: automotive technology, business, child development, computer applications, fashion apparel and construction, food and nutrition, furniture and cabinetmaking, graphic design, and web design.

Crimson High School. Crimson is a comprehensive high school built within the last 15 years. It offers typical comprehensive high school activities and programs. Crimson's CTE offerings are largely traditional courses such as food and nutrition or woods technology. Business forms its own separate department. Although some programs exhibit a potential sequence, CTE is not formally laid out in this manner at Crimson and students need not complete a program sequence.

Mandated Components of POS in West District Control Schools

1. Incorporate and align secondary and postsecondary education elements. At the control schools visited, CTE is positioned a supplement to academics, and programs do not appear to have been aligned with programs at the local community college, except to the extent to which course curricula were developed by the district to align with and generate tech prep credit. There

are few or no connections between the schools' CTE programs and postsecondary.

2. Include academic and CTE content in a coordinated, non-duplicative progression of courses. Most CTE courses are not offered in the kinds of progressive sequences seen in POS high schools. Some areas, like automotive, do follow such a progression, but in general, the control schools have not sought to align academic and CTE content into POS-like pathways. Some teachers reported trying to do curriculum integration on their own, but it is not mandated.

3. Offer the opportunity, where appropriate, for secondary students to acquire postsecondary credits. At the control sites visited, tech prep remains an optional component of students' graduation plans, unlike the study schools, where it is promoted to students as a vital component of their POS. The number and type of tech prep courses offered vary according to program.

4. Lead to an industry-recognized credential or certificate at the postsecondary level, or an associate or baccalaureate degree. Because there are no specific course sequences requiring a postsecondary component at the control sites, there are no POS leading to such credentials or degrees. There was little to no evidence of industry-recognized credentials or certificates available at the high school level in the control sites visited. Given their different missions and lower numbers of CTE students, the control sites have not sought to acquire certifications.

Supporting Components of POS in West District Control Schools

Legislation and policies. Our control schools currently are not expected to implement POS. However, schools know that POS are coming. For now, CTE programs offered at the control sites are not purposefully connected to the region's economic or workforce development needs.

Partnerships. Relationships with postsecondary and business and industry at the control sites visited appear to be largely personal and local. However, the three sites visited do have connections with valuable partners in the community who support their programs in varied ways.

Professional development. The district funds and supports professional development for teachers and guidance counselors at all district schools. Some personnel reported attending a state-level training on POS, but no other work related to POS was reported at the sites visited.

Accountability and evaluation systems. West District values the use of data for program assessment and improvement, as described. All three control principals noted that they share student achievement data with their program chairs and faculty and use data to adjust instruction.

College and career readiness standards. We observed no particular standards related to college and career readiness during any of our control site visits.

Course sequences. Most of the CTE courses at the schools visited seemed either traditional (e.g., automotive) or a mixture of traditional and modern (e.g., 3D animation) in content; only some programs are offered as full sequences. Most CTE courses are offered *à la carte*. Sequences have not been laid out so students see the links between academics, CTE, postsecondary, and careers.

Credit transfer agreements. During our control site visits, we did not observe anything unusual

regarding credit transfer agreements; the control high schools follow district policy for tech prep.

Guidance counseling and academic advisement. As in the study schools, career advising happens largely in CTE programs in the control sites visited. West District guidance counselors are primarily tasked with academic (e.g., graduation plans, scheduling) and college planning. Teachers serve as a main source of career guidance for CTE students. Some career guidance is available in optional career education courses; not all schools have career centers.

Teaching and learning strategies. We did not note any remarkable strategies being used in the CTE programs at the control sites visited other than the integration of technology in class lectures and activities. Curriculum integration was cited by CTE teachers as a means of engaging students and incorporating rigor, but there was no administrative mandate to foster it.

TSAs. The control schools visited follow district policy regarding TSAs.

POS in East District

Over 65% of East District's students self-identify as ethnic minorities, and almost half are eligible for the federal free lunch program. East offers magnet programs across grade spans, and a number of high schools offer magnet and POS programs to qualified students.

Blue Academy. Blue is a state-of-the-art high school featuring nine pathways in three integrated technology academies combining rigorous academics with POS in engineering, medical sciences and biotechnology, and IT. CTE program sequences begin in ninth grade with introductory courses and a mandatory computer class.

Mandated Components of POS at Blue

1. Incorporate and align secondary and postsecondary education elements. Curriculum alignment with postsecondary is a priority at Blue; in some programs, once-a-month alignment meetings are held in which teachers across the district review curriculum and pacing guides. Some meetings are held at the local community college and led by a community college instructor. The community college has also helped secondary teachers with their techniques.

2. Include academic and CTE content in a coordinated, non-duplicative progression of courses. Coursetaking follows a POS sequence beginning with foundational courses, leading to more intensive coursework, and ending with a culminating experience. Students are required to complete their sequences within their academies; once complete, they may take related courses within or outside their academy. The recession has compelled Blue to dedicate more resources to introductory courses with larger enrollments instead of upper-level courses serving few students.

3. Offer the opportunity, where appropriate, for secondary students to acquire postsecondary credits. District-wide, high schools offer students a number of opportunities to earn postsecondary credits, including articulated credit, AP, International Baccalaureate, concurrent enrollment at the local community college, virtual high school, and online postsecondary courses. A highlight of a 2008 scouting visit was Blue's concurrent enrollment program, which

allowed students to take classes at the local college with funding, transportation, and material support. In 2009 and 2010, funding for this and similar credit-earning programs had been largely withdrawn. Students are now encouraged to take online courses. Many interviewees noted that students were not performing as well in these courses as in regular, in-person courses.

4. Lead to an industry-recognized credential or certificate at the postsecondary level, or an associate or baccalaureate degree. All programs lead to an industry-recognized credential at the postsecondary level or an associate or baccalaureate degree program. Blue offers such certificates as NATEF accreditation in automotive, NCCER accreditation in construction, and a PLTW program. The NAF-accredited IT academy offers CISCO and Oracle certifications. CompTIA A+ certification is available, in addition to an AP computer science class.

Supporting Components of POS at Blue

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

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

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

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

College and career readiness standards. Blue sets high expectations of students and provides them with the extra resources to meet them. Teachers are paid extra to provide tutoring in various subject areas. Soft skills are imparted through the school's unique cultural practices and modeled by faculty and administrators. All students are expected to move on to postsecondary.

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

postsecondary articulation agreements, but the process takes a long time.

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

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

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

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

East District Comparison Schools

Emerald High School. Emerald is a 60-year-old facility with an IB magnet program that is part of the district's efforts to promote student diversity. Emerald has many CTE course offerings, including business, marketing, health occupations, family and consumer sciences (culinary), technology education (PLTW), and automotive. Although CTE programs are offered in course sequences, students can switch and begin another sequence.

Heliotrope High School. Heliotrope High School was reorganized in the 1990s as a college preparatory high school with magnets in math, science, environmental studies, and IB. Its CTE offerings are mostly technology-focused and include business education, medical sciences, IT, drafting, and PLTW. Heliotrope lost its dedicated career coordinator, a position it now shares with another school. Heliotrope has a career center, but we did not observe it during our visits.

Indigo High School. Indigo is a 40-year-old facility located outside city limits that was built to educate students from earlier rings of suburban development. CTE offerings included automotive, business and marketing, construction, family and consumer sciences, health occupations, and IT; due to budget cuts, Indigo closed its automotive and construction programs by our second visit. Indigo has an incipient PLTW program but only one certified teacher.

Neon Visual and Performing Arts School. Neon is a Grades 6-12 arts-focused magnet that enrolls students from all over the district. Neon's minimal CTE offerings include Apparel I and

II, Costume Design, Computer Applications I and II, Fashion Merchandising, Theater Tech, and, before the business program was closed, Small Business Entrepreneurship.

Mandated Components of POS in East District Comparison Schools

1. Incorporate and align secondary and postsecondary education elements. Located in a state with a top-down educational structure, East District is charged with following state-developed course and program curricula that align secondary and postsecondary elements. The comparison sites appear to have very limited, mostly personal connections with the local community college.

2. Include academic and CTE content in a coordinated, non-duplicative progression of courses. The state developed technical standards for all CTE program areas and has aligned curricula across secondary and postsecondary education. Course guides include academic skills that are integrated into course activities. None of the comparison schools' programs have been laid out to show required academic, CTE, dual enrollment, and postsecondary courses.

3. Offer the opportunity, where appropriate, for secondary students to acquire postsecondary credits. Opportunities exist for East District students to earn college credit while in CTE programs. Students can take college courses while in high school and receive credit from both institutions, or complete certain high school courses and apply for credit upon enrollment in college. Funding to support such programs has decreased post-recession, and online courses were noted as alternatives.

4. Lead to an industry-recognized credential or certificate at the postsecondary level, or an associate or baccalaureate degree. Opportunities to earn industry-recognized credentials or certificates are limited at our comparison schools, partly due to their cost.

Supporting Components of POS in East District Comparison Schools

Legislation and policies. East's comprehensive schools are not implementing POS. CTE programs respond to regional economic and workforce development needs only to the extent that the district funds CTE programs that are connected to the local economy—and only continues to fund programs that support sufficient numbers of students. This policy, post-recession, has lead to the closure of expensive programs like the ASE-certified automotive program at Indigo.

Partnerships. Partnerships with postsecondary and business and industry are present in some of our comparison schools and display greater and lesser degrees of institutionalization and formality. Programmatic advisory committees were most often observed.

Professional development. Professional development is available for all East District teachers and guidance counselors, although none has been provided related specifically to POS. The availability and intensity of CTE-specific professional development varied across comparison sites.

Accountability and evaluation systems. Data-driven decision-making happens at every school. Teachers and departments are responsible for addressing any weaknesses evident in assessment results. The district recently adopted a new accountability system that is creating headaches for academic teachers; CTE teachers have had few problems, given that their assessments have been

drawn from state or district-level testing banks for many years.

College and career readiness standards. College and career readiness is reflected in the district's graduation requirements. For our cohort, college-preparatory, career-preparatory, and combination college- and career-preparatory courses of study are available. "College and career ready" often means preparing students with 21st-century skills and easing the transition to college and jobs.

Course sequences. This state aligned its CTE curriculum across secondary and postsecondary educational levels and has approved curricula for all CTE programs in POS schools like Blue and the comprehensives. However, our comparison sites have not created POS-like sequences.

Credit transfer agreements. We have noted this state's process of establishing articulation agreements with postsecondary. The same credit transfer and curriculum alignment processes hold at the comparison sites. Sites appear to have limited or no articulated courses, however; students do not always automatically accrue postsecondary credit upon completing eligible courses.

Guidance counseling and academic advisement. Statewide, career guidance happens largely in CTE classrooms and is delivered by CTE teachers. Other career-related resources supplement in-class guidance. Pre-recession, all high schools had a career coordinator; most schools now share. Some schools—like Emerald, Heliotrope, and Indigo—have career centers; Neon has none.

Teaching and learning strategies. The state mandates curriculum integration to the extent that academic skills must be embedded in CTE curricula and assessments. But curriculum integration as a collaborative activity between CTE and academic teachers happens rarely. Professional learning communities targeted to academics, not CTE, were mentioned at two comparison schools.

TSAs. The comparison schools follow the state CTE curriculum and TSA system.

Conclusions

We here report observations made over our cohort's first two years of high school; our conclusions are thus tentative, given that most students have not yet engaged in the most intensive experiences of their POS. Thus far, we believe that POS reflect a significant amplification of CTE as it is being offered at the control sites. POS offer students rigorous, engaging instruction in academic and technical content areas with opportunities to apply their knowledge and skills to the solution of real-world problems, earn valuable college credits, familiarize themselves with careers, and connect with business.

Both districts are fully implementing the four mandated components of POS. The alignment of secondary and postsecondary elements has been achieved by formalizing local or personal relationships between and across secondary, postsecondary, and industry. POS improve and expand the alignments begun under tech prep. All POS schools have aligned academic and technical content in non-duplicative course sequences that progress from broad introductions through more intensive coursework and culminate in advanced, career-specific courses. The recession has curbed the types of postsecondary credit-earning opportunities available, but all POS schools make it possible to participate in some form of dual or concurrent enrollment. All

POS at our treatment schools lead to either an industry-recognized credential or a postsecondary degree, but budget issues have constrained district support for in-school student credentialing.

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

We cannot yet say whether POS as implemented by these two districts will positively impact student engagement, academic and technical achievement, and transition to postsecondary education and careers. The next two years of data collection will help us make a larger contribution to the national conversation regarding the reauthorization of Perkins.

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