



March 2022

CAREER AND TECHNICAL EDUCATION

Perspectives on Program Strategies and Challenges

Why GAO Did This Study

CTE programs offer students opportunities to explore potential careers while learning technical and employability skills. Education administers funds for these programs through the Strengthening Career and Technical Education for the 21st Century Act (Perkins V). For fiscal year 2021, Congress authorized about \$1.3 billion to support CTE programs through Perkins V, and about 11 million students participated in these programs in 2019-2020. Perkins V and a U.S. House of Representatives Committee report accompanying a fiscal year 2021 appropriations bill include provisions for GAO to examine CTE service and funding strategies. In addition, GAO was separately asked to review programs funded through Perkins V.

This report examines (1) strategies selected recipients of federal CTE funds have used to support their CTE programs and assist different student populations, (2) challenges CTE stakeholders face and how they are addressing them, and (3) how Education supports CTE programs.

GAO interviewed officials from Education, state officials in Delaware, Georgia, Ohio, and Washington (selected based on CTE enrollment of students from different populations, among other factors), representatives from eight CTE program providers, and 14 additional CTE stakeholders, including business representatives. GAO also reviewed CTE funding information from the eight CTE program providers; and reviewed relevant federal laws and Education documents.

View [GAO-22-104544](#). For more information, contact Dawn Locke at (202) 512-7215 or locked@gao.gov.

CAREER AND TECHNICAL EDUCATION

Perspectives on Program Strategies and Challenges

What GAO Found

Career and technical education (CTE) enables high school and college students to pursue in-demand occupations such as manufacturing jobs, and provides employers with a trained workforce. The four selected states and eight CTE program providers GAO interviewed supported different student populations through strategies such as leveraging state, local, and other federal funding; conducting needs assessments; or engaging with industry. Needs assessments can be useful tools for identifying students' needs and uncovering ways to improve CTE programs. For example, one CTE provider identified gaps in serving English learners and hired an interpreter to make information more accessible. The provider said this action increased CTE program enrollment among this population to 12 of 20 students in school year 2021-2022, compared to none in the prior school year. Selected state officials also emphasized the importance of engaging industry partners to identify work-based learning opportunities.

Selected CTE stakeholders, including state officials, program providers, and business representatives, reported long-standing challenges with delivering, accessing, and replicating CTE programs (see figure). In some cases, stakeholders provided examples of how they are addressing CTE challenges. For example, to overcome negative perceptions associated with CTE, two program providers said their schools have conducted outreach activities to inform parents about the benefits of CTE. In addition, two other stakeholders have taken steps to address challenges with limited long-term outcome data, such as developing a system that can link different data sources.

Challenges Reported by Selected Stakeholders with Delivering, Accessing, and Replicating Career and Technical Education (CTE) Programs



Delivering CTE programs may be challenging for providers due to:

- Funding and staff capacity
- Difficulty recruiting and retaining diverse teachers
- Negative perceptions of CTE



Accessing CTE programs may be challenging for students due to:

- Lack of transportation for work-based learning
- Language barriers
- Lack of support services and inflexible scheduling
- Program screening criteria
- Financial challenges



Replicating CTE programs may be challenging for states and providers due to:

- Limited long-term outcome data
- Limited information on evidence-based strategies

Source: GAO analysis of information obtained from interviews with selected CTE stakeholders. | GAO-22-104544

The Department of Education supports CTE programs by administering grants, providing technical assistance, partnering with other federal agencies, and expanding research. For example, Education has taken steps to expand research on strategies for improving CTE student outcomes. Education's What Works Clearinghouse is a central source of evidence on education and provides educators with information on how to improve CTE outcomes. Education officials also reported making improvements to the What Works Clearinghouse website in 2021 to enhance users' access to research on CTE.

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Abbreviations

Clearinghouse	What Works Clearinghouse
CTE	career and technical education
DOL	Department of Labor
ETA	Employment and Training Administration
OCTAE	Office of Career, Technical, and Adult Education
Perkins V	Strengthening Career and Technical Education for the 21st Century Act
Perkins I&M	Perkins Innovation and Modernization Program
WIOA	Workforce Innovation and Opportunity Act

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March 30, 2022

Congressional Committees

Career and technical education (CTE) programs prepare high school and college students for in-demand occupations. Specifically, CTE programs provide students with academic, technical, and employability skills and prepare them for postsecondary learning opportunities or work. For fiscal year 2021, Congress authorized about \$1.3 billion to support CTE programs through the Strengthening Career and Technical Education for the 21st Century Act (Perkins V), and about 11 million students participated in these programs in 2019-2020.¹ CTE stakeholders—such as CTE professionals, secondary and postsecondary program providers, and representatives from business and industry—have emphasized the importance of providing opportunities for students of all populations to gain skills that meet labor market needs.

Perkins V and the House Appropriations Committee Report 116-450 include provisions for us to review CTE service and funding strategies that help different populations of students and workers develop new skills.² In addition, we were asked to examine programs funded through Perkins V. This report examines (1) strategies selected recipients of federal CTE funds have used to support CTE programs and assist different populations, (2) challenges CTE stakeholders face and how they are addressing them, and (3) how the Department of Education supports CTE programs.

¹Pub. L. No. 115-224, 132 Stat. 1563 (2018). Perkins V was enacted in July 2018 and went into effect in July 2019. Perkins V reauthorized and amended the Carl D. Perkins Career and Technical Education Act of 2006. For purposes of this report, we refer to the Carl D. Perkins Career and Technical Education Act of 2006, as amended, as Perkins V.

²Pub. L. No. 115-244, sec. 201(a)(8), § 219, 132 Stat. at 1621; H. R. Rep. No. 116-450 at 285 (2020).

To address these objectives, we interviewed selected recipients of federal CTE funds, including state agency officials and CTE program providers.³ We interviewed state officials in Delaware, Georgia, Ohio, and Washington, which were selected based on:

- the racial and ethnic diversity of their CTE student populations;
- enrollment of special populations of students in CTE—such as students with disabilities and English learners;⁴
- strategic approaches to aligning federal education and workforce programs; and
- how funds are divided between secondary and postsecondary CTE program providers, which varies among states.

We also considered recommendations from national-level organizations and the presence of completed, ongoing, or planned research on evidence-based CTE program strategies in the state.⁵ Additionally, we interviewed representatives from a total of eight secondary and postsecondary CTE program providers, including two recipients of Perkins Innovation and Modernization Program (Perkins I&M) grants and CTE program providers that were known to have positive student outcomes or served diverse student populations according to state officials.

To describe funding strategies and sources for CTE for fiscal years 2018 through 2020, we requested funding information from the eight secondary and postsecondary program providers, and received responses from seven of the eight providers. To collect this information, we first identified

³State agencies include state educational agencies and state workforce development boards. Throughout this report, we refer to state agencies as “states.” Eligible recipients of federal Perkins V funds within states include local educational agencies, tribal organizations, institutions of higher education, and area career and technical education schools, among others. See 20 U.S.C. § 2302(20)-(21). Throughout this report, we refer to eligible recipients of Perkins V funds as CTE program providers.

⁴Under 20 U.S.C. § 2302(48), special populations include individuals with disabilities; individuals from economically disadvantaged families, including low-income youth and adults; individuals preparing for nontraditional fields; single parents, including single pregnant women; out-of-workforce individuals; English learners; certain homeless individuals; youth who are in or have aged out of the foster care system; or youth with a parent who is an active-duty member of the Armed Forces.

⁵As discussed in more detail later in this report, evidence-based activities, strategies, or interventions are those that have been proven to enhance student outcomes, such as the percentage of students completing high school or accumulating college credit.

federal funding sources for CTE through our interviews with Department of Education and Department of Labor (DOL) officials and through our research. We then compiled a list of funding sources and asked each CTE program provider to indicate if their CTE program received funding in fiscal years 2018 through 2020 from the programs listed, and also to indicate any funding sources not included in GAO's list. We also asked each CTE program provider to describe the challenges, if any, to funding their CTE program. We reviewed responses to our request for funding information for obvious errors, such as the years of funding, and in a couple of cases we followed up with respondents for clarification.

Based in part on recommendations from state officials, we also interviewed 14 additional CTE stakeholders. To obtain a range of perspectives, we selected stakeholders that represent different industries or serve different student populations. Stakeholders included representatives from career and technical student organizations that prepare students for different career pathways; business associations that represent different industries, such as hospitality; state workforce boards; and CTE educators. In addition, we interviewed individuals knowledgeable about CTE from six national-level organizations. We identified these organizations through our research, interviews, and recommendations from DOL and Education officials.

To provide illustrative examples of strategies for serving different student populations and identify common challenges, we reviewed selected states' Perkins V plans and conducted a comprehensive analysis of information gathered from interviews. Our findings cannot be generalized to all recipients of federal CTE funds or stakeholder groups, but provide insights into different service and funding strategies used by states and CTE providers to support CTE, as well as the challenges they face.

To examine actions Education has taken or plans to take to support CTE, we interviewed officials from the agency's Office of Career, Technical, and Adult Education and the Institute of Education Sciences. We also interviewed DOL officials from the Employment and Training Administration, which administers federal job training programs and grants for public employment service programs. We reviewed relevant federal laws and Education documents, such as the agency's fiscal year 2022 annual performance plan.

We conducted this performance audit from September 2020 to March 2022 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to

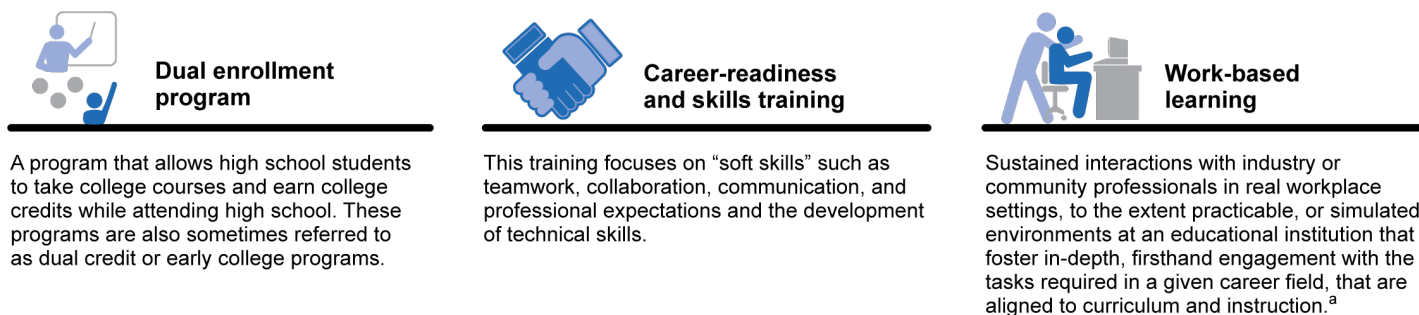
obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

Approaches to CTE

CTE programs include instruction and training, such as dual secondary and postsecondary educational enrollment programs, career-readiness and skills training, and work-based learning—including apprenticeships (see fig. 1). These programs may be delivered through career academies, community and technical colleges, or comprehensive high schools through individual course offerings, among other settings.⁶ Perkins V allows states and local CTE program providers some flexibility in delivering CTE.

Figure 1: Aspects of Career and Technical Education (CTE) Programs



Source: Information from Education’s What Works Clearinghouse, an education and social policy research organization, and Perkins V. | GAO-22-104544

^aThis is the definition for work-based learning in Perkins V. See 20 U.S.C. § 2302(55).

Another aspect of CTE includes “programs of study” and career pathways. Among other things, a program of study addresses the academic and technical knowledge, and the employability skills needed to attain technical skill proficiency or recognized postsecondary credentials.⁷ Examples of CTE programs of study include health sciences, hospitality and tourism, information technology, and manufacturing. Programs of

⁶According to Education’s What Works Clearinghouse, career academies are school-within-school programs operating in high schools in which students can take both career-related and academic courses and acquire work experience through local employers.

⁷20 U.S.C. § 2302(41).

study progress in specificity (beginning with all aspects of an industry and leading to more occupation-specific instruction), have multiple entry and exit points that incorporate credentialing, and culminate in the attainment of a recognized postsecondary credential. Career pathways are similar to programs of study. Perkins V uses the same definition of career pathway as the employment and training programs authorized under the Workforce Innovation and Opportunity Act (WIOA).⁸ (See text box.)

Career Pathway

A combination of rigorous and high-quality education, training, and other services that—

- (A) aligns with the skill needs of industries in the economy of the state or regional economy involved;
- (B) prepares an individual to be successful in any of a full range of secondary or postsecondary education options, including apprenticeships registered under the Act of August 16, 1937 (commonly known as the 'National Apprenticeship Act,' 50 Stat. 664, chapter 663 (29 U.S.C. § 50-50c);
- (C) includes counseling to support an individual in achieving the individual's education and career goals;
- (D) includes, as appropriate, education offered concurrently with and in the same context as workforce preparation activities and training for a specific occupation or occupational cluster;
- (E) organizes education, training, and other services to meet the particular needs of an individual in a manner that accelerates the educational and career advancement of the individual to the extent practicable;
- (F) enables an individual to attain a secondary school diploma or its recognized equivalent, and at least one recognized postsecondary credential; and
- (G) helps an individual enter or advance within a specific occupation or occupational cluster.

Source: Workforce Innovation and Opportunity Act (29 U.S.C. § 3102(7)). | GAO-22-104544

Perkins V Funding

Perkins V is the main source of federal funding for developing and implementing secondary and postsecondary CTE programs, and Education's Office of Career, Technical, and Adult Education is responsible for administering grant programs under the act. Specifically, Education allocates Perkins V funds to states, and states in turn distribute funds to local CTE program providers.⁹ Each state determines how to direct resources and split funds between secondary and postsecondary levels. Perkins V requires that the majority of funds allocated to the

⁸20 U.S.C. § 2302(8). WIOA is codified at 29 U.S.C. §§ 3101-3361. WIOA programs provide education and other services to help job seekers obtain employment and advance in the labor market, including job search assistance, career counseling, and a variety of occupational skills such as classroom and on-the-job training.

⁹20 U.S.C. § 2322(a)(1)-(3). Perkins Title I formula grants are allocated to states through a formula based on states' populations in certain age groups and per capita income. States can use up to 15 percent of funds for administrative and state leadership activities before passing at least 85 percent of funds on to secondary and postsecondary CTE program providers, such as school districts and community colleges.

secondary level be passed on to local CTE program providers based on the school district's share of students from families below the poverty level for the preceding fiscal year. Postsecondary funds are primarily allocated based on the institution's share of Pell grant recipients.¹⁰

State Plans

Before receiving federal Perkins V funding, states are required to develop a plan that includes information on developing and implementing CTE programs that meet labor market needs. A state may develop an individual Perkins V State Plan, or it can include its Perkins V information as part of the state's WIOA plan that also contains details on employment and training programs. Either way, the plan must include, among other things¹¹

- the state's strategic vision and goals for preparing an educated and skilled workforce;
- workforce development activities the state supports and their strategy for coordinating with other federal programs, including those authorized under WIOA; and
- program strategies for serving special populations.

In developing their plans, states are required to consult with a range of stakeholders, including representatives of secondary and postsecondary CTE programs, state workforce development boards, business and industry, and special populations.¹² These plans are then submitted to Education for review and approval.

¹⁰The federal Pell grant program provides low-income undergraduate students with financial aid for postsecondary education. See 20 U.S.C. §§ 1070a, 1091.

¹¹A state plan covers a 4-year period. 20 U.S.C. § 2342(a)(1). For a complete description of the information that states must include in their plan, see 20 U.S.C. § 2342(d).

¹²For a complete description of the different groups that should be consulted during the development of the Perkins V state plan, see 20 U.S.C. § 2342(c)(1).

Evidence-Based Strategies

Example of Reviewed Research on a K-12 Career and Technical Education (CTE)-Related Intervention

The What Works Clearinghouse includes reviewed research on K-12 CTE-related interventions—such as dual enrollment programs—that help students with the transition to college.

Dual enrollment programs allow high school students to earn college credit. In February 2017, the Clearinghouse published a brief on its review of the research that stated these programs improve student outcomes, such as high school completion, credit accumulation, college access and enrollment, and college degree attainment.

Source: Information from the Department of Education's What Works Clearinghouse. | GAO-22-104544

Education's Institute of Education Sciences manages the What Works Clearinghouse (the Clearinghouse), a central source of scientific evidence on education that reviews research, determines which studies meet specified eligibility and design standards, and summarizes the findings on different strategies and interventions (see sidebar).¹³ The Clearinghouse focuses on research about interventions that could improve educationally relevant outcomes, including those for students and educators. For example, the Clearinghouse rates studies to assess which activities, strategies, or interventions have positive effects on student outcomes, such as completing high school or accumulating college credit. Studies are rated based on how the research is designed and implemented, and then they are categorized based on the strength of the evidence.¹⁴ According to information on Education's website, evidence requirements are designed to ensure that states, school districts, and schools can identify programs, practices, and policies that improve student outcomes across various student populations.

¹³The What Works Clearinghouse (the Clearinghouse) reviews studies that use eligible research designs. Eligible research designs are: randomized controlled trials, quasi-experimental designs, regression discontinuity designs, and single-case designs. Studies that use other designs are not reviewed by the Clearinghouse. The Clearinghouse develops protocols for reviewing studies. A review protocol describes the procedures that will be followed when conducting the review. Developed with substantive experts, the protocol defines the parameters for the review, including the populations, settings, and outcomes.

¹⁴The Clearinghouse Standards and Procedures handbooks define the requirements for determining the strength of evidence. The Clearinghouse assigns study findings to evidence tiers that align with Education's regulations for implementing the Elementary and Secondary Education Act, as amended by the Every Student Succeeds Act. The regulatory definition of "evidence-based" includes four tiers of evidence for determining which activities, strategies, or interventions have positive effects on student outcomes based on how research studies are designed and implemented: strong, moderate, promising, and "demonstrates a rationale." Education considers evidence-based activities, strategies, or interventions supported by research that meets the definitions of strong or moderate evidence to have a causal impact on student outcomes, such as the percentage of students completing high school or accumulating college credit. See 34 C.F.R. § 77.

**Selected Recipients
of CTE Funds
Reported Using
Multiple Funding
Sources and Other
Strategies to Assist
Different Populations**

**Selected Recipients
Leveraged State and
Local Revenues, Federal
Grants, and Philanthropic
Donations**

Selected state officials and CTE program providers reported using multiple funding sources to support CTE, including state and local revenues, federal grants, and donations from philanthropic organizations. Officials from the selected states and local CTE program providers described “braiding” funding sources to more fully support CTE programs and address student needs (see sidebar). For example, officials in three of the four selected states said they were better able to leverage federal funding to support education and workforce programs, and develop a more cohesive workforce strategy by including Perkins V information as part of their states’ WIOA plans.

Selected recipients of Perkins V funds we interviewed provided examples of how they were able to use other sources of funding to serve different student populations.

Example of Braiding Funding Sources to Support Career and Technical Education (CTE)

One postsecondary CTE program provider in Delaware reported braiding the following funding sources to support CTE:

State. Funding included revenues from certain taxes collected from employers that can be used to train or retrain certain workers and provide young people with school-to-work transition services, among other things.

Federal. Funding included six different grants administered by the Department of Education, some of which were used to support activities such as developing curriculum and paying salaries. Funding also included six grants administered by the Department of Labor used, in part, to purchase equipment and provide support services, among other activities.

Philanthropic. Funding included donations from private corporate donors to supplement the above funding sources and expand workforce training opportunities for different populations of students. For example, funds were used to provide workforce training for ethnically diverse, low-income students.

Source: Information reported by CTE program provider for fiscal years 2018 through 2020 and GAO review of related information. | GAO-22-104544

State and local revenues. States can use state and local revenues to provide local CTE program providers with incentives and support. For example, state officials in Ohio and Washington said their states provide school districts with a financial incentive to encourage CTE offerings related to in-demand occupations, such as manufacturing jobs. An official from the governor's office in Ohio also said the state funds a grant program that helps businesses provide employees with opportunities to earn technology-focused credentials by reimbursing the employer's training costs. Four of the eight CTE program providers we interviewed reported that state and local funds were primarily used to support their programs by, for example, enhancing CTE classrooms and labs. Education officials said state and local funds generally make up most of the funding states use to support CTE.¹⁵

Federal grants. Six of the eight selected CTE program providers reported using other federal grant funds administered by Education, in addition to Perkins V funds, to support their CTE programs. See table 1 for the most commonly reported Education grants in addition to Perkins V.

¹⁵Federal CTE funds are meant to supplement and not supplant nonfederal funds for CTE. 20 U.S.C. § 2391(a).

Table 1: Most Commonly Reported Federal Grants Administered by the Department of Education Used by Selected Program Providers (in Addition to Perkins V) to Support Career and Technical Education (CTE) Programs

Grants to Support Secondary CTE	Examples of Grant Uses to Support CTE
Student Support and Academic Enrichment Grants ^a	School districts can use these grants for a variety of activities, including career preparation activities. CTE program providers reported using these funds toward curriculum and support services, among other uses.
Supporting Effective Instruction State Grants ^b	School districts can use these grants to provide professional development for teachers on strategies to integrate academic content, CTE, and work-based learning. CTE program providers reported using these funds toward curriculum and salaries.
Grants to Support Postsecondary CTE ^c	Examples of Grant Uses to Support CTE
Adult Education State Grants ^d	These grants can be used for integrated education and training that includes literacy activities and workforce training. CTE program providers reported using these funds toward curriculum and equipment, among other uses.

Source: Information from Education officials and funding information reported by selected CTE program providers. | GAO-22-104544

^aSee generally 20 U.S.C. §§ 7111-7122.

^bSee generally 20 U.S.C. §§ 6611-6614.

^cSelected program providers also reported the use of Pell grants to support postsecondary CTE, which provide financial aid to low-income undergraduate students.

^dSee generally 29 U.S.C. §§ 3291-3293. Education’s Office of Career, Technical, and Adult Education provides grants to states for the Adult Education and Family Literacy Act program, which are mostly distributed to local adult education providers such as community colleges.

A secondary and postsecondary CTE program provider also reported using federal funds administered by Education for targeted assistance to special populations of students, including students with disabilities and English learners. For example, a postsecondary CTE program provider in Ohio reported using Education grant funds authorized by the Language Instruction for English Learner and Immigrant Students Act to provide English learners with culturally responsive career counseling and for career exploration activities.

The four selected postsecondary CTE providers reported using grant funds from other federal agencies including DOL, the National Science Foundation, and the Department of Defense to support CTE (see table 2).

Table 2: Examples of Federal Funding from Agencies Other than the Department of Education Used to Support Postsecondary Career and Technical Education (CTE) Programs, as Reported by Selected Program Providers

Federal agency administering grant	Grant(s)	Description of how postsecondary CTE provider used grant funds
Department of Labor	Youth Apprenticeship Readiness Grant; Workforce Innovation and Opportunity Act (WIOA)	A technical community college in Delaware used Youth Apprenticeship Readiness Grant funds to support partnerships for providing in-school and out-of-school youth with apprenticeship opportunities in construction, hospitality, and information technology. The postsecondary CTE program provider also reported using WIOA Youth Formula Program funds to operate several programs for in-school and out-of-school youth.
National Science Foundation	Advanced Technical Education Program	A public technical institute in Washington used these grant funds to develop and support a technician pathway that leads to a software development degree, and to develop recruitment strategies for enrolling underserved students in software development programs.
Department of Defense	Manufacturing and Engineering Education Program	A community college in Ohio used these grant funds to develop and implement guided pathways for youth to meet the talent and skill needs of the nation's defense manufacturing industries.

Source: Funding information reported by selected CTE program providers and GAO review of related documents. | GAO-22-104544

Philanthropic donations. Three of the eight local CTE program providers we interviewed also reported using philanthropic funding from corporate donors or nonprofits to support their CTE programs. In Delaware, a local bank granted \$400,000 to a postsecondary CTE program provider to expand workforce training programs for in-demand sectors in the state, such as health care and construction. According to information on the school's website, training programs will be available to 200 students and will support ethnically diverse, low-income students. Officials in Washington provided an example of a scholarship funded in part by philanthropic donors and industry that is matched dollar-for-dollar by the state. Scholarship funds can be used by students toward associate degrees, certificates, or apprenticeships for in-demand trades such as welding and manufacturing or to cover support services such as transportation.

Selected Recipients Used Needs Assessments and Other Strategies to Assist Different Student Populations

Needs Assessments

Perkins V requires CTE program providers to conduct a comprehensive local needs assessment to receive funds.¹⁶ Needs assessments can be useful tools for identifying students' needs and uncovering ways to improve CTE programs. Selected CTE program providers described how they have used formal needs assessments. For example:

- In Ohio, the state education department hosted “equity labs” to assist CTE school districts with equitable access planning by providing tools and strategies to analyze data for the local needs assessment. One CTE district administrator said these tools helped their program identify gaps in serving English learners by uncovering low CTE enrollment among this student population. As a result, the district hired an interpreter to make information more accessible. The district administrator said that because of their efforts, CTE enrollment among English learners increased to 12 of 20 students in school year 2021-2022, from 0 of 10 students in the prior school year.
- In Georgia, a technical college discovered that fewer men than women were enrolling in CTE pathways that led to nontraditional occupations—jobs that are predominantly occupied by someone of a different gender.¹⁷ The school used Perkins V funding to develop a video featuring men in pathways traditionally pursued by women, such

¹⁶For comprehensive needs assessment requirements, see 20 U.S.C. § 2354(c). In the assessment, CTE program providers must include an evaluation of student performance, including for special populations; a description of how the programs they offer are aligned to state, regional, tribal, or local in-demand industry sectors or occupations identified by the state workforce development board; how they will improve the recruitment, retention, and training of CTE professionals; and their progress toward ensuring equal access to high-quality CTE programs for all students, among other things.

¹⁷One of the core indicators of performance under Perkins V at both the secondary and postsecondary levels is the percentage of CTE students participating in programs that lead to nontraditional fields. See 20 U.S.C. § 2323(b)(2)(A)(v), (B)(iii). The term “nontraditional fields” means occupations or fields of work, such as careers in computer science, technology, and other current and emerging high-skill occupations, for which individuals from one gender comprise less than 25 percent of the individuals employed in each such occupation or field of work. 20 U.S.C. § 2302(33).

as early childhood care and education, in an effort to increase enrollment of men in CTE pathways that lead to nontraditional fields.

CTE program providers we interviewed also described means other than formal needs assessments to identify the needs of different populations—including mid-career workers, tribal youth, and students with disabilities. Selected providers said they found ways to tailor CTE programs and services based on the identified needs of these populations. For example:

- In Delaware, one postsecondary CTE program provider developed a course to upskill and certify nursing assistants in long-term care facilities in response to increased demand resulting from the COVID-19 pandemic.
- In Washington, a CTE program provider developed CTE pathways for tribal youth that align with the tribe's major industries in the area. Representatives said there is a cultural component to each of the pathways, such as introducing indigenous ingredients into a culinary arts class. They said they developed this effort based on the tribe's desire to have more tribal members in leadership roles in Native-run businesses and for students to stay connected with the tribe through their career choices.
- In Georgia, officials said that students with disabilities often require additional supports. To address such needs, the state developed a career and technical student organization specifically designed to provide social and emotional learning support for secondary CTE students with disabilities. These services include setting career goals and assisting students with job placements.

Stakeholder Engagement and Support

Several selected recipients of federal CTE funds emphasized the importance of involving industry and obtaining support beyond the educational community in order for CTE programs to be successful. Perkins V requires industry input into certain activities such as the development of state plans and local needs assessments. Selected recipients described ways in which they engaged with business and industry and obtained support.

- **Engaging with business and industry.** Officials in the four selected states said that meaningful partnerships with business and industry are essential for CTE programs to be successful, especially in developing in-demand career pathways and identifying work-based learning opportunities, for example. State officials in Washington said that business and labor organization representatives on the state workforce board worked together and developed an advocacy strategy to increase resources for secondary and postsecondary CTE.

As a result of their joint effort, the state legislature invested more dollars in CTE.

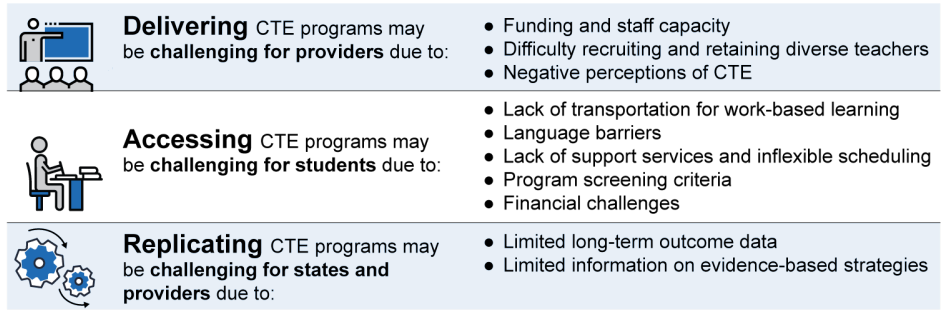
- **Obtaining support from state and local leadership.** Representatives from a national CTE organization said that state leaders often set the vision and strategy for CTE. State officials in Delaware and Ohio, for example, said that their governors played a significant role in shaping the state’s approach to CTE. In addition, three of eight CTE program providers stated that buy-in from state and local leadership, including education superintendents, was instrumental in expanding CTE opportunities. For example, one secondary CTE program provider in Georgia said the superintendent supported the county transitioning from traditional public schools to career academies—schools organized around different career pathways—to promote graduation and student engagement.

Stakeholders Reported Long-Standing Challenges with Delivering, Accessing, and Replicating CTE Programs, and Efforts to Address Them

Stakeholders we interviewed—including representatives of national organizations, state officials and CTE program providers, career and technical student organization representatives, and employers—reported long-standing challenges with delivering, accessing, and replicating CTE programs (see fig. 2).¹⁸

¹⁸Reported challenges generally fall into one of three categories. In some cases, reported challenges, such as funding and capacity, affected the ability to deliver, access, and replicate CTE programs.

Figure 2: Challenges Reported by Selected Stakeholders with Delivering, Accessing, and Replicating Career and Technical Education (CTE) Programs



Source: GAO analysis of information obtained from interviews with selected CTE stakeholders. | GAO-22-104544

Delivery Challenges for CTE Program Providers Included Funding and Capacity, Difficulty Recruiting and Retaining Diverse Teachers, and Negative Perceptions

Funding and capacity. Funding challenges can make it difficult to deliver a range of CTE services and can constrain students' access to certain opportunities, according to four of the eight selected CTE program providers. Representatives from two national organizations reported challenges with obtaining sufficient funding to purchase leading edge technology for CTE coursework. The postsecondary CTE program provider in Washington also said that funding challenges can hinder other providers from replicating a program model supported by evidence of its effectiveness, such as the state's Integrated Basic Education Skills and Training program (see sidebar). This particular program model provides students with basic skills, occupational training, and support services, such as career counseling, and it is delivered using a team-based teaching approach. Officials in Washington said their state provides additional funding per student to implement this approach, but providers in other states told them obtaining funding to pay two teachers to support the team-based teaching approach is a challenge.

Integrated Basic Education Skills and Training (I-BEST)

Washington State's I-BEST program was first implemented in the 2006-2007 school year. The program provides integrated basic skills and occupational training that is intended to allow adults to complete their training program faster than traditional programs, and provide supports to ensure students stay engaged in training.

The What Works Clearinghouse has reviewed three studies that meet its standards on the I-BEST program model. The Clearinghouse's review found evidence to support that implementing I-BEST is likely to increase industry-recognized credential, certificate, or license completion, and may increase short-term employment and earnings.

I-BEST has been replicated in other locations, sometimes under different names.

Source: Information from the Department of Education's Institute of Education Sciences. | GAO-22-104544

Stakeholders we interviewed also described challenges with providing CTE services because of limited staff capacity for providing career counseling to students, navigating partnerships with employers for work-based learning opportunities, and pursuing federal grants. Three stakeholders said that providing services is especially challenging for smaller or rural schools, which typically have fewer staff resources. As discussed earlier in this report, selected providers try to mitigate capacity and funding challenges by braiding different sources of funding from the federal, state, and local levels, as well as from philanthropic organizations.

Difficulty recruiting and retaining diverse teachers. Attracting CTE teachers—including racially and ethnically diverse teachers and those who have experience in subjects such as computer science and math—is another challenge, according to officials in two of the selected states and six of the eight CTE program providers. Retaining these teachers also can be challenging because according to one program provider, it can be difficult to keep teachers in the classroom when they can make more money working in their industry jobs. Officials in Ohio said that CTE teachers—especially those from industry-based professions—need stronger supports such as teacher training courses to help them transition from an industry setting to the classroom. In an effort to mitigate this challenge, officials in Washington said the state used Perkins V funding for a “boot camp” to train technical faculty with limited or no teaching experience on how to manage learning environments to complement their subject matter expertise.

One stakeholder said a lack of diversity among CTE teachers makes it difficult for students to see examples of themselves in individuals with successful careers. To address challenges with recruiting diverse teachers, CTE administrators from a tribal school in Washington said they encourage students enrolled in the education career pathway to consider coming back to the school to teach in an effort to recruit more CTE teachers with tribal backgrounds.

Negative perceptions. The perception that CTE programs are for students who underperform academically is another challenge, according to officials in two of the four states and five of the eight CTE program providers we interviewed. A CTE program provider in Ohio said some parents also share this negative perception, and that both parents and students may not know that CTE programs can lead to high-wage jobs.

To overcome the negative perceptions associated with CTE, program providers in Georgia and Ohio said their schools have conducted outreach activities to inform parents about the benefits of CTE. An employer in Ohio also reported reaching out to high school counselors to provide them with information they can use to help students understand that CTE programs provide high-wage, in-demand job opportunities.

Access Challenges for Students Included Barriers to Work-Based Learning Opportunities and Limited Social Supports

Barriers to work-based learning opportunities. Students encounter challenges to participating in work-based learning for several reasons, according to seven stakeholders we interviewed. For example, six stakeholders said that students lack transportation to work sites. Students' ability to engage in some work activities can also be limited if employers do not understand the kinds of work that are allowable under child labor and occupational safety laws or if schools and employers have not worked together to create opportunities for students.¹⁹

To address barriers to work-based learning, stakeholders described several efforts they have undertaken. A school district administrator in Ohio said the district used Perkins V funds to hire a work-based learning coordinator to identify opportunities and help students find transportation. A business stakeholder in Georgia reported plans to foster connections between schools and businesses by publishing a guide for employers on how to connect with schools that serve students from low-income families. Another business stakeholder in Washington said that they developed an employer-driven portal that will link K-12, postsecondary, and industry partners to match students with available work-based learning opportunities.

Language barriers and limited social supports. According to stakeholders we interviewed, students may also experience challenges accessing CTE programs because of language barriers and a lack of social supports. For example, CTE materials on one state's CTE website were only available in English. Students interested in CTE programs may also experience challenges participating because of a lack of support services such as childcare, inflexible scheduling of CTE activities, program screening criteria such as tests, and financial challenges such as

¹⁹Under Perkins V, states may choose to include the percentage of CTE students having participated in work-based learning as an indicator of CTE program quality at the secondary level. See 20 U.S.C. § 2323(b)(2)(A)(iv)(I)(cc).

accessing federal financial aid for postsecondary nondegree education, according to 10 stakeholders we interviewed.²⁰

Stakeholders provided some examples of efforts to increase access for students. For example, to help address language barriers, one CTE administrator in Ohio said the school district's online CTE applications are available in English and Spanish. To provide more flexibility for students experiencing scheduling challenges, several stakeholders said they are providing or considering providing online instruction.

Replication Challenges for States and CTE Program Providers Included Limited Long-Term Outcome Data and Information on Evidence-Based Strategies

Selected state officials and CTE providers reported there are limited data on long-term CTE outcomes and a lack of information on evidence-based strategies, thereby making it difficult to identify and replicate efforts that are known to be effective. Specifically:

Limited long-term outcome data. Linking data across state systems to follow a student through the K-12, postsecondary, and workforce systems to determine long-term CTE outcomes is difficult, according to state officials in three of the four states and four of the eight CTE program providers.²¹ Specifically, four of eight CTE program providers said that available data provide an incomplete picture of student outcomes, such as whether students who progress through a career pathway eventually work in that field.²²

To address these challenges, states and CTE program providers described steps taken to improve longitudinal data and data systems to measure long-term CTE student outcomes. For example, a state official in Delaware said the state is developing a postsecondary data system to

²⁰For example, programs must meet certain credit and hour requirements for students to be eligible for federal Pell grants. Pell grants primarily support students pursuing degrees, and students pursuing nondegree instructional education, such as certificate programs, may not be eligible for these grants.

²¹See GAO, *Education and Workforce Data: Challenges in Matching Student and Worker Information Raise Concerns about Longitudinal Data Systems*, GAO-15-27 (Washington, D.C.: Nov. 19, 2014) for additional challenges related to matching student and worker information, such as state law or agency policy prohibiting the collection of a Social Security number in K-12 data, which can make it more difficult to directly match individuals' K-12 and workforce records.

²²The postsecondary Perkins V performance indicator for the percentage of CTE students who receive a recognized postsecondary credential measures credential attainment during participation in a program or within a year of program completion. See 20 U.S.C. § 2323(B)(ii).

link different sources of data to better understand student needs and outcomes. A postsecondary CTE provider in Ohio entered into a data-sharing partnership at the state and federal levels to track long-term earnings and employment outcomes for graduates of the community college.²³ The provider is also exploring data matching between Perkins V data and unemployment data to determine CTE program employment outcomes.

Limited information on evidence-based strategies. Information on evidence-based strategies that improve CTE outcomes is limited, according to officials from two states and two national organizations. One secondary CTE provider in Delaware said there is a lack of information on the number of hours a student needs to participate in work-based learning in order to get a quality experience. In addition, little rigorous research exists on CTE at the secondary level, including for special populations of students, and research at the postsecondary level is even more limited, according to the state official in Delaware.

To address this challenge, the official in Delaware said they looked for research on evidence-based strategies that demonstrated positive outcomes for certain populations, such as by gender. The official said they then used the research to develop strategies for coordinating CTE services for other populations, including youth with disabilities.

Education Supports CTE Programs through Grants, Technical Assistance, Partnerships and Research

Education supports CTE programs and efforts to assist different student populations through activities such as administering grants; providing technical assistance to states and CTE program providers; partnering with other federal agencies, including DOL; and expanding research.

Administering Grants

In addition to Perkins V, Education administers other grants that can be used to support CTE activities. As noted above, selected CTE program providers reported using federal grants administered by Education such

²³Post-Secondary Employment Outcomes are experimental tabulations developed by the U.S. Census Bureau. Post-Secondary Employment Outcomes data provide earnings and employment outcomes for college and university graduates by degree level, degree major, and postsecondary institution.

as Adult Education State Grants, Student Support and Academic Enrichment Grants, and Supporting Effective Instruction State Grants. Perkins V also authorized the Perkins Innovation and Modernization Program (Perkins I&M).²⁴ This program was developed, in part, to serve students from low-income families, economically distressed communities, or rural communities. It was also developed to identify, support, and rigorously evaluate evidence-based and innovative strategies to improve and modernize CTE. Two of the eight CTE program providers we interviewed were awarded Perkins I&M grants. One program provider in Ohio plans to use the grant funds to expand computer science dual enrollment pathways and serve students from low-income families. The other Perkins I&M grant recipient in Georgia plans to expand student access to CTE and computer science by increasing course offerings and encouraging women and students of non-White races and ethnicities to enroll in these courses, according to information provided by the grantee.

Providing Resources and Technical Assistance

Education provides various resources and technical assistance to help states and CTE program providers meet requirements and improve the quality of their programs and data. Resources provided by Education include the Perkins Collaborative Resource Network, which includes webinars on different CTE topics. For example, the Office of Career, Technical, and Adult Education hosted a webinar in August 2019 for state CTE directors on the potential benefits of including Perkins V information within a WIOA plan. One such benefit discussed in the webinar is that by working across state agencies, states may develop CTE programs that are more useful to students and employers and improve the efficiency and effectiveness of workforce development systems. In addition, Education's Perkins V technical assistance website includes information on implementing and collecting data on work-based learning, as well as how different states define work-based learning. Education officials also said the agency makes certain data available to stakeholders, including researchers, to identify equity gaps such as differences in CTE enrollment across student populations.

Partnering with Other Federal Agencies

Education officials reported partnering with numerous other federal agencies on CTE-related activities, including technical assistance, for different student populations, including:

²⁴20 U.S.C. § 2324(e)(1). In September 2019, Education awarded nine grants totaling about \$1.5 million. Grant recipients are currently in the third year of the 3-year project period. At the end of the 3-year project period, the Secretary of Education may extend the grants for up to 2 additional years provided certain conditions are met.

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- **Youth apprenticeship and other workforce initiatives.** Education officials reported partnering with DOL on several efforts. For example, staff from the Office of Career, Technical, and Adult Education (OCTAE) reported meeting on a bimonthly basis with staff from DOL to discuss youth apprenticeship initiatives. In addition, Education officials said OCTAE staff participate in monthly calls with DOL's Employment and Training Administration (ETA) staff to discuss activities related to career pathways, and in 2020, OCTAE and ETA staff collaborated on the review and approval of nine WIOA plans that included Perkins V information.
 - **Community-based rehabilitation programs.** Education has partnered with the Department of Justice on a diversion project to help redirect young adults from arrest, prosecution, sentencing, or incarceration to community-based rehabilitation programs. Education officials said the initiative administered by OCTAE provides individuals with alternatives to justice system involvement, such as CTE and other workforce development opportunities.
 - **Cybersecurity training.** To improve the quality of CTE cybersecurity programs and prepare students to meet cybersecurity workforce needs, Education has partnered with the Department of Homeland Security, the National Institute of Standards and Technology, and the National Security Agency, on a professional development initiative for teachers. Among other things, the initiative aims to develop the skills and capacity of high school CTE teachers to teach cybersecurity and to increase access to these programs for students.

Expanding Research

Education officials said rigorous research on CTE is limited and the agency is working to expand information on evidence-based strategies, including in the What Works Clearinghouse (the Clearinghouse). The goal of the Clearinghouse is to provide educators with the information they need to make informed decisions about which evidence-based strategies to use, but it currently includes limited reviewed research on CTE programs. Education officials said that when the Clearinghouse was created in 2002, its focus was on literacy, math, and science, specifically. They said that CTE and postsecondary topics are newer to the Clearinghouse, and it includes less research in these areas given its original focus.

Education has taken several steps in recent years to expand research on evidence-based strategies or interventions for improving CTE student outcomes. For example, according to Education officials:

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- To advance the agency's understanding of evidence-based strategies and approaches to providing CTE, officials from Education's Institute of Education Sciences reported undertaking several research and evaluation initiatives with input from the Office of Career, Technical, and Adult Education.²⁵ For example, studies will include information on work-based learning, career development, and counseling strategies. Expected publication dates for the various studies range from 2023 to 2025. According to Education officials, these studies will be included in the Institute of Education Sciences' national evaluation of CTE. The national evaluation will provide information about state and local CTE policy and practices, identify challenges to carrying out Perkins V, and update and summarize research on the effectiveness of CTE strategies.
 - To increase the number of studies that examine the impact of CTE programs on student outcomes, Education's Institute of Education Sciences awarded grants to fund six CTE impact studies through the CTE Research Network.²⁶ Study topics include CTE dual enrollment pathways and the use of career advising tools.
 - To expand the information available on effective CTE strategies at the postsecondary level, the Institute of Education Sciences developed a protocol in August 2019 to review CTE postsecondary interventions. The Clearinghouse used the protocol to review research on a postsecondary CTE model that provides integrated basic skills and occupational training and in 2020 it issued a brief on its findings.²⁷ The Clearinghouse also used the postsecondary CTE protocol to review research on two additional postsecondary CTE interventions

²⁵Perkins V directs Education to carry out research, development, evaluation and assessment, capacity building, and technical assistance with regard to CTE programs either directly or through grants and contracts. See 20 U.S.C. § 2324(c)(1).

²⁶The six grants were awarded at varying times from 2016 to 2021. The CTE Research Network Lead is a group of four partner organizations, including nonprofit research and advocacy organizations and a private research university. The Network Lead is funded through Perkins, and it facilitates research efforts, carries out research activities of its own, and communicates the network's findings. The research carried out by the network member research teams is funded by the Institute of Education Sciences National Center for Education Research through its Education Research Grants Program.

²⁷The What Works Clearinghouse, *Integrated Basic Education Skills and Training (I-BEST)* intervention brief (September 2020).

and in November 2021 it published briefs on the findings.²⁸ In March 2021, the Clearinghouse published a guide on designing and delivering career pathways at community colleges, which includes recommendations for implementing occupational skills training that are supported by evidence-based strategies.²⁹

- To continue building the evidence base for what works in CTE, Education published a Request for Information on successful approaches for expanding work-based learning opportunities for youth in December 2020 and received 63 comments.³⁰ Education officials said responses to the Request were also used to inform the agency's fiscal year 2022 budget request, including funding for competitive awards.

Education officials also reported making improvements to the Clearinghouse website in 2021 to enhance accessibility to CTE information as it becomes available. For example, descriptions of, and links to, the Clearinghouse's major products—that is, practice guides, intervention reports, and reviews of studies—are now more prominently displayed on the website. Education officials also added a link on the Clearinghouse home page to resources for educators, which include a series of webinars related to the 2021 published guide on designing and delivering career pathways at community colleges. Education officials said they are planning additional improvements over the next year so that users can search across all Clearinghouse products by topic, including in the area of career and technical education.

Agency Comments

We provided a draft of this report to the Departments of Education and Labor for review and comment. Education provided technical comments, which we incorporated as appropriate. The Department of Labor did not have any comments.

²⁸One brief was on *Project QUEST (Quality Employment through Skills Training)*, which provides comprehensive support services to help participants complete occupational training programs, and the other brief was on *Year Up*, an occupational and technical intervention that targets high school graduates to provide them with training in the information technology and financial services sectors.

²⁹The What Works Clearinghouse, *Designing and Delivering Career Pathways at Community Colleges: A Practice Guide for Educators* (March 2021). Practice guides are based on reviews of research, the experiences of practitioners, and the expert opinions of a panel of nationally recognized experts.

³⁰85 Fed. Reg. 77,456 (Dec. 2, 2020).

We are sending copies of this report to the appropriate congressional committees, the Secretary of Education, and the Secretary of Labor. In addition, the report will be available at no charge on the GAO website at <https://www.gao.gov>.

If you or your staff have any questions about this report, please contact me at (202) 512-7215 or locked@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to this report are listed in appendix I.

A handwritten signature in black ink, appearing to read "Dawn Locke". The signature is fluid and cursive, with a large initial "D" and "L".

Dawn Locke, Acting Director
Education, Workforce, and Income Security Issues

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Appendix I: GAO Contact and Staff Acknowledgments

GAO Contact

Dawn Locke at (202) 512-7215 or locked@gao.gov

Staff Acknowledgments

In addition to the contact named above, Danielle Giese (Assistant Director), Meredith Moore (Analyst-in-Charge), Stacy Spence, and Margaret Weber made key contributions to this report. Also contributing to this report were David Barish, Serena Lo, Mimi Nguyen, Stacy Ouellette, James Rebbe, Almeta Spencer, Curtia Taylor, Kate van Gelder, and Adam Wendel.

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