



# What Works in Career and Technical Education: Evidence Underlying Programs and Policies that Work

## **Introduction and Career & Technical Education Background**

Career and technical education (CTE) has been part of the landscape of the U.S. elementary and secondary education system<sup>1</sup> since the very beginning. It has taken different shapes and forms over that time period from apprenticeships, to specialized schools, to career pathways, to vocational education, and more. It has been en vogue, out of fashion, and everything in between. But at its core, career and technical education has always been focused on helping young people further their education in service of getting a job.

But have CTE programs in our country accomplished this important mission? The answer is decidedly mixed. That is not because we know that CTE programs are generally falling short necessarily; but rather, because some programs have been evaluated while others have not. The research is excellent and deep in some areas and incredibly spotty in others.

The purpose of this Policy Impact Snapshot is to identify the major categories of career and technical education currently available within our nation's secondary and postsecondary education systems and describe the existing research on whether these programs are achieving desired outcomes for students.

This Policy Impact Snapshot describes four major types of CTE programs:

1. CTE instruction and training;
2. Career Pathways;
3. Youth Apprenticeships; and
4. Career Readiness and Skills Training.

We have reviewed the evidence of effectiveness for each category and found that, because CTE programs have been around for so long, there are many studies, including many that are out of date. Many also describe associations and relationships

<sup>1</sup> This paper centers on career and technical education primarily at the k-12 level, which is the focus of most of the existing research. We also touch briefly on some key postsecondary programs. There are, however, adult programs that have been evaluated as well (such as the [Pathways for Advancing Careers and Education](#) project at the Administration for Children and Families). Those programs are outside of the parameters of this paper.

rather than causal connections to specific outcomes. But over time, better data availability and quality have allowed researchers to conduct more rigorous studies. In this paper, we focus on those more recent and rigorous studies.

In general, multiple quasi-experimental studies have found associations between CTE course participation and positive student outcomes, such as increased high school graduation rates and higher wages, particularly among low-income students, young men, and students with disabilities. Several rigorous randomized controlled trial (RCT) studies of Career Pathways programs have linked positive outcomes to the programs themselves, rather than to other factors such as the kinds of students participating in the programs. On the other hand, youth apprenticeship models and soft skills (or power skills) training programs have not yet been linked with rigorous evidence. This is likely because youth apprenticeships are relatively new in the United States and soft/power skills training is a relatively new component of many CTE programs.

### **Career and Technical Education Categories**

Today's CTE programs can generally be grouped into four categories:

1. ***CTE instruction and training*** are courses offered at high schools and community colleges, including dual enrollment programs (where students take both high school and college courses during high school). This training may be offered in a structured sequence or as individual courses. For example, a high school might offer a set of classes in health care that are to be taken in a particular order and culminate in a health care related credential. The school might also offer an introductory level course on Microsoft Office that serves as the base level course for multiple CTE programs of study, including the health care one, or that can be taken as a stand-alone course. Both students that enroll in the complete healthcare sequence and those that enroll just in the Microsoft Office course are receiving CTE training and instruction.
2. ***Career Pathways*** programs and support services are typically structured around a particular career theme and offered in a cohesive sequence. Courses are usually combined with a variety of other work-based learning experiences, such as internships, mentoring, or job-shadowing. One popular type of pathway program is the career academy. These are industry-themed academies within a high school that students proceed through as part of a cohort. They provide additional learning experiences outside the school day such as internships and job-shadowing. Another popular pathway model is the Linked Learning program<sup>2</sup>, which also provides high school students with industry-themed course work and work-based learning experiences. However, Linked Learning programs differ from career academies in that

<sup>2</sup> The four core components of Linked Learning programs are: (1) academics; (2) CTE course work; (3) work-based learning; and (4) support services. By contrast, career academies are small cohort model learning communities with (1) rigorous academics; (2) CTE course work; and (3) work-based learning opportunities. Career academies place less emphasis on support services than do Linked Learning programs.

students do not necessarily proceed through them as part of a cohort. Students generally may enter and exit the program on individualized timelines.

3. **Youth Apprenticeships** often are collaborative efforts between school districts, local employers, and community colleges that combine paid work, skills, and competency-based training focused on a specific industry. They are distinct from the majority of apprenticeship programs that exist in the U.S., which are aimed at adult workers. Instead, youth apprenticeship programs combine training with paid work and generally involve some classroom study. For example, the CareerWise Colorado apprenticeship program is a three-year program in which students attend high school classes several days a week, and work in paid training opportunities the other two days. Students also have the opportunity to earn community college credits as part of the program. Other youth apprenticeship programs exist in, among other places, Georgia, Maryland, Minnesota, South Carolina, and Wisconsin.
4. **Career Readiness and Skills Training** are generally courses within a larger program. They focus on non-cognitive professional or “power skills” such as team-work, collaboration, communication, and professional expectations. Students may take these courses in high school or in combination with a work experience. For example, the Youth Force NOLA program in New Orleans provides high school students 60 hours of soft skills training before placing them in paid internships with local employers.

### **What We Mean By Evidence of Effectiveness**

We use the terms "evidence" and "evidence-based" to mean the use of rigorous, scientifically valid, and reliable methods to determine and improve the impact of education programs and practices. When evidence is used to evaluate the effectiveness of a program or practice, we call it "evidence-based."

The *Every Student Succeeds Act* (ESSA) includes a [tiered definition of evidence](#), which has been aligned with similar definitions used in the U.S. Department of Education’s (ED) [What Works Clearinghouse](#) and [Education Department General Administrative Regulations](#) (EDGAR). This allows ED to use a [common definition across its programs](#), including when allocating grant dollars. Most State Education Agencies (SEAs) have adopted this definition for use in distributing school improvement funds, and an increasing number are using it to inform the allocation of other federal and state education funds. In addition, the most recent federal legislation on career and technical education, the *Strengthening Career and Technical Education for the 21st Century Act* (Perkins V), adopts ESSA’s tiered evidence definition in its Innovation and Modernization Grant program. Under this grant program, ED has the authority to distribute dollars proportionate to the amount of evidence applicants have for their programs. In the first year ED only required programs to meet the first tier of evidence, Demonstrating a Rationale, but in future years the Department could increase the evidence requirements.

## ***Career and Technical Education Instruction and Training***

Multiple studies have found associations between CTE course participation and positive student outcomes, such as increased high school graduation rates and higher wages, particularly among low-income students.<sup>3</sup> A 2016 study by the Thomas B. Fordham Institute of three cohorts of students (those who started high school in 2008, 2009, and 2010), for example, found that “taking just one additional CTE course above the average increases a student’s probability of graduating from high school by 3.2 percentage points and ... increases a student’s probability of being employed the year after graduation by 1.5 percentage points.” The study uses data from the Arkansas Research Center and follows more than 100,000 students from eighth grade through high school and into college and the workforce. Looking at these cohorts of students, the study found that CTE concentrators (students who take multiple CTE courses in the same subject) were more than 20 percentage points more likely to graduate from high school, and 1.3 percentage points more likely to enroll in two-year colleges. These effects were strongest among young men and low-income students.<sup>4,5</sup>

Quasi-experimental studies conducted by Karp et al. and Rodriguez, Hughes, and Belfield of a number of career-related dual-enrollment programs found that students who participated in them had higher grade point averages, graduated high school, stayed enrolled in college, and enrolled in four-year degree programs at higher rates than other students. For example, the 2012 study by Rodriguez et al. of dual-enrollment programs in California found that after two years in college, “dual enrollees had accumulated an additional 4.6 credits. This is a difference of 20 percent more credits” than their peers in the comparison group.<sup>6</sup> Other studies of dual-enrollment programs do not separate CTE-related dual-enrollment programs from pure academic dual-enrollment programs. But these studies also find similar positive benefits of dual-enrollment programs for high-school students. For example, in [a new quasi-experimental study](#)<sup>7</sup> of the City University of New York’s (CUNY) College Now program Britton et al., used a regression discontinuity design (RDD) to compare students on either side of an eligibility threshold for the program. They found that eligibility for the program led to a seven percentage point increase in college enrollment, and an 8.6 point increase in the eligibility of enrollment in a four-year college.

Moreover, [at least one quasi-experimental study](#) of regional vocational high schools -- where a single school offers all the available CTE in a given district or region -- conducted by Dougherty, Neild et al. and Brunner et al. found positive impacts on students enrolled in these schools. For example, the Dougherty study of students in two

<sup>3</sup> Bishop and Mane (2004); Dougherty (2016b); Mane (1999); Plank, DeLuca, and Estacion (2008).

<sup>4</sup> [Dougherty \(2016a\)](#).

<sup>5</sup> Perkins V defines “concentrator” as a student who takes *two* or more CTE courses in a sequence. Much of the literature cited above, however, defines “concentrators” as students that take *three* or more CTE courses.

<sup>6</sup> Karp et al. (2007); Rodríguez, Hughes, and Belfield (2012).

<sup>7</sup> Britton et al (2019).

Massachusetts CTE high schools found that attending a regional vocational high school boosted the probability of on-time graduation from high school by three to five percentage points for higher income students, and seven to 10 percentage points for their lower-income peers.<sup>8</sup> The Neild study of five CTE schools in Philadelphia found that “CTE students had significantly better outcomes in terms of graduation rates, credit accumulation, and the successful completion of the college preparatory mathematics sequence algebra 1, algebra 2, and geometry.”<sup>9</sup> Finally, [a new study](#) by Brunner, Dougherty and Ross of the technical high school system in Connecticut found that male students who attended the schools were 10 percentage points more likely to graduate high school, but eight percentage points less likely to attend college. Male students who attended these schools had higher quarterly earnings after high school, however. The study found no effect on outcomes for women who attended technical high schools.<sup>10</sup>

Finally, several studies found strong and positive economic benefits for students who earn vocational certificates or career-focused associates degrees, particularly those related to health care and information technology. For example, a 2014 study of all community college students in California between 1992 and 2011 by Stevens, Kurlaender, and Grosz found that average returns for these kinds of degrees ranged from 10 percent at the low end for short-term certificates to as much as 25 percent at the high end for associates degrees, with returns to health care credentials driving much of the positive results.<sup>11</sup>

## ***Career Pathways***

One of the most popular K-12 career pathway models is Career Academies, of which there are currently more than 7,000 in public and private high schools across the U.S.<sup>12</sup> This growth came about in part because of a rigorous, experimental [MDRC Randomized Control Trial \(RCT\) study](#) that found sustained positive impacts on earnings eight years after high school for academy students, particularly among young men. In particular, students who randomly won the opportunity to enroll in a Career Academy had an average 11 percent per year higher earnings than their peers who randomly lost the opportunity to attend the academies, eight years after expected high school graduation.<sup>13</sup> A more recent study by Hemelt, Lenard, and Paeplow conducted in 2017 of a single Career Academy in North Carolina also found positive impacts of enrolling in the academy on high school graduation and college enrollment, particularly for boys. In addition, because many issues in both education and the workforce have changed over the last 20 years, when the original Career Academies cohort was

<sup>8</sup> Dougherty (2018).

<sup>9</sup> Neild, Boccanfuso, and Byrnes (2015).

<sup>10</sup> Brunner, Dougherty, and Ross (2019).

<sup>11</sup> Stevens, Kurlaender, and Grosz (2015).

<sup>12</sup> <https://www.ncacinc.com/nsop/academies>

<sup>13</sup> Kemple and Willner (2008).

enrolled in the study, MDRC is currently conducting a new, rigorous RCT study of contemporary [Career Academies in California](#).

The early college high school (ECHS) model is a career pathway that allows students to earn credits toward a postsecondary degree during high school, through a partnership with a college. Several rigorous studies<sup>14</sup> of this model found that they improved high school graduation, the earning of postsecondary credentials, and the taking and passing of core college preparatory courses. For example, Edmunds et al. have published several studies detailing longitudinal results of a lottery-based RCT study of 1,651 students who applied to 12 ECHSs in North Carolina between 2005 and 2010. They found that students enrolled in ECHSs were 5.5 percentage points more likely to succeed in ninth grade algebra. Positive impacts followed through to college enrollment, with ECHS students more than 20 percentage points more likely to have enrolled in college within six years of first entering high school.<sup>15</sup> Another matched comparison design study conducted by Lauen, Fuller, Barrett, and Janda also found that ECHS students were 22 percentage points more likely than similar students in regular district schools to have earned associates degrees two years after high school.<sup>16</sup>

Evidence about the popular Linked Learning pathway model, which combines rigorous academics, sequenced CTE courses, work-based learning, and support services, is confined to a less rigorous matching design study of Linked Learning students in nine school districts across California conducted by Warner et al. The study found that students in the program were more likely to graduate from high school and enroll in college, with stronger effects among students with weaker academic preparation, and African-American students. Specifically, the study found that “on average, students who entered certified pathways with low prior achievement were 4.5 percentage points less likely to drop out, were 7.6 percentage points more likely to graduate, and accumulated 15.5 more credits and 1.7 more college preparatory requirements than similar peers in traditional high school programs. Although students with low prior achievement in certified pathways were equally likely to enroll in a postsecondary institution as their peers, when they did enroll in college they were 6.4 percentage points more likely to enroll in a 4-year institution.”<sup>17</sup>

At the postsecondary level, a 2009 study by Jenkins, Zeidenberg, and Kienzl of participants in the I-BEST program, which includes basic skills training in vocational courses, used a matching design and found that I-BEST students stayed in community college courses at increased rates. Also, in a two-year tracking period after the program, these students were 23 percentage points more likely to earn college credits than comparison group students, 17 percentage points more likely to remain enrolled in

<sup>14</sup> Some ECHSs have a CTE focus while others are more academically focused. But the evidence that exists does not distinguish between the two models. The studies referenced in this paper similarly do not separate the two models of ECHS in part because more recent models recognize that the preparation needed for college and career is similar.

<sup>15</sup> Edmunds et al. (2017).

<sup>16</sup> Lauen, Fuller, Barrett, and Janda (2017).

<sup>17</sup> Warner et al. (2016).

the second year, and 40 percentage points more likely to earn an occupational certificate during the two-years.<sup>18</sup>

Further, a small RCT study of Project QUEST's 410 participants (Project QUEST provides occupational skills training related to health care at a few community colleges in San Antonio, Texas) conducted by the Economic Mobility Corporation and published in 2019 found that six years after the program, QUEST students earned close to \$5,000 a year more than control group students.<sup>19</sup> Another sectoral jobs program similar to QUEST, Per Scholas, provides employment and training to low-income workers focused on the information technology sector.<sup>20</sup> Two well-conducted RCT studies<sup>21</sup> found that Per Scholas increased average earnings by nearly 30 percent, or about \$4,800, three years after random assignment. A third sectoral jobs program, Year Up, which provides workforce training in the financial sector was found to increase annual earnings by \$7,011 in the third year after random assignment.<sup>22</sup> Alternatively, a recent study of the U.S. Department of Health and Human Services' Health Profession Opportunity Grant (HPOG) program, which provides training and job counseling in the health sector, has shown - at least in the short-term - no significant or meaningful impacts on overall employment rates or quarterly earnings.<sup>23</sup>

### ***Internships and Apprenticeships***

Internships are popular components of many pathway programs. One RCT study conducted by The Urban Institute of 1,062 applicants to the Urban Alliance's high school internship program (which combines a paid internship with professional training and mentoring) found large effects on college attendance for young men. Specifically, participation in the Urban Alliance program increased the probability of college enrollment for young men by 12 percentage points. Males who completed the program were 23 percentage points more likely to enroll in college.<sup>24</sup>

Although there is a lot of policy enthusiasm for youth apprenticeship models in the United States, there is a lack of evidence about their efficacy or impact. Several studies of apprenticeship programs *for adults* in the United States found a positive association between program participation and higher earnings.<sup>25</sup> And one large, quasi-experimental study of the long-term effects of youth vocational education in 11 European countries conducted by Hanushek et al. found that vocational students in

<sup>18</sup> Jenkins, Zeidenberg, and Kienzl (2009).

<sup>19</sup> Elliott and Roder (2017).

<sup>20</sup> Per Scholas currently operates in Georgia, Massachusetts, Maryland, New Jersey, New York, Ohio, and Texas.

<sup>21</sup> Schaberg (2017); Hendra et al. (2016).

<sup>22</sup> Fein and Hamadyk (2018).

<sup>23</sup> Peck et al (2018).

<sup>24</sup> Theodos et al. (2017).

<sup>25</sup> Reed et al. (2012); Hollenbeck (2008).

countries where the vocational education track emphasized apprenticeships were more likely to be employed when they were younger than general-education participants, but later in life they were more likely to struggle to adapt to technological change and to maintain employment. The study used data from the International Adult Literacy Survey as well as German microcensus data. The pattern of findings was most pronounced in countries that emphasize apprenticeship programs, including Germany, Denmark, and Switzerland, and the sample from these countries included 2,170 adults. <sup>26</sup>

### ***Readiness Skills Training***

Although there is a growing demand for workers who can combine analytical skills with soft (or power) skills, there is currently little to no evidence about the effects of programs that seek to develop these skills in students and young adults. Despite the lack of evidence about the efficacy of training in soft (or power) skills, there is evidence that demand for these skills will only grow for future labor markets. For example, research by David Deming indicates that jobs that require high levels of social interaction grew by 12 percentage points between 1980 and 2012, while those requiring high levels of math without social interaction fell by 3.3 percentage points. Workers with jobs requiring higher levels of social interaction also saw greater economic returns over the same period, indicating that both demand and economic rewards for these kinds of skills are growing.<sup>27</sup>

### ***Career and Technical Education Impact on Specific populations***

#### Students with Disabilities

In addition to studies of different types of CTE programs, there also are several studies focusing on CTE's impact on specific populations of students. For example, several studies focus on the impact of CTE on students with disabilities, which is a population that historically participates in CTE at high rates. A number of these studies found positive associations between participation in CTE and employment and earnings outcomes, high school graduation, and postsecondary enrollment. Specifically, a study conducted by Theobald et al. in 2019 that utilized a longitudinal dataset of all public school students in Washington state from 2008 to 2013 found that students with disabilities who were CTE concentrators in high school (i.e., taking four or more CTE courses) were four percentage points more likely to graduate high school, and three percentage points more likely to be employed immediately after high school than similar students with disabilities who did not concentrate in CTE.<sup>28</sup>

<sup>26</sup> Hanushek, Schwerdt, Woessmann, and Zhang (2017).

<sup>27</sup> Deming (2017).

<sup>28</sup> Theobald, Goldhaber, Gratz, and Holden (2019).



## Young Men

It is also worth noting, as mentioned in the description of studies above, that multiple studies of different kinds of CTE find stronger impacts for young men. For example, the studies conducted by Theodos et al.; Brunner, Dougherty, and Ross; and Kemple and Wilner all found this kind of strong impact. Similar impacts have not been found for young women who participate in CTE programs.

## Middle Grades

One notable change in the new Perkins V legislation is that it expands the definition of middle grades, allowing states to offer CTE beginning in fifth, rather than seventh grade. But there is limited evidence about the impact on career related outcomes for people who participated in CTE during their middle grade years. One RCT conducted by Woolley et al. studied 3,295 students in 14 middle schools, seven of which were assigned to treatment that included using a curriculum that embeds career relevant learning into core subjects. The study found an impact of this kind of “real world learning” on performance in math. Specifically, students in treatment schools performed a quarter of a standard deviation higher in math than students in control schools.<sup>29</sup> There does not, however, appear to be evidence that suggests offering CTE to middle grade students has a causal impact on career related outcomes.

## **Career and Technical Education Local, State, and Federal Policy Recommendations**

The findings of these studies, in conjunction with several recently enacted federal laws, such as the *Workforce Innovation and Opportunity Act* (WIOA) and the *Strengthening Career and Technical Education for the 21<sup>st</sup> Century Act* (Perkins V), provide opportunities for forward-looking leaders at the federal, state, and local level to move the needle on student outcomes in CTE by directing their resources toward the type of evidence-based solutions identified earlier in this brief. To that end, we offer the following recommendations to federal, state, and local policymakers:

### *Federal*

To continue to build the evidence base outlined above and increase the impact of existing CTE programs, ED and the U.S. Department of Labor (DOL) should ensure that Perkins V funds and WIOA youth program funds are invested in evidence-based, results-driven solutions by:

- Prioritizing evidence of effectiveness in all federal CTE programs (overseen by both ED and DOL) using the definitions of evidence in ESSA.
- Setting aside one percent of funds from Perkins V and WIOA competitive grant programs to evaluate CTE programs.

<sup>29</sup> Woolley et al. (2013).

- Allocating more of the Perkins V National Activities dollars (\$7.4 million in FY19) through the Innovation and Modernization Grants program, which uses a tiered evidence funding framework like the one used in ESSA's Education Innovation and Research program (\$130 million in FY19). To date, ED has distributed approximately \$1.5 million in Innovation and Modernization grants to interventions meeting the lowest level of evidence defined in ESSA. In future rounds of grantmaking it should both allocate more funds in this evidence-based manner and require interventions to meet one of the three higher tiers of evidence.
- Creating a CTE category in the What Works Clearinghouse so that evaluations and intervention reports are easily accessible to state and local education agencies.
- Coordinating the ED What Works Clearinghouse, the DOL Clearinghouse for Labor Evaluation and Research (CLEAR), and the [CTE Research Network](#) so that there is one place where all CTE evaluations are located. All evaluations should be further categorized according to the ESSA evidence level they satisfy.

### *State*

To continue to build the evidence base outlined above and increase the impact of existing CTE programs, State Education Agencies (SEAs) should ensure that their state and federal CTE funds are invested in evidence-based, results-driven solutions by:

- Prioritizing evidence of effectiveness in all of their state CTE grant programs using the evidence definitions in ESSA.
- Setting aside one percent of their state CTE funds and the federal CTE funds they receive for CTE program evaluations.
- Developing and submitting a WIOA Plan to DOL that combines the state's plans for WIOA programs and Perkins V programs. As states prepare and submit their four-year Perkins V plans, they should consider aligning them with their WIOA plans as a baseline. States also should [consider aligning](#) their Perkins V and WIOA plans with plans under ESSA, Temporary Assistance for Needy Families, Employment and Training programs under the Supplemental Nutrition Assistance Program, Unemployment Insurance Programs, Community Service Block Grants, and Reintegration of Ex-Offenders, creating a comprehensive K-12 to career alignment of education and workforce programs.
- Connecting their K-12, higher education, and workforce data systems to create an integrated longitudinal data system that can both respond to the new accountability requirements of Perkins V and provide high-quality data on the long-term outcomes for students who participate in CTE programs.

## *Local*

To continue to build the evidence base outlined above and increase the impact of existing CTE programs, local school districts should ensure that their CTE funds are invested in evidence-based, results-driven solutions by:

- Prioritizing evidence of effectiveness in all of their local CTE grant programs using the evidence definitions in ESSA.

## **Conclusion**

The increase in studies evaluating the effectiveness of both secondary and postsecondary CTE programs in recent years provides policymakers with additional information about how evidence can help to achieve better results for students who participate in these programs. With the addition of federal laws like Perkins V, which encourage the use of data and evidence to determine the effectiveness of CTE programs, federal, state, and local leaders have more leverage than ever before to implement programs that will help students find post-graduation success in college and a career. It is time for leaders to take advantage of these evidence-based tools and use them to structure CTE programs that will help students get further faster.

## APPENDIX A

### ***Strengthening Career and Technical Education for the 21st Century Act (Perkins V)***

On July 31, 2018, the President signed the *Strengthening Career and Technical Education for the 21st Century Act*, also known as Perkins V, into law. Overall, Perkins V focuses on aligning systems -- connecting K-12 and postsecondary education systems with the needs of the workforce system, while leveraging accountability systems to improve academic and career outcomes. That means that CTE programs can and should invest in evidence-based programs and practices that are more likely to improve the achievement, skills, and career readiness of students.

Several new provisions in Perkins V make it clear that Congress expects leaders at all levels -- from the U.S. Department of Education (ED) to classroom teachers -- to take an evidence-based approach. Several provisions in particular are worth mentioning in detail because they offer leverage points that state and local officials can use to invest in the types of evidence-based solutions described above.

**Definitions (Sec. 3).** For the first time, Perkins V defines the term evidence-based, using the same [tiered evidence definition](#) that was included in the *Every Student Succeeds Act* (ESSA). The law then uses the term 12 times, including in descriptions of professional development and teaching practices, requirements for evaluation of the effectiveness of CTE programs, and requirements for innovation grants (see below). The law also, for the first time, defines [Pay for Success](#) (PFS) initiatives: agreements where recipients of state or local funds commit to achieve specific outcomes as a condition of payment. This is a break from traditional grantmaking, which funds projects regardless of whether they achieve their stated goals or outcomes. Over the past few years, ED has [supported the development of PFS projects](#) to implement new or scale-up existing evidence-based CTE opportunities focused on improving outcomes for underserved, high-need youth. While PFS is a relatively new idea and not a panacea, it is a promising approach that aligns funding incentives so that dollars flow toward results rather than inputs.

**National Activities (Sec. 114).** Perkins V authorizes a new Innovation and Modernization grant program within the National Activities fund (Sec. 114(e)) whose purpose is to “create, develop, implement, replicate, or take to scale evidence-based, field-initiated innovations to modernize and improve effectiveness and alignment of career and technical education and to improve student outcomes.” The law clarifies that grantees can use grant funds for a variety of purposes, including PFS initiatives. As noted, Perkins V defines evidence-based in the same way ESSA does, with four tiers of evidence. This provides the U.S. Secretary of Education the authority to adopt any one of the four tiers as the evidence base necessary to receive a grant under this new fund. In its [2019 grantmaking](#), ED chose to require that applicants meet the lowest tier of evidence – evidence that Demonstrates a Rationale – to receive a grant. The inclusion of a tiered evidence requirement for the first time in Perkins V is a step in the right direction. And, the choice to use the lowest tier the first time out may stem from the fact

that Perkins programs previously have not required evidence to receive a grant. Going forward, ED has the opportunity to require higher levels of evidence or to distribute funds proportionally to the amount of evidence a grantee can provide for its program request. Moreover, the amount of funding available for research through this grant is quite small, about \$1.48 million for nine projects, which is unlikely to be enough for a high-quality RCT. However, Section 114 also requires the U.S. Secretary of Education to evaluate, among other things, the extent to which CTE programs supported by Perkins are “grounded on evidence-based research.” Ongoing evaluation by ED may compensate for the lack of funding for individual programs to conduct RCTs. Additionally, such ongoing evaluation is key to continuing to build the evidence base of what works in CTE.

**Accountability (Sec. 113).** Perkins V requires states to set performance targets and report their success in meeting those targets for both secondary and postsecondary concentrators. The law defines a concentrator for secondary purposes as anyone that takes at least two courses in one program of study. For these students, states are required to set performance targets on graduation rates; academic performance; postsecondary placement; student attainment of postsecondary credentials, credits, or work-based learning; and CTE concentrators that go into non-traditional fields. There is also a postsecondary concentrator definition and associated performance targets. For evidence-building purposes, this requirement means states will now have better data on what happens to students after they exit a secondary and postsecondary CTE program. Moreover, it means [states will need to link](#) their K-12, postsecondary and workforce data systems, creating a strong data foundation for evaluating CTE programs going forward.

**State Plans (Sec. 122).** States seeking Perkins V funds must submit an application with various information, including a description of how they will approve eligible recipients for funds with a focus on improving outcomes (academic achievement and skill attainment) (Sec. 122(d)(5)). This may not seem related to evidence, but here states have an opportunity to ask recipients to include a description of the evidence behind the activities they plan to fund with federal dollars. A simple request like this could help steer eligible recipients in the direction of evidence-based solutions.

**State Leadership Activities (Sec. 124).** Perkins V authorizes states to set aside 10 percent of their state allocations for state-level activities to improve career and technical education. The law lists a variety of approved activities these funds may be spent on, including PFS and professional development that is grounded in evidence-based research, to the extent practicable. As with the state plans, states could use the flexibility provided by this funding stream to support and scale evidence-based approaches.

**Local Applications (Sec. 134).** Eligible recipients of state funds include local school districts or consortia of school districts and partnerships with postsecondary institutions. Although money flows by formula, to receive funding recipients must submit an application including a comprehensive needs assessment (Sec. 134(c)) that informs the selection of CTE programs and activities. The needs assessment must be conducted

every two years and describe how CTE programs are “sufficient in size, scope, and quality to meet the needs of all students served by the eligible recipient.” Again, as with the state plan and activities provisions, states could leverage the local application process to require that applicants show they consulted the evidence base in developing their needs assessment and they selected their programs and activities based on their effectiveness in meeting the needs of students.

**Local Use of Funds (Sec 135(b)).** The law requires local grant recipients to “support career and technical education programs that are of sufficient size, scope, and quality to be effective,” including training teachers to use “evidence-based pedagogical practices” and “develop[ing] and implement[ing] evaluations of the activities carried out with [Perkins] funds.” As previously noted, states and local grant recipients could leverage this language to ensure individual CTE programs invest in evidence-based solutions and evaluate programs to determine what is working for students and what could be improved.

### ***Connection to the Workforce Innovation and Opportunity Act (WIOA)***

Like Perkins V, WIOA emphasizes the use of evidence-based interventions and prioritizes evaluated approaches as part of its tiered-evidence [Workforce Innovation Fund](#). WIOA performance measures focus on longer-term outcomes for participants and pay for success provisions allow for outcomes-based contracts that link funding to long-term, high-bar outcomes. Moreover, Perkins V encourages states to submit [combined plans](#) that cover Perkins V and WIOA. States can increase the use of evidence-based approaches in their CTE/workforce pipeline by aligning the approaches they take to implementing both federal laws as well as the funding that supports those approaches. To create a comprehensive system of services that covers more than just education and workforce, states should also consider aligning their ESSA, Temporary Assistance for Needy Families (TANF), and Supplemental Nutrition Assistance Program Employment and Training (SNAP E&T) plans and programs with their Perkins V and WIOA plans. Aligning these various programs and their funding streams could enable states to look beyond the baseline of education and training and create a comprehensive system that supports all the economic mobility needs of their individuals and families.

## APPENDIX B

### ***Bibliography***

- Bishop, John H, and Ferran Mane. 2004. "The impacts of career-technical education on high school labor market success." *Economics of Education Review* 23, 4: 381-402. (What Works Clearinghouse: not reviewed)
- Britton, Tolani, Birunda Chelliah, Millie Symns, and Vandeen Campbell. 2019. "College Now...or Later: Measuring the Effects of Dual Enrollment on Postsecondary Access and Success" EdWorking Paper No. 19-118, Retrieved from Annenberg Institute at Brown University: <https://doi.org/10.26300/2wb0-ka92> (What Works Clearinghouse: not reviewed)
- Brunner, Eric, Shaun Dougherty and Stephen Ross. 2019. "The Effects of Career and Technical Education: Evidence from the Connecticut Technical High School System." EdWorking Paper No. 19-112, Retrieved from Annenberg Institute at Brown University: <http://www.edworkingpapers.com/ai19-112>. (What Works Clearinghouse: not reviewed)
- Deming, David J. 2017. "The growing importance of social skills in the labor market." *The Quarterly Journal of Economics* 132, 4: 1593-1640. (What Works Clearinghouse: not reviewed)
- Dougherty, Shaun M. 2016a. [\*Career and Technical Education in High School: Does It Improve Student Outcomes?\*](#) Washington, DC: Thomas B. Fordham Institute. (What Works Clearinghouse: not reviewed)
- Dougherty, Shaun M. 2016b. "The effect of career and technical education on human capital accumulation: Causal evidence from Massachusetts." *Education Finance and Policy*. (What Works Clearinghouse: not reviewed)
- Dougherty, Shaun M. 2018. "The Effect of Career and Technical Education on Human Capital Accumulation: Causal Evidence from Massachusetts." *Education Finance and Policy* 13, 2: 119-148. (What Works Clearinghouse: not reviewed)
- Edmunds, Julie, Fatih Unlu, Elizabeth Glennie, Arthur Smith, Lily Fesler, and Lawrence Bernstein. 2017. "Smoothing the Transition to Postsecondary Education: The Impact of the Early College Model." *Journal Of Research on Educational Effectiveness* 10, 2: 297-325. (What Works Clearinghouse: meets standards without reservations)
- Edmunds, Julie A., Lawrence Bernstein, Fatih Unlu, Elizabeth Glennie, John Willse, Arthur Smith, and Nina Arshavsky. 2012. "Expanding the start of the college pipeline: Ninth-grade findings from an experimental study of the impact of the early college high school model." *Journal of Research on Educational Effectiveness* 5, 2: 136-159. (What Works Clearinghouse: meets standards without reservations)

- Elliott, Mark, and Anne Roder. 2017. *Escalating Gains: Project QUEST's Sectoral Strategy Pays Off*. New York: Economic Mobility Corporation. (What Works Clearinghouse: not reviewed)
- Fein, David and Jill Hamadyk. 2018. *Bridging the Opportunity Divide for Low-Income Youth: Implementation and Early Impacts of the Year Up Program*. Washington, DC: HHS, ACF, Office of Policy, Research and Evaluation. (What Works Clearinghouse: not reviewed)
- Grossman, Jean B, Linda Kato, Tony Mallon, Sheila Maguire, and Maureen Conway. 2015. *The Value of Credentials for Disadvantaged Workers: Findings from the Sector Employment Impact Study*. Washington, D.C.: Aspen Institute. (What Works Clearinghouse: not reviewed)
- Hanushek, Eric A, Guido Schwerdt, Ludger Woessmann, and Lei Zhang. 2017. "General Education, Vocational Education, and Labor-Market Outcomes over the Lifecycle." *Journal of Human Resources* 52, 1: 48-87. (What Works Clearinghouse: not reviewed)
- Hendra, Richard, David H. Greenberg, Gayle Hamilton, Ari Oppenheim, Alexandra Pennington, Kelsey Schaberg, and Betsy L. Tessler. 2016. *Encouraging Evidence on a Sector-Focused Advancement Strategy: Two-Year Impacts from the WorkAdvance Demonstration*. New York: MDRC. (What Works Clearinghouse: not reviewed)
- Hollenbeck, Kevin. 2008. "State Use of Workforce System Net Impact Estimates and Rates of Return." Presented at the Association for Public Policy Analysis and Management (APPAM) Conference, Los Angeles, CA. (What Works Clearinghouse: not reviewed)
- Jenkins, Davis, Matthew Zeidenberg, and Gregory Kienzl. 2009. "Educational Outcomes of I-BEST, Washington State Community and Technical College System's Integrated Basic Education and Skills Training Program: Findings from a Multivariate Analysis." Unpublished paper. Community College Research Center, Columbia University. (What Works Clearinghouse: meets standards with reservations)
- Karp, Melinda Mechur, Juan Carlos Calcagno, Katherine L Hughes, Dong Wook Jeong, and Thomas R Bailey. 2007. "The Postsecondary Achievement of Participants in Dual Enrollment: An Analysis of Student Outcomes in Two States." *Community College Research Center, Columbia University*. (What Works Clearinghouse: does not meet standards because of QED design without baseline equivalence)
- Kemple, James J, and Cynthia J Willner. 2008. *Career Academies: Long-term impacts on labor market outcomes, educational attainment, and transitions to adulthood*. New York: MDRC. (What Works Clearinghouse: meets standards without reservations)
- Lauen, Douglas L, Sarah Fuller, Nathan Barrett, and Ludmila Janda. 2017. "Early Colleges at Scale: Impacts on Secondary and Postsecondary Outcomes." *American Journal of Education* 123, 4: 523-551. (What Works Clearinghouse: not reviewed)



- Mane, Ferran. 1999. "Trends in the payoff to academic and occupation-specific skills: the short and medium run returns to academic and vocational high school courses for non-college-bound students." *Economics of education review* 18, 4: 417-437. (What Works Clearinghouse: not reviewed)
- Neild, Ruth Curran, Christopher Boccanfuso, and Vaughan Byrnes. 2015. "Academic impacts of career and technical schools." *Career and Technical Education Research* 40, 1: 28-47. (What Works Clearinghouse: meets standards with reservations because of high attrition)
- Peck, Laura R., Alan Werner, Eleanor Harvill, Daniel Litwok, Shawn Moulton, Alyssa Rulf Fountain, and Gretchen Locke. 2018. "Health Profession Opportunity Grants (HPOG 1.0) Impact Study Interim Report: Program Implementation and Short-Term Impacts" HHS, Administration for Children and Families, Office of Planning, Research & Evaluation. (What Works Clearinghouse: not reviewed)
- Plank, Stephen B, Stefanie DeLuca, and Angela Estacion. 2008. "High school dropout and the role of career and technical education: A survival analysis of surviving high school." *Sociology of Education* 81, 4: 345-370. (What Works Clearinghouse: not reviewed)
- Plasman, Jay Stratte, and M. A. Gottfried. 2016. "Applied STEM Coursework, High School Dropout Rates, and Students With Learning Disabilities." *Educational Policy* 32, 5: 664-696. (What Works Clearinghouse: not reviewed)
- Reed, D., Yung-Hsu Liu, A., Kleinman, R., Mastri, A., Reed, D., Sattar, S., & Zeigler, J. (2012). *An Effectiveness Assessment and Cost-Benefit Analysis of Registered Apprenticeship in 10 States*. Retrieved from Oakland, CA (What Works Clearinghouse: not reviewed)
- Rodríguez, Olga, Katherine Lee Hughes, and Clive Belfield. 2012. "Bridging college and careers: Using dual enrollment to enhance career and technical education pathways (NCPR Working Paper)." Unpublished paper. New York: National Center for Postsecondary Research. (What Works Clearinghouse: does not meet standards because of quasi-experimental design without baseline equivalence)
- Schaberg, Kelsey. Can Sector Strategies Promote Longer-Term Effects? Three-Year Impacts from the WorkAdvance Demonstration. MDRC (Sept. 2017) (What Works Clearinghouse: not reviewed)
- Stevens, Ann Huff, Michal Kurlaender, and Michel Grosz. 2015. *Career technical education and labor market outcomes: Evidence from California community colleges*. National Bureau of Economic Research. (What Works Clearinghouse: not reviewed)
- Theobald, R., D. Goldhaber, T. Gratz, and K. L. Holden. 2019. "Career and technical education, inclusion, and postsecondary outcomes for students with learning disabilities." *Journal of learning disabilities* 52, 2: 109-119. (What Works Clearinghouse: not reviewed)

Theodos, Brett, Michael R. Pergamit, Devlin Hanson, Sara Edelstein, Rebecca Daniels, and Tanaya Srin. 2017. *Pathways after High School Evaluation of the Urban Alliance High School Internship Program*. Washington, DC: Urban Institute. (What Works Clearinghouse: not reviewed)

Warner, Miya T., Kyra Caspary, Nicole Arshan, Deepa Patel, C.J. Park, and Nancy Adelman. 2016. *Taking Stock of the California Linked Learning District Initiative: Seventh- Year evaluation Report*. SRI. (What Works Clearinghouse: meets standards with reservations because of quasi-experimental design with baseline equivalence)

Woolley, Michael E., Rose A. Roderick, Dennis K. Orthner, Patrick T. Akos, and Hinckley Jones-Sanpei. 2013. "Advancing Academic Achievement Through Career Relevance in the Middle Grades: A Longitudinal Evaluation of CareerStart." *American Educational Research Journal* 50, 6: 1309-1335. (What Works Clearinghouse: not reviewed)