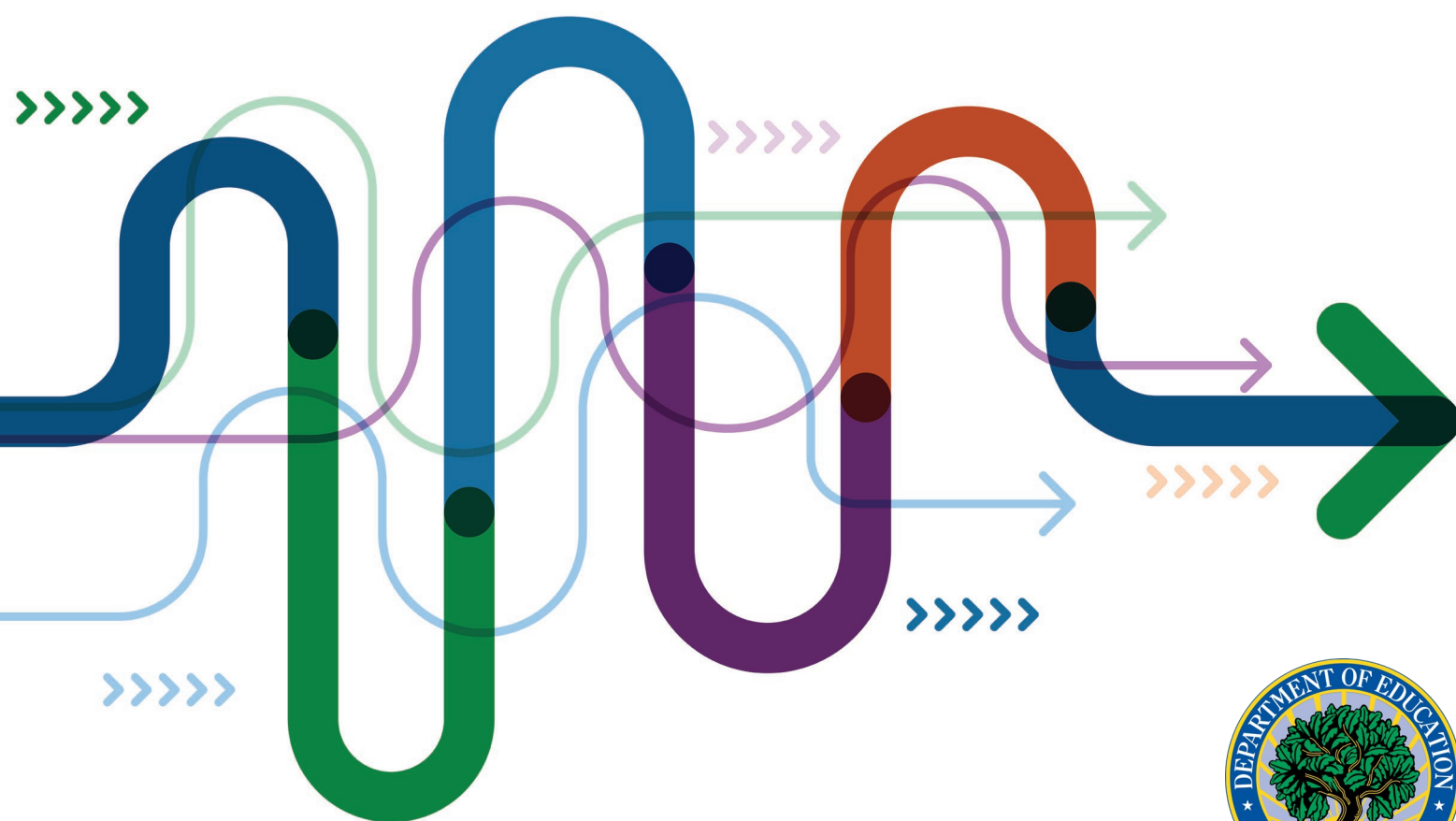


STUDY OF THE HIGH SCHOOL CAREER AND TECHNICAL EDUCATION TEACHER PATHWAY INITIATIVE GRANT

2022

U.S. Department of Education

Office of Career, Technical, and Adult Education



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Office of Career, Technical, and Adult Education
Amy Loyd, Ed.L.D.
Assistant Secretary

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Content Contact: Jenny Lambert at Jenny.Lambert@ed.gov.



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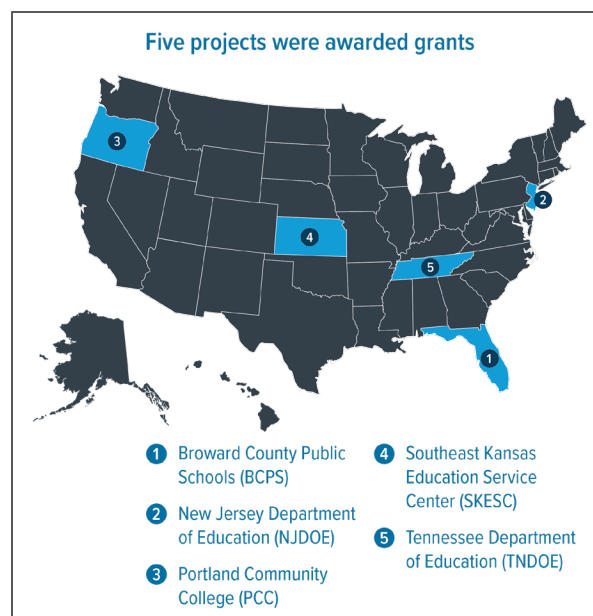
AIR	American Institutes of Research
BCPS	Broward County Public Schools (Florida)
BESTT	Broward Educating Superior Technology Teachers
CAEP	Council for the Accreditation of Educator Preparation
CEEPP	Certificate of Eligibility Educator Preparation Program (New Jersey)
CoP	community of practice
CTACE	BCPS Office of Career, Technical, Adult and Community Education
CTE	Career and Technical Education
EPP	education preparation program
ESL	English as a second language
FTCE	Florida Teacher Certification Examination
InTASC	Interstate Teacher Assessment and Support Consortium
IT	information technology
KCCTE	Kansas Center for Career and Technical Education
KCS	Knox County Schools (Tennessee)
LEA	local education agency
NJDOE	New Jersey Department of Education
NJDOL	New Jersey Department of Labor and Workforce Development
OCTAE	U.S. Department of Education's Office of Career, Technical, and Adult Education
ODE	Oregon Department of Education
O*NET	Occupational Information Network
PCC	Portland Community College (Oregon)
PDP	professional development plan
PLC	professional learning community
PLP	Peer Link Pro
RCPS	Rutherford County Public Schools (Tennessee)
RTI	response to intervention
SKESC	Southeast Kansas Education Service Center
SREB	Southern Regional Education Board
TNDOE	Tennessee Department of Education
TPI	Teacher Pathway Initiative
UTC	University of Tennessee at Chattanooga
VEI	Virtual Enterprises International
WPU	William Paterson University



GRANT AND STUDY OVERVIEW

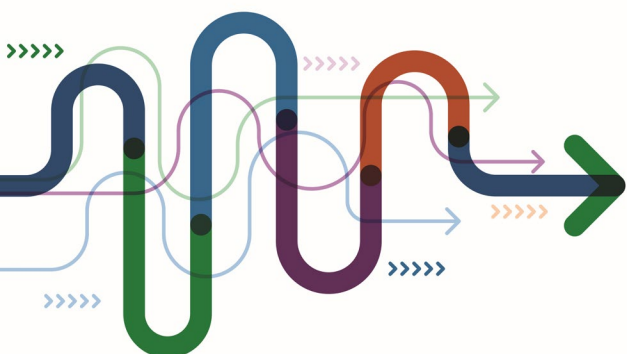
In 2017, the U.S. Department of Education's Office of Career, Technical, and Adult Education (OCTAE) launched the High School Career and Technical Education (CTE) Teacher Pathway Initiative (also referred to as CTE TPI). The purpose of the initiative was to improve CTE programs assisted under the *Carl D. Perkins Career and Technical Education Act* (the *Perkins Act*)¹ by exploring innovative strategies being used to increase the supply of high school CTE teachers available to teach students in CTE programs that align with in-demand industry sectors or occupations in states and communities where shortages of such teachers exist. Five eligible applicants² (grantees) were awarded three-year grants. By type of applicant, the grantees are as follows:

- Two state departments of education (New Jersey Department of Education [NJDOE] and Tennessee Department of Education [TNDOE])
- A regional education service center in collaboration with universities (Southeast Kansas Education Service Center [SKESC], also known as "Greenbush," working closely with the Kansas Center for CTE at Pittsburg State University and other Kansas universities)
- A community college system (Portland Community College [PCC] in Oregon)
- A school district (School Board of Broward County, Florida, with implementing entity Broward County Public Schools [BCPS])



This report summarizes the approaches grantees took to increase the number of CTE teachers by recruiting and supporting new CTE teachers in their locales. It also contains a case study for each grantee, detailing their efforts, the challenges they encountered, and the solutions they developed while implementing their programs.

FOCUS AREAS and OUTCOMES for FIVE CTE TPI GRANTEES



- **BCPS** | 100 teachers gained certification in business education, computer science, or engineering and 23 teachers implemented a new CTE course.
- **NJDOE** | 53 industry professionals enrolled in an educator preparation program and 9 current teachers completed a program to help them transition to CTE teaching.
- **PCC** | 48 industry professionals and 27 current teachers transitioning to CTE teaching enrolled in an educator preparation program and community of practice
- **SKESC** | 165 new CTE teachers and 63 mentors participated in at least 1 year of a structured mentoring program.
- **TNDOE** | 61 teachers enrolled in new school district-led educator preparation programs, and 39 teachers and 30 mentors piloted a new regional mentoring model.

¹ CTE is administered in every state through a variety of federal, state, and local funds, including over \$1.3 billion in annual federal expenditure (2022) under the *Carl D. Perkins Career and Technical Education Act of 2006* as amended by the *Strengthening Career and Technical Education for the 21st Century Act (Perkins V)* in 2018. See <https://cte.ed.gov/legislation/perkins-v>.

² *Eligible Applicants*: The following entities were eligible to apply under this competition: (a) A state board designated or created consistent with state law as the sole state agency responsible for the administration of CTE in the state or for the supervision of the administration of CTE in the state; (b) An LEA (including a public charter school that operates as an LEA), an area CTE school, an educational service agency, or a consortium of such entities, in each case, that receives assistance under section 131 of the Act; (c) An eligible institution that receives assistance under section 132 of the Act. See <https://www.federalregister.gov/documents/2017/11/07/2017-24218/authorization-of-subgrants-for-the-high-school-career-and-technical-education-teacher-pathway>



OCTAE provided grantees with nine different categories of activities to choose from to address the shortages of high school CTE teachers they were experiencing, as displayed in Exhibit 1.³

Exhibit 1. Grantee Activities to Address CTE Teacher Shortages⁴

Grantee activities	New Jersey Department of Education	Portland Community College, OR	Broward County Public Schools, FL	Tennessee Department of Education	Southeast Kansas ESC (Greenbush)
Mentoring or teacher induction program	•	•	•	•	•
Partnerships for populations (i.e., industry professionals) outside of teaching to certify	•	•	•	•	
Educator preparation programs	•	•	•	•	
Developing routes for state certification	•	•	•	•	
Recruitment of CTE teachers	•	•			•
Differential pay or financial incentives	•		•		
Removal of recruitment and retention barriers	•				
Teacher residency programs	•				

All grantees included mentoring or induction efforts⁵, to some extent. SKESC focused mainly on mentoring or induction by training and/or monitoring experienced teachers in guiding and acclimating new CTE teachers to the profession. Four grantees (NJDOE, PCC, BCPS, and TNDOE) tried to incorporate efforts to encourage industry professionals to enter the teaching profession and gain teaching certification or licensure through receiving education on teaching pedagogy (see *Partnerships for populations (i.e., industry professionals) outside of teaching to certify* in Exhibit 1). Three grantees (NJDOE, TNDOE, and PCC) supported the development of entire educator preparation programs (EPPs) that did not exist prior to the grant, and TNDOE updated the standards of EPP authorization to ensure uniform quality throughout the state. BCPS supported new course development within an existing EPP and recruited industry professionals early on in their grant activities. However, they focused most of their efforts on helping teachers in the district currently licensed in areas other than CTE gain the knowledge necessary for new CTE certifications and prepare for and pass certification exams.

Three grantees (NJDOE, BCPS, and SKESC) used funds to publicize programs within their states and recruit additional teachers or industry professionals. Two grantees used direct financial incentives, providing teachers \$1,000 for completing a new certification under the grant (BCPS) or \$2,500 for completing a summer externship in a relevant industry that would contribute to certification (NJDOE). NJDOE removed a recruitment barrier by updating its administrative code to allow content-relevant teaching experience and externships to count toward industry work requirements necessary for certification. Finally, NJDOE instituted a teacher residency program in which industry professionals can teach part time.

³ A full description of each of the nine allowable uses of funds is included in Appendix A.

⁴ No grantees incorporated out-of-state recruitment/certification reciprocity, a ninth allowable use of funds.

⁵ Teacher mentoring and induction programs are defined as a professional development model designed to provide support from experienced educators or, as is possible in the CTE context, experienced industry personnel, to beginning teachers to help new teachers to develop and grow within their professional skills or content expertise, and ultimately increase teacher retention. See ESSA Guidance on Induction and Mentoring: <https://www2.ed.gov/policy/elsec/leg/essa/essatitleiipartaguidance.pdf>



Education systems typically have two populations to consider when recruiting and supporting high school CTE teachers. Work within *Developing routes for state certification* in Exhibit 1 entailed grantees finding ways to bolster training on effective teaching or work experience and content expertise within the following two populations:

- **Population 1 | Industry professionals transitioning to CTE teaching:** One population consists of individuals who have content expertise and work experience in a particular industry that would enable them to teach high school students the relevant skills to succeed in that industry. This group typically does not have education in teaching pedagogy necessary to enter the classroom, and efforts to support this group involve providing a minimum level of education in this area so that the individual can enter the classroom and continue to receive a full education on pedagogy sufficient to become a licensed teacher over time.
- **Population 2 | Current teachers transitioning to CTE teaching:** A second population consists of current teachers licensed or certified in areas outside of CTE who already have the pedagogical skill base and are interested in transitioning to teach CTE courses. These teachers typically have some background in a CTE-relevant content area, but efforts to support them involve helping them gain enough work experience or content expertise to meet state requirements for certification or licensure in CTE teaching.

Study Questions | OCTAE commissioned a study by the American Institutes for Research® (AIR®) focused on the following questions to examine the challenges and potential solutions encountered during grant implementation and summarize grantee activities:

1. What do grantees see as the major factors contributing to shortages of secondary CTE teachers in their state or community?
2. How have grantees used CTE TPI funding to alleviate CTE teacher shortages?
3. What challenges have grantees experienced in implementing their CTE TPI activities, and what strategies are they using to overcome those challenges?
4. Are there early indicators of success in alleviating CTE teacher shortages?

Throughout this report, we answer questions 1, 2, and 3. The data to answer study question 4 were limited at the time this report was compiled for three main reasons. First, grantee activities were ongoing through fall 2022. The initial award period was three years, from October 2017 to September 2020. Data collection for the study was originally designed to take place approximately midway through grant implementation in spring 2019 and again in fall 2020, just after the grants ended. As a result of the COVID-19 pandemic that began in March 2020, all grantees requested no-cost, time extensions: SKESC through fall 2021 and the other four grantees through September 2022. Second, grantees lacked the systems to consistently track whether participants had gained teaching certification or licensure in CTE areas, whether they were employed in CTE teaching positions, or whether they remained in those positions over time. Third, grantees did not have access to regional or statewide data to systematically monitor fluctuations in shortages of CTE teachers over time. When the topic was discussed in interviews, grantees explained they relied on anecdotal information from conversations within their institutions, and most held the impression that because of the COVID-19 pandemic, shortages of CTE teachers had worsened, at least temporarily.



Data Collection for the Study | Between March and May 2019, AIR researchers held individual or group interviews with 142 individuals during in-person site visits, as displayed in Exhibit 2. Researchers drew on the data collected through these site visits to develop case studies of each grantee and reported to OCTAE in September 2019 on progress and challenges up to that point. Since the extension of the grant time period, AIR conducted a second data collection with grantees between July 2021 and May 2022 to learn about their progress and challenges as they planned for and conducted their final year of grant implementation. AIR analyzed program documents and spoke virtually with 46 individuals, as shown Exhibit 2. Interviewees were selected if their work and/or participation related directly to grant program activities occurring since the pandemic and first data collection.

Exhibit 2. Roles of Study Interviewees

	Role	2019	2021–22
	Teachers or aspiring teachers	34	9
	Mentors or mentor program administrators or supervisors	31	18
	Education program administrators within school districts or colleges	23	5
	Grantee or partner staff involved in administering programs	54	14
	TOTAL	142	46

AIR researchers developed and used semi-structured interview protocols tailored to the role of each interviewee in grant program activities⁶. Researchers first interviewed grant coordinators and gathered existing program documents from them to gain a holistic understanding of the grant program components before finalizing additional protocols for program administrators and participants. Interviews were generally one hour in length. All interviews were recorded with participant consent, professionally transcribed, and coded using qualitative analysis practices to identify emerging themes.

Although AIR researchers invited all teachers or aspiring teachers involved in grant activities to participate in focus groups or individual interviews, many teachers or aspiring teachers expressed that they could not participate due to time restrictions during the academic year of 2021-22, which was still largely affected by the pandemic. To provide teachers an outlet for feedback and to collect as much of their perspective as possible, AIR sent a brief, online survey, consisting of mostly open-ended questions tailored to each program developed by grantees, to 222 teachers or aspiring teachers involved in grant activities in some way between 2019 and 2022. Ninety-two teachers provided responses regarding their experiences and the supports and resources they thought were most important to attract and retain high school CTE teachers. Please see Exhibit 4 in the following report section for the survey results on the supports responding teachers or aspiring teachers felt were most important for CTE teachers in their first three years in the profession. Appendix B includes more details on the teacher surveys, including the percentage of responses from teachers within each grantee program.

⁶ Interviews are referred to as semi-structured because although detailed questions were developed in advance, researchers asked follow-up questions within interviews as needed given their holistic understanding of the grant programs, prior document review, and new information learned during the interview.



FACTORS CONTRIBUTING TO CTE TEACHER SHORTAGES

A main question for the study was ***What do grantees see as the major factors contributing to shortages of secondary CTE teachers in their state or community?*** During the first collection of data in 2019, grantee staff, partners, and participants were asked about factors that contribute to high school CTE teacher shortages in their respective states. In 2021 and 2022, researchers asked interviewees whether high school CTE teacher shortages were ongoing or had evolved in any way as a result of the pandemic. The impression that shortages continued was unanimous and driven by discussions with local or regional entities looking to fill specific positions, but as noted, respondents said they did not have access to systematic data on the shortages at their organizational or state level. The following factors contributing to shortages were identified in 2019, and remained present in subsequent conversations in 2021 and 2022, as the main issues that grantees were attempting to address.

Disparities Between In-Demand Industry Professions and Teaching | Grantee staff and their partners in all five sites attributed CTE teacher shortages to the higher salaries available in in-demand industry career clusters versus those for teaching in those same fields. Interviewees felt that individuals with training in in-demand fields continue to be financially incentivized to pursue an industry position over a teaching position. In addition, respondents expressed that industry jobs are less stressful than teaching and offer more work-life balance. Many noted that the transition from industry to teaching is often challenging because of learning the necessary skills of the teaching profession (pedagogy, classroom management, etc.) and the many institutional requirements. By comparison, they felt the transition from teaching back to industry has fewer barriers if individuals have maintained the specialized training they underwent to gain their CTE teaching licensure.

Lack of CTE Educator Preparation Programs | With the exception of SKESC, all other grantee staff and partners identified the lack of higher education programs to train potential CTE teachers coming out of industry professions as another factor contributing to CTE teacher shortages. This fact prompted TNDOE to develop two district-led EPPs, PCC to focus on developing an EPP, and NJDOE to support William Paterson University (WPU) in developing the second CTE alternative route program in the state for those coming from industry. Interviewees also expressed that the lack of programs that target undergraduate teacher candidates contributes to CTE teacher shortages. They felt that teacher candidates are not encouraged to consider teaching in CTE subjects during their undergraduate programs unless they happen to already have work experience in a CTE area. If teacher candidates have a bachelor's degree, they sometimes do not have industry work requirements for state licensure, depending on the content area, or the hour requirements for work experience are less.

Difficulty Navigating the CTE Teacher Licensure Process and Requirements | With the exception of SKESC, all other grantee staff, partners, and participants described challenges in navigating the CTE teacher licensure process and requirements as the third main factor contributing to CTE teacher shortages. Exhibit 3 provides a summary of the tiers of licensure across grantees. All states in which grantees are located have multitiered licensure structures, with two to three levels of licensure. Teachers progress through before becoming fully certified to teach their CTE content. In all grantee states, CTE teacher candidates obtain a provisional or restricted license that allows them to be hired to teach by a district once they have demonstrated they meet the minimum degree and industry experience requirements and are successfully enrolled in a state-approved EPP. Grantees' state regulations all require CTE teacher candidates coming from industry to obtain district sponsorship and teach while completing their EPP coursework. Districts sponsor teacher candidates by hiring teachers in a classroom position and often provide supports, such as mentoring, during the teacher candidates' first couple of years



of teaching. This process may pose challenges for candidates coming from industry not familiar with the education profession, typical types of coursework, and steps that educators in training must complete before entering a classroom or gaining full certification. CTE teacher candidates typically obtain a provisional or restricted license within their first few years of teaching and then work toward full licensure while teaching through professional development and EPP coursework.

Exhibit 3. Tiers of CTE Teacher Licensure in Grantee States and the Allowable Time to Completion

Grantee state	Tier 1	Tier 2	Tier 3
Florida	Temporary Certificate (3-year)	Professional Certificate (5-year, renewable)	—
Kansas	Restricted or Initial License (2- to 4-year)	Full Certificate (5-year, renewable)	—
Tennessee	Practitioner License (3- to 6-year)	Professional License (6-year, renewable)	—
New Jersey	Certificate of Eligibility (until hired by district to teach)	Provisional Certificate (2-year)	Standard Certificate (permanent teaching credential)
Oregon	Restricted License (1-year)	Preliminary License (3-year, renewable)	Professional License (5-year, renewable)

Differentiated Education and Experience Requirements by CTE Program | CTE content areas often differ in terms of the amount of education or experience required to teach in a particular field, which is another factor that CTE teaching candidates must be knowledgeable about when contemplating transitioning into teaching from industry. For example, Tennessee teacher candidates pursuing information technology need an associate degree or above with a minimum of five years' work experience out of the past ten years, unless they have a bachelor's degree. Tennessee teacher candidates pursuing advanced manufacturing positions need a high school diploma or above with a minimum of five years' work experience out of the past ten years, but only need one year of experience if they have a relevant associate degree (and no experience if they have a bachelor's degree).⁷ Some state programs also have varied occupational competency exams or credential requirements on top of education level and years of experience. Interviewees often expressed that even though they understood the reasons for the varied requirements across the many CTE content areas, these requirements served as an additional barrier for industry professionals. Often, states or regional entities encouraged or required candidates to submit their experience and education for review either formally or through a conversation to determine whether they meet requirements before they begin the process. Interviewees saw this lack of immediate clarity and additional step as a possible deterrent in the recruitment process.

Exams in Teaching Skills or Content Areas | To become fully certified, licensed, or endorsed, CTE teachers must pass standardized exams within three to six years of beginning to teach. The types of tests vary by state but have three basic components: (a) basic/core academic knowledge in reading, writing, and mathematics; (b) knowledge and essential teaching strategies broadly applicable in classrooms; and (c) subject area content. Interviewees expressed that CTE teachers sometimes have difficulty passing the required standardized tests necessary to receive full licensure and that the knowledge expected to pass these exams deters some candidates from entering the profession.

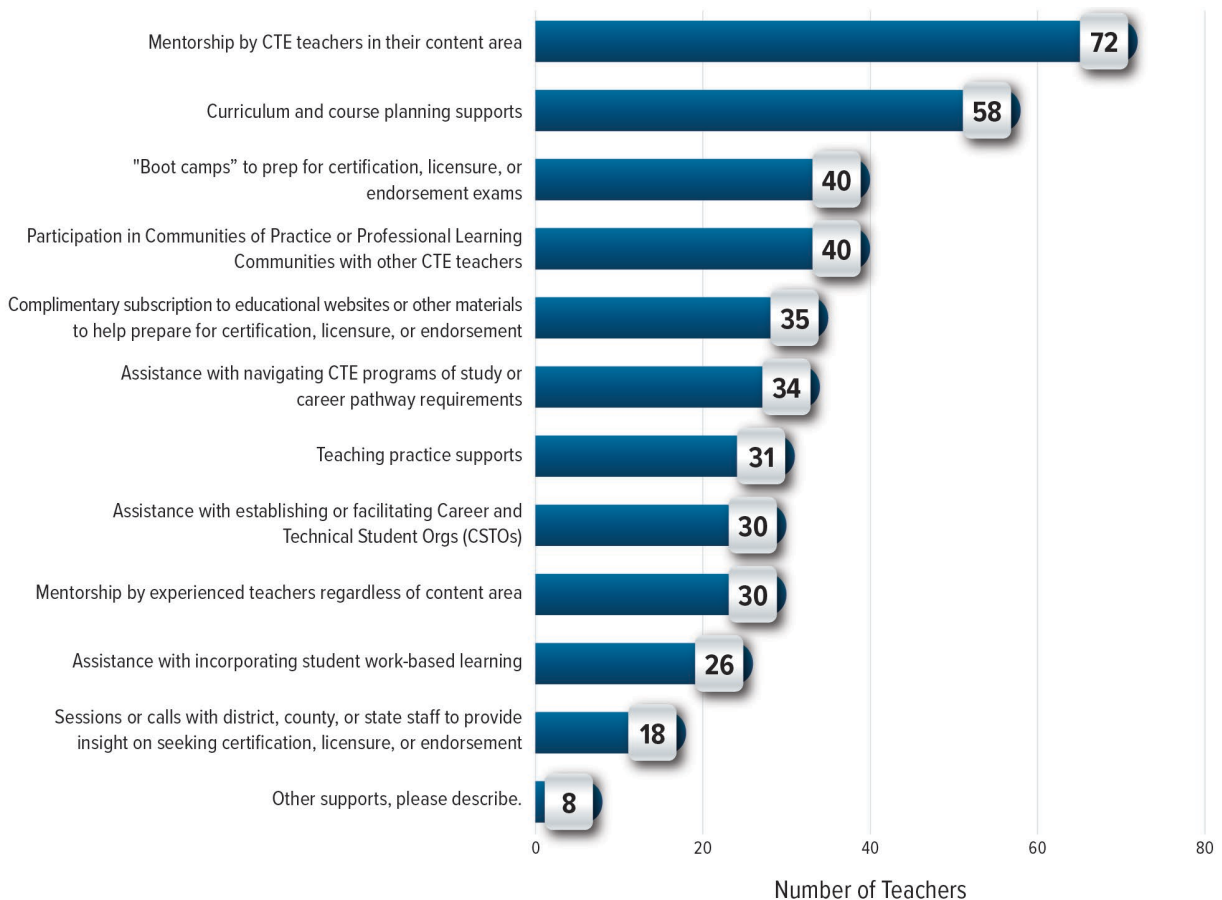
⁷ See Tennessee CTE license and endorsement information: <https://www.tn.gov/content/dam/tn/education/ccte/occ-lic/Occupational%20Licensure%20and%20Endorsement%20Guidance.pdf>



Supports Most Important for CTE Teachers

In March 2022, AIR surveyed teachers involved in activities across grantees since the onset of the pandemic.⁸ In addition to hearing about teachers' perspectives on their involvement in grant activities, the research team asked teachers what supports they felt were most important for new CTE teachers. The responses provided supplemental information for Study Question 1 on the factors leading to shortages. The survey was sent to more than 220 teachers, and 41 percent responded (92 teachers). One question was, "What types of supports do you think are most important for new CTE teachers in their first three years of teaching? Please select all that apply." Exhibit 4 displays the responses from the 92 respondents. Slightly more than 78 percent of respondents selected mentorship within their CTE content area as one of the most important supports, and 63 percent valued curriculum and course planning supports as a most important for new CTE teachers. Many teachers shared in written responses that new CTE teachers often feel professional isolation upon entering their positions as they may be the only instructor in their content area in their building or district and the school environment and education systems are unknown to them when coming from industry. They felt that having a teacher mentor experienced in their content area helped them establish classroom expectations, understand program and student CTE requirements across their education system, and establish or develop curriculum and course parameters that would best translate their work experience into educating students.

Exhibit 4. Types of Supports Reported Most Important for New CTE Teachers (*n* = 92)



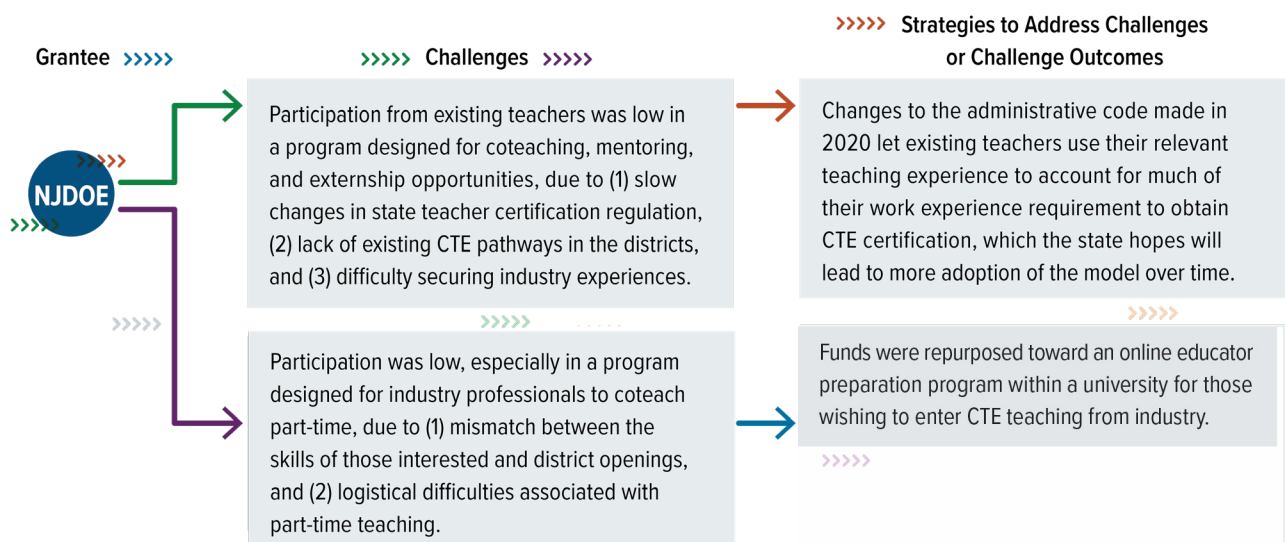
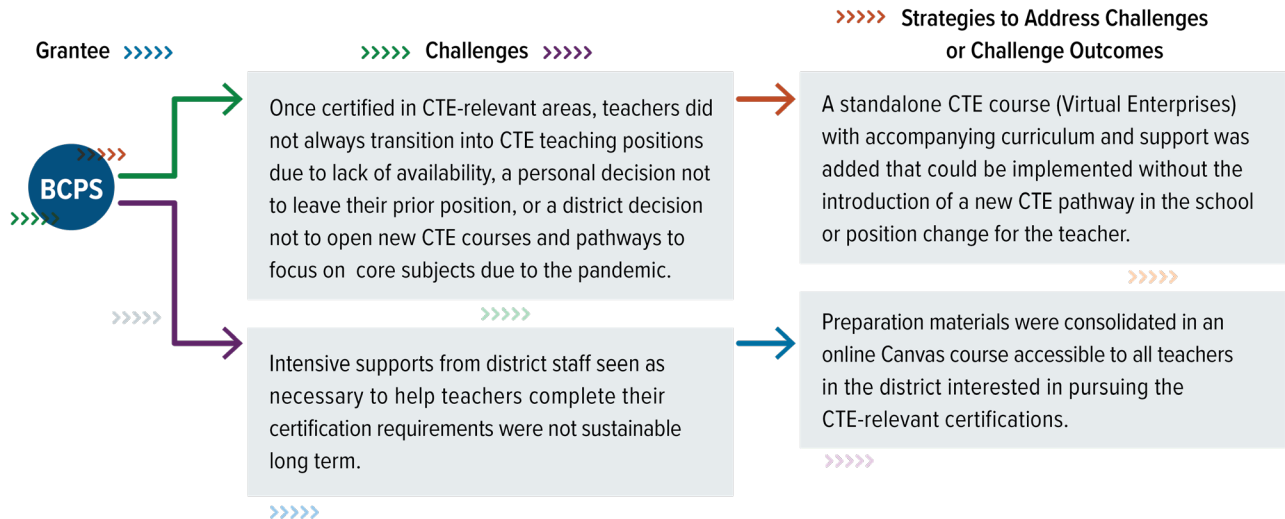
⁸ Not all teachers involved in activities across the life of the grant were surveyed as some activities occurred in 2018 and 2019. In some cases, working email addresses for participants were not available from the grantee. In addition, some grant activities were deemed too new to survey participating teachers, including the Knox County EPP and mentoring consortia in Tennessee.

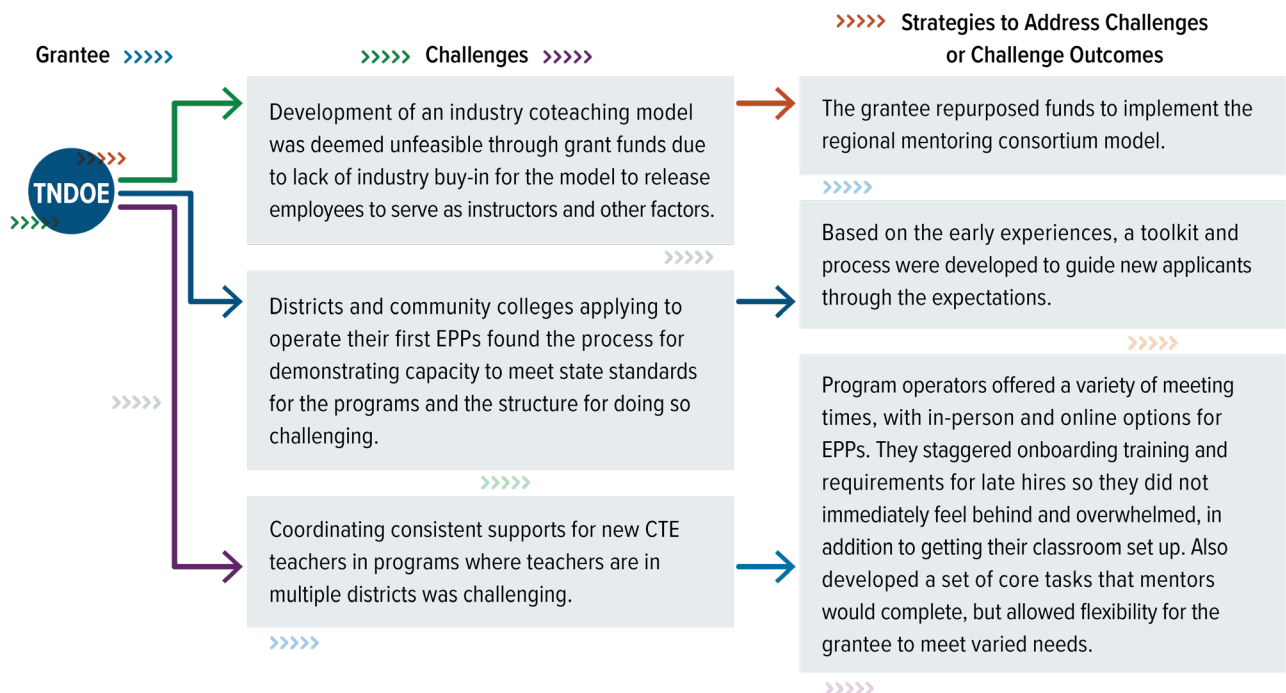
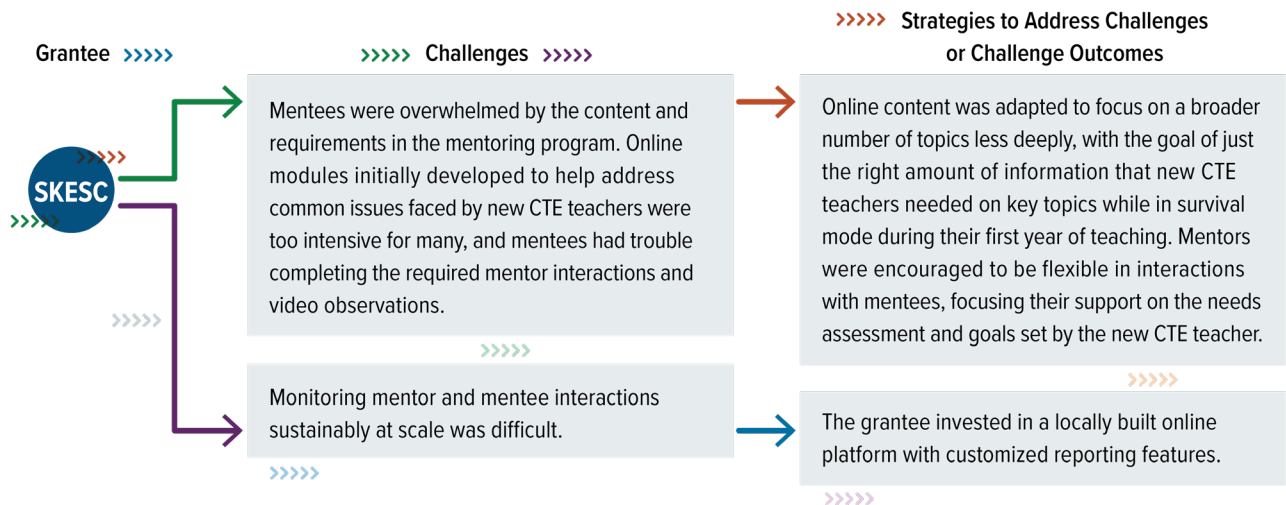
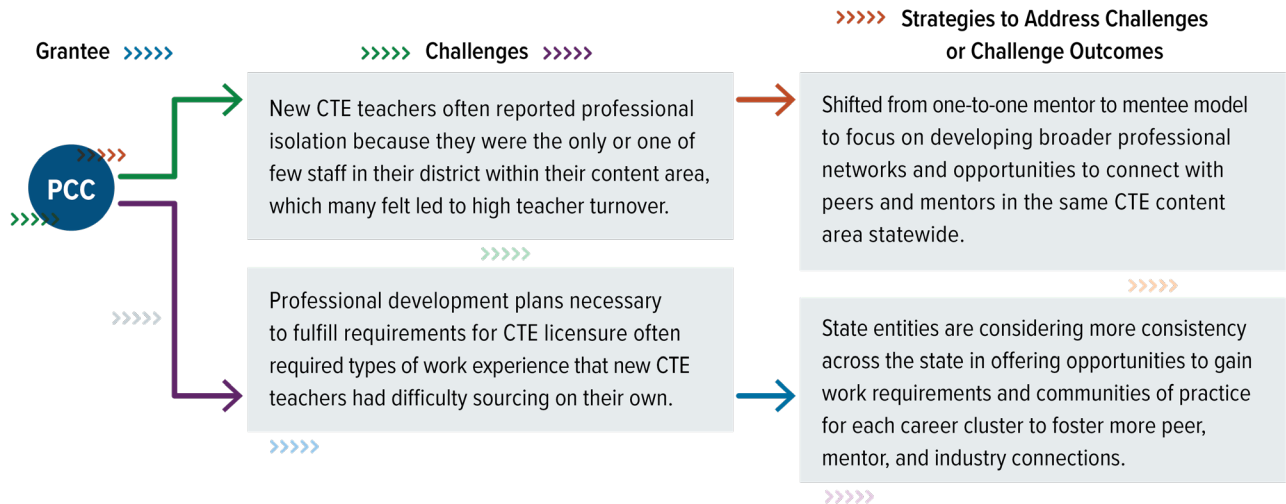


GRANTEE CHALLENGES AND STRATEGIES TO ADDRESS THEM

Another key question for the study was ***What challenges have grantees experienced in implementing their CTE TPI activities, and what strategies are they using to overcome those challenges?*** Exhibit 5 summarizes the main challenges experienced by grantees and the strategies they implemented or directions they took to help address them. **Each grantee case study provides additional descriptions of the challenges, strategies, and outcomes.** Keep in mind that challenges experienced with a particular model to address CTE teacher shortages are not meant to dissuade others from implementing a model in their context. The CTE TPI grantee experiences provide takeaways for practitioners to consider when designing their strategies to address teacher shortages, but many factors, even beyond the ones listed in this report, can impact local implementation and viability. Likewise, descriptions of the strategies used by grantees are not an endorsement of the strategy as evidence-based or effective but serve to describe the effort.

Exhibit 5. Summary of Grantee Challenges, Strategies Used to Address Them, or Challenge Outcomes







KEY FINDINGS TO CONSIDER

The research team documented grantee and participant experiences implementing strategies to recruit, prepare, and retain high school CTE teachers during the five years of grant activity, from 2017 to 2022. Grantees could carry out some strategies close to their original conception and adapted other strategies as necessary in their given contexts. Some adaptations to grant activities resulted at least partially from the COVID-19 pandemic, whereas others resulted from factors entirely unrelated to the pandemic. The following key themes in the findings are culled from these experiences for other state and local education agencies to consider as they implement their strategies to address high school CTE teacher shortages in their contexts.

- ▶ Establishing broader regional or statewide professional and/or mentoring networks through which new CTE teachers can access support from peers and more experienced CTE teachers is particularly important for new CTE teachers to combat what many teachers refer to as “professional isolation.” Grantees and participants consistently noted that being the sole person or one of a few individuals responsible for instructing CTE content in a school or district without adequate supports can lead to feeling overwhelmed and a shorter time in the profession.
- ▶ Mentorship is clearly a needed support, particularly when it is aligned with new CTE teachers’ content areas. Flexibility to tailor mentoring program expectations to an individual’s professional needs may help participants make the most of the experience. New CTE teachers appreciated having a variety of curated content and support to access when the content was most applicable to the immediate demands of their jobs. Needs-sensing and goal-setting exercises to align planned supports with individual needs may be helpful tools to center and prioritize program requirements based on a new teacher’s incoming skills and background⁹.
- ▶ Grantees held the impression that shortages of high school CTE teachers persisted at levels similar to or greater than they were prior to the pandemic, citing anecdotal conversations within their locales. However, grantees did not have access to systematic data regarding where and in what content areas high school CTE teachers are needed. This information must be collected from the district level, aggregated to the state level, and made accessible to coordinate an effective response.
- ▶ Educational institutions interested in recruiting current non-CTE teachers for CTE positions can make advance planning for moving teachers into those roles an explicit component of their strategy. The investment of preparing teachers for certification and licensure might be most impactful when accompanied by an institution-level commitment to directly translate teacher preparation into expanded CTE programs and an increase in CTE course opportunities for students.
- ▶ Collaboration across multiple organizations takes time to coordinate, whether at the local, regional, or state level. Whenever possible, grantees should solidify agreements with partners as partnerships launch or within grant applications that allow participant-level data sharing and a flow of information across organizations to monitor participant progress. This data sharing allows grantees to offer better supports and enables flexibility in supporting CTE teachers.

⁹ See the Southeast Kansas Education Service Center (Greenbush) Case Study on page 24.



GRANTEE CASE STUDY |

Broward County Public Schools, Florida

The School Board of Broward County was awarded the CTE TPI grant to implement the Broward Educating Superior Technology Teachers (BESTT) initiative, which aimed to recruit, prepare, and support current BCPS teachers to complete their CTE teacher licensure requirements. During the grant period, 100 teachers gained a certification in business education six to 12 (76 teachers¹⁰), computer science K–12 (22 teachers), or engineering and technology six to 12 (two teachers). Most teachers had not instructed courses relevant to their new certification as of spring 2022 in part because of the pandemic. To provide this opportunity, grant staff focused on implementation of an externally developed and operated business education course, called “Virtual Enterprises,”¹¹ in the final year of the grant, with 23 newly certified teachers instructing.

BCPS Focus <<<<

- Certifying current teachers in the district in new CTE areas
- Intensive supports, including coursework, community of practice, mentoring, and test preparation
- Financial incentive for completion
- How to encourage teacher transition to CTE roles once certified

Grant Program Components

Early Focus on Business Education Certification | Prior to the grant, the district identified shortages of CTE teachers in computer science and information technology (IT). In conjunction with Broward College, BCPS had initially planned for teachers to enroll in courses in applied cybersecurity, cloud computing, and data virtualization to align with local industry growth. However, after conducting further research, BCPS realized that the district did not have enough teachers with the foundational skills necessary to enroll in courses to certify in these more advanced computer science and IT areas within the grant time frame. Given this limitation, grantee staff identified a need for teachers with a Business Education 6–12 certification that would enable them to instruct basic technology courses and begin on a path of gaining more advanced experience if desired by the teacher and school administrators over time.

Certification Cohorts | To prepare current BCPS teachers for the Business Education 6–12 certification exam and its aligned courses, the grantee designed a series of experiences that teachers moved through as a group or cohort. Grant staff provided (a) a community of practice (CoP) with mentorship, (b) a certification preparation course at Broward College, (c) online study materials and intensive review sessions prior to the certification exam, (d) grant-

Exhibit 6. BCPS Teachers Certified by Cohort and Content Area

Cohort	# Completed	Content area
1	14	Business Education
2	20	Business Education
3	21	Business Education
4	4 21	Business Education Computer Science
5	12	Business Education
Modified cohort	2 5 1	Engineering and Technology Business Education Computer Science
Total	76 22 2	Business Education Computer Science Engineering and Technology
Grand Total	100	

¹⁰ Four individuals who gained a Business Education 6–12 certification through the grant were Broward College Educator.

¹¹ <https://veinternational.org/>



funded certification testing, (e) direct support from district staff to help teachers address any challenges that emerged along the way as adult learners, and (f) a \$1,000 stipend upon completion of all requirements. Three cohorts of teachers had progressed through the process by fall 2019, which accounted for 55 of the business education teacher certifications, as displayed in Exhibit 6. In spring 2019, the district identified a group of teachers with the necessary background and interest to pursue their computer science certification. The fourth cohort, which completed the Broward College course at the end of 2019, resulted in 25 teachers certifying (21 in computer science and four in business education). The fifth and last cohort, which focused solely on business education and completed the Broward College course in summer 2020, resulted in an additional 12 certified teachers.

Community of Practice | During the first five cohorts, BESTT participants took part in a mandatory CoP facilitated by a current CTE teacher in BCPS with experience in IT and computer science. Teachers and facilitators participating in this CoP gathered to review best practices and content in teaching CTE courses under the business education umbrella, prepare candidates to pass the certification exam, and make candidates ready for the Broward College course. Several teachers and facilitators mentioned in interviews that the CoP covered high-level overviews of the nine competencies of the Business Education 6–12 Florida Teacher Certification Examination (FTCE), including IT, business management, and business law and ethics.¹² CoPs occurred across five two-hour sessions. Teachers could attend the CoP in person at a BCPS high school with the facilitator presenting live, but most chose to attend virtually via Blackboard or Zoom. At the beginning and end of the CoPs, each teacher took a pretest and posttest to measure learning gains. Learning tools used in the CoP included PowerPoint presentations of study materials developed by the facilitator, modules from Study.com (an online learning platform), and Quizlet. Teachers recalled in interviews that the CoP was highly task based, and teachers created an e-portfolio of their work in various Microsoft Office applications.

According to the facilitators, the CoP served as a trial period to ensure only candidates regularly attending, and fully committed to participating in and completing the program stayed on for the Broward College course, for which the district covered full tuition. The CoP facilitator updated the curriculum to improve teachers' learning experiences with each new cohort based on the previous cohort's feedback and exam performances. After the first cohort's CoP, a teacher who had recently completed the program and become certified mentored a group of participants as an additional resource for questions throughout the process. Overall, teachers reported having a positive experience in the CoP. Several interviewees mentioned the extremely helpful support provided by CoP staff and participants in keeping them on task and motivated throughout the program. As one teacher said:

"Having the people kept you accountable. Having the CoP there constantly, and you know that they were there to support you, kept you from getting lost in the everyday goings-on that could interrupt with you staying focused on content. So, it was good to have that support behind you."

Certification Examination Preparation Course at Broward College | Teachers in the first five cohorts enrolled in a course at Broward College to help them study and prepare for the Business Education 6–12 FTCE. Like the CoP, the course covered the nine competencies of the Business Education 6–12 exam and was designed specifically by a Broward College IT faculty member for BESTT teachers. The Broward College course spanned eight to 12 weeks, depending on the cohort. Implementation staff used grant funds to waive the course fee for all participants. The online-only course allowed for teachers to complete modules and assignments at their own pace if they met assignment deadlines. An adjunct faculty member taught the Broward College course. This educator noted that 20–30 percent of the course focused on teaching strategies for CTE and business education, and the rest focused on the certification examination. According to enrolled teachers and the course syllabus, most course

¹² Florida Department of Education. *Competencies and skills required for teacher certification in Florida* (25th ed., p. 32). <https://www.fldoe.org/core/fileparse.php/7479/urlt/FTCE25thEdition19.pdf>



materials and assignments were housed on Study.com. On this platform, teachers were assigned modules to complete, including readings and videos, and they took quizzes to test their knowledge. As a result of the waivers participating teachers signed, the grant facilitators and professor of the course monitored teachers' progress throughout the course to make sure they were on track for completion. Teachers also received an additional six to nine months of access to Study.com after completing the course, depending on their cohort, to prepare for the certification examination.

In their interviews, participating teachers said they appreciated the course's structure and flexibility. Many mentioned positive experiences using Study.com, which they viewed as an effective learning tool. However, some noted a preference for a blended learning format with some in-person components to accommodate different learning types and strategies. In addition to Study.com, teachers also received the FTCE textbook and study guide to review for the certification examination, paid for by grant funds. The course also used LinkedIn Learning, another online learning platform, to cover the computer science and IT portions of the certification examination. The course ended with an assignment on creating and implementing a lesson plan and a final examination that mirrored the certification examination.

Bootcamp Sessions Focused on Exam Preparation | To further support teachers as they pursued their FTCE certifications, district staff provided drop-in study sessions in the evening up to two times per month. Staff offered evening bootcamp sessions to all teachers regardless of initial cohort. The sessions focused on reviewing certification and testing practices for the FTCE. To continue providing these bootcamp sessions for staff throughout the pandemic, the district offered them virtually.

Modified Supports | Based on teacher feedback and interest in BESTT, as well as on the need to continue providing support using a sustainable model after the conclusion of grant funding, BCPS created modified supports for teachers interested in pursuing their CTE certifications. Teachers using the modified supports took preparation courses developed by BCPS staff via Canvas but did not participate in a CoP, enroll in the Broward College course, or receive the \$1,000 stipend (funded through the grant) for becoming certified. As of the 2021–22 school year (Exhibit 6), eight teachers had been certified via this route: five in business education, two in engineering technology, and one in computer science.

Throughout the grant, 78 additional teachers began the certification process but did not complete it (59 in business education, 13 in computer science, and six in engineering technology), which equates to a 56 percent completion rate overall. The grantee did not track individual teacher reasons for discontinuing the program.

Challenges and Strategies to Help Address Them¹³

Translating New Teacher Certifications in High-Demand Areas into New Opportunities for Student Access to CTE | Even though BCPS had success with the 100 teachers who completed the program and gained certification through the district initiative, transitioning teachers into new CTE courses and career pathways proved complex. As an indicator of this complexity, only 16 out of 37 teachers who responded to a survey in spring 2022, or 43 percent, reported they were teaching a course that required their recently attained CTE certification. Teachers expressed difficulty transitioning into CTE teaching roles because of a lack of open positions that met their needs and a general hesitancy related to teaching a new content area.

¹³ Please note the strategies described are not necessarily evidence-based and do not represent implementation recommendations. Grantees chose to implement the described strategies in response to their challenges.



This lack of open CTE teaching positions resulted from the pandemic and subsequent student needs. District administrators shared that they had originally planned to work with principals, master schedulers, and teachers to increase opportunities for newly certified teachers to move into roles to use their CTE certifications. To support this work, BCPS's Office of Career, Technical, Adult and Community Education (CTACE) staff in the district had worked with master schedulers before the pandemic to develop a framework of how to create CTE teaching opportunities for newly certified teachers. However, the pandemic led to a shortage of core subject teachers in many schools, which meant the district could not move newly certified teachers into CTE roles. The need to accelerate student learning to recover from learning gaps made worse by the pandemic exacerbated the shortage of core subject teachers because more instructors were needed for remedial courses in core subjects.

Some participants found ways to expand CTE pathways and access for students in their building even when they moved out of a traditional teaching role. One participant, who had recently transitioned into an administrator role, had completed certification to build school staff capacity to teach courses in computer science. To support student access to CTE pathways, the administrator worked to open a computer science pathway for students in sixth through eighth grades and began mentoring teachers on implementing the curriculum and completing their CTE certifications.

Use of Virtual Enterprises Courses to Increase Student Access to CTE Opportunities | To ensure schools could offer additional CTE courses related to the business education and IT teacher certifications obtained during the grant while balancing teacher staffing needs related to the pandemic, CTACE staff began implementing [Virtual Enterprises International \(VE\)](#) courses. Using VE's simulated online economy and banking system, students produced a virtual product, prototype, or service in an industry of their choice by engaging in commerce with other student-run businesses in the VE network. Shifting the implementation phase of the grant to use the VE curriculum allowed schools to offer additional CTE courses not dependent on opening new CTE pathways or teaching positions. As of spring 2022, 23 teachers who had gained certification through the grant were implementing a VE course and were expected to continue in the 2022–23 school year.

Intensive Support to Help Teachers Complete Requirements | District staff provided a large amount of individualized support to teachers to ensure they successfully obtained their CTE certifications. They responded to phone calls from teachers daily and in the evenings, transported resources across the district, held appointments with teachers during the evenings or on Saturdays, and frequently checked in with teachers via texts. District staff also monitored teacher grades at Broward College; if a teacher participant's grade dropped, the central office coordinated next steps with the professor and teacher to formulate a plan to increase the teacher's grade. Although district staff could not provide an estimate of the number of hours they spent on these tasks, they reported that three staff members who typically assist adult learners in various grants in the district were responsible for coordinating these supports. Interviewed and surveyed teachers spoke positively about the program and the level of support they received and would recommend similar supports to others.

However, the intensive district support was not sustainable beyond the grant conclusion. To preserve the preparation materials for any teacher interested in the certifications in the future, the original CoP facilitator created two stand-alone Canvas courses for Engineering and Technology 6–12 or Business Education 6–12 among other established courses available to district teachers on the platform. Preparation material for the computer science certification was integrated into an existing Canvas preparation course related to that topic. Teachers can self-pace the online courses and can reach out to district administrators if they need to borrow additional materials to help them understand content.



GRANTEE CASE STUDY |

New Jersey Department of Education

The NJDOE was awarded the CTE TPI grant to create programs for current teachers to gain CTE endorsement through paid summer externships, co-teaching, and mentoring during the school year (the Teacher Bridge Program), as well as to recruit industry professionals into teaching through a part-time co-teaching model (the Industry Fellows Program). NJDOE worked toward changing the administrative code to allow relevant teaching to count toward work experience requirements, which took effect in early 2020. Nine teachers certified in non-CTE subjects completed the Teacher Bridge Program as of spring 2022. When the industry professionals' co-teaching program was discontinued in 2019 because of low participation and completion, NJDOE focused on supporting William Paterson University in developing an online EPP. As of spring 2022, 53 industry professionals had completed a 50-hour introductory course, of which 23 had enrolled in an additional 350-hour program, and five teachers had completed the program.

NJDOE Focus <<<<

- Changes to administrative code to count relevant teaching experience as CTE work experience
- Program to help current teachers gain CTE certification through mentoring, co-teaching, and paid summer externships
- Part-time teaching with co-teaching, mentorship, and coursework for industry professionals
- New educator preparation program at a university

Grant Program Components

CTE Teacher Bridge Program | NJDOE designed the CTE Teacher Bridge Program to enable current high school teachers, often instructing in such core subjects as mathematics or science, to gain an endorsement to teach CTE courses in programs of study short of teachers, as defined by NJDOE. Participating teachers must complete an industry externship over the course of two summers, with a company relevant to the CTE endorsement they are pursuing, for 160 hours each summer or 320 hours total. During two academic years, CTE teachers from their schools or districts experienced in their content areas mentor participants. Participants co-teach at least 100 hours annually and co-plan with the mentor and sometimes other experienced CTE teachers. Teachers completing the requirements receive a stipend of \$2,500 each year or \$5,000 total. As of spring 2022, nine teachers had completed their Teacher Bridge Program requirements in the areas of engineering (four), architecture (two), computer science (two), and health sciences (one). Six additional teachers had begun but not completed participation in aeronautics (two), engineering (two), and health sciences (two).

Many of the nine teachers for whom the program worked well already had been teaching or co-teaching courses within a career pathway related to the CTE endorsement they wanted to fully pursue and had supplemental knowledge in the content area. For example, one teacher with existing chemistry and physics certifications and Project Lead the Way engineering course experience was participating in the Teacher Bridge Program to pursue an engineering technology endorsement to teach more extensively within the aerospace engineering program at their school.¹⁴ Another teacher with a mathematics background and technology industry experience had been teaching introductory cybersecurity, networking, and financial literacy and was pursuing a computer science endorsement to transition into teaching more extensive cybersecurity and information systems content. A current

¹⁴ Three of the nine completing teachers and one mentor responded to a spring 2022 survey regarding their experiences.



algebra 2 and precalculus teacher who taught a 3D printing elective course was pursuing an engineering technology endorsement. This teacher said:

"I found the externship experience to be particularly valuable. As someone whose interest in engineering primarily came through my experiences at [a makerspace], I appreciated the opportunity to see and experience an actual engineering workplace. The mentorship has been great as well and has provided me the opportunity to engage in discussions of not just how to teach CTE courses but think about how to integrate CTE skills into my current course load of math classes."

Industry Fellows Program | The Industry Fellows program recruited and trained industry professionals throughout New Jersey in in-demand industries to teach CTE in high schools. Candidates completed teacher preparation coursework at Brookdale Community College¹⁵ and co-taught in a high school with a CTE mentor teacher for at least 100 hours. Industry Fellows first completed a 50-hour introductory preparation course to equip them to enter the classroom and had their background, industry experience, and education reviewed by the NJDOE Office of Certification and Induction to obtain a certificate of eligibility. They then began co-teaching while continuing the teacher preparation coursework at Brookdale Community College. Within the 50-hour course, 30 hours were dedicated to coursework and curriculum, and the other 20 involved hands-on experience with their mentor. Industry Fellows took the 30-hour coursework portion online and learned about implementing state-endorsed lesson plans and classroom management strategies. The coursework also incorporated reading assignments and video learning. The remaining 20 hours occurred over the course of two Saturdays in person with a mentor as a precursor to the co-teaching component. The 50-hour course satisfied stage one of the Provisional Teacher Process, which is a two-year period before a teacher can obtain a standard teaching certificate in New Jersey (Exhibit 1). During this two-year provisional period, teachers complete an additional 350 hours in an EPP and receive at least 30 weeks of mentoring by a certified teacher.

Co-teaching is not standard in the Provisional Teacher Process across the state, which means that not all teaching candidates entering teaching from industry can co-teach. Members of a grantee advisory committee believed that adding the co-teaching component would give Industry Fellows the experience of teaching in a high school classroom and help them ease into the position with support. They hoped the supported transition, or induction process, might increase the retention of CTE teachers. In addition, they hoped that the co-teaching requirement would help connect Industry Fellows to a district where they would have good prospects for employment upon completing the teacher preparation program. NJDOE felt this would better facilitate the hiring of industry professionals and encourage other professionals to transition into teaching.

However, recruitment and progression through the program was challenging. Grant staff assigned Industry Fellows to districts based on the hiring needs of the district and location of the candidate within the state. In the first year of the grant, NJDOE recruited 22 individuals to participate in the Industry Fellows program and ultimately matched 12 with districts that had needs in their fields. NJDOE could not find district matches for the other 10 individuals based on their skillset and geographic proximity to districts. Industry Fellows were enrolled in the first phase of the teacher preparation course during spring 2019. Eight Industry Fellows completed the 50-hour course, but none completed the 100 hours of co-teaching as intended, although some districts did hire Industry Fellows directly to teach full time. The program was discontinued in fall 2019.

William Paterson University Alternative Route Educator Preparation Program | In 2019, NJDOE redirected funds from the Industry Fellows program and contracted with WPU, located in Wayne, New Jersey, to

¹⁵ Located in Monmouth County, the Brookdale Community College program was created 10 years ago through funding from the Certificate of Eligibility Educator Preparation Program (CEEPP), an ongoing grant. When the CTE TPI began, it was the only alternative-route EPP in New Jersey.



develop a new 400-hour CTE EPP for candidates coming from industry, the second such program available in the state, which they referred to as an alternative route. In August 2020, the Office of Educator Recruitment, Preparation, and Recognition and the New Jersey State Program Approval Council approved the program, and the first cohort of six candidates began in September 2020. The first 50-hour preprofessional portion, with a participation fee of \$300, helps career changers decide whether teaching is a good fit for them before continuing to the additional 350-hour, four-semester, two-year program. The 50 hours of instruction are spread over 12 weeks, including an overview of classroom management, building lesson plans, differentiated instruction, education law, and special education.¹⁶ The program is all online and mostly asynchronous, although it does offer a weekly synchronous portion akin to office hours.

If participants go on to secure employment with a district, they can progress to the Provisional Teacher Process and the additional 350-hour program. Candidates enroll in four online courses each semester, involving competency-based asynchronous instruction in professional responsibility, the learner in the learning environment, the cycle of teaching for planning, and assessment. The program also includes a synchronous online CoP that resembles a traditional student teaching seminar in which participants draw heavily on their classroom experiences, including sharing videos of their teaching and receiving feedback. Course instructors are both faculty from the university's EPP and adjunct faculty hired from CTE/vocational technical schools in New Jersey.

The cost of the 400-hour alternative route program is \$4,400 overall or \$1,100 per semester for four semesters. The coursework is not immediately credit bearing but transfers to a bachelor's or master's degree if candidates wish to pursue the degrees with more coursework. Some CTE endorsements in New Jersey are granted without a degree and require only work experience, aside from completing the EPP in the Provisional Teacher Process, which is satisfied by the 400-hour program. In the 2020–21 academic year, WPU developed a curriculum for three educational services endorsements that teacher candidates can add on if they decide to pursue the bachelor's degree: Teacher of Students with Disabilities, Bilingual/ESL (English as a second language), and/or Cooperative Education Coordinator. As of spring 2022, five cohorts of the 50-hour course were operating, with 53 individuals enrolled across varying CTE content areas, and 23 provisional teachers enrolled in the two-year alternative route program, with the first cohort of five completing it in late spring 2022. WPU plans to continue the program after the grant period ends.

Challenges and Strategies to Help Address Them¹⁷

Lack of Participation in the Teacher Bridge Program | Originally, NJDOE intended to enroll up to 75 teachers in the Teacher Bridge Program across the three-year grant period. The Teacher Bridge Program was referenced in New Jersey's *Perkins V* plan and in the state's guide to conducting a comprehensive local needs assessment. Sixteen districts, representing up to 50 teachers, indicated that they would be participating in the program, and approximately 25 teachers reached out individually from their school district. However, even prior to the pandemic, grant coordinators, district staff, and mentors identified a few common barriers to districts and teachers ultimately being able to participate.

First, until a regulatory amendment was adopted in November 2019 and took effect in March 2020, barriers in the administrative code governing teacher certification existed that prohibited most general education teachers from being able to meet the work requirements necessary to gain a CTE endorsement.¹⁸ NJDOE had identified this

¹⁶ A cohort of the 50-hour preprofessional program also operated with the same curriculum in a condensed four-week format.

¹⁷ Please note the strategies described are not necessarily evidence-based and do not represent implementation recommendations. Grantees chose to implement the described strategies in response to their challenges.

¹⁸ See Regulatory Amendment N.J.A.C. 6A:9B-11.3(f), pages 81–86 of Chapter 9B of the State Board of Examiners and Certification administrative code (New Jersey Administrative Code 6A) that sets forth the rules governing the licensure of educators in New Jersey: <https://www.nj.gov/education/code/current/index.shtml>.



issue early and worked as a part of the grant to put forward an administrative code amendment. The amendment guaranteed that districts and teachers who committed the time to pursue the externship, mentoring, and co-teaching components could gain an endorsement in their desired CTE content area. As a result of NJDOE leadership changes and continued debate about the certification requirements, passage of the amendment took much longer than grant leadership anticipated. Before March 2020, to receive a CTE endorsement, teachers needed to have four years of work experience in the aligned industry within the last 10 years, reviewed and approved by NJDOE. This requirement was equivalent to 8,000 hours of employment, and teaching experience in the content area did not count toward the total. With the administrative code amendment, teachers could count their teaching experience as three of the four required years of employment, as well as their externship experiences through the Teacher Bridge Program. The code now references participation in the Teacher Bridge Program as a path to CTE endorsement.

Second, a district needed to already have a state-approved CTE career pathway in the area of interest to the teacher candidate, so that mentor teachers were available for guidance and co-teaching. The program agreement was between the district and NJDOE. With districts sponsoring teacher participation in the program, NJDOE had not designed the experience for teacher participants to go outside of their districts to secure a mentor or co-teaching experience. For example, sometimes teachers within a district were interested in participating but could not because their district did not already offer the CTE program of study that aligned with their expertise or interest. NJDOE did not identify a solution to this barrier during the grant period.

Third, and last, grant coordinators, district staff, mentors, and teachers cited difficulties in securing externship experiences before,¹⁹ and especially during, the pandemic summers of 2020 and 2021. Companies providing externships were not required to compensate participating teachers as the grant offered the \$2,500 summer stipend, although some companies did provide additional compensation to the teachers. Aside from their teaching experiences and some related professional development, teachers often did not have direct experience in the industries in which they were requesting the externship, and some interviewed teachers and mentor teachers felt this may have been the primary issue. In-person experiences were not feasible in summer 2020 because of the pandemic, and although some companies pivoted to offer virtual externships in summer 2021, the timing and context became a barrier for some.

Lack of Participation in the Industry Fellows Program | The Industry Fellows program was discontinued in fall 2019 because of lack of participation. Originally, grant coordinators intended to recruit Industry Fellows from school districts' existing industry and business partners. However, many of these partners provide work opportunities for CTE students. District administrators felt that recruiting their industry partners' talent into teaching would be detrimental to their relationships with partners and hurt the quality of CTE programs eventually. As one school district administrator noted:

"The original plan was, we were going to be using our regular industry partners, which we don't have a lot of, to try to recruit, and then we were concerned that that might burn some bridges. There were industry partners that were helpful for us, and now we're saying, 'Hey can you lend us some people that we might eventually steal or recruit in the classroom?'"

With these concerns in mind, NJDOE decided to work in collaboration with New Jersey Department of Labor and Workforce Development (NJLWD) to recruit for the program. They sent targeted emails to unemployed industry professionals looking for new employment throughout in-demand industries, such as computer science, health occupations, carpentry, and transportation, distribution, and logistics. Using Occupational Information Network

¹⁹ Three teachers completed externship experiences in summer 2019.



(O*NET) occupation codes, NJDOL matched individuals to targeted content created by NJDOE based on their industries of employment. Recipients on the email list constantly change as employment statuses and receipt of benefits shift. NJDOE also managed an email inbox to which prospective candidates could send any inquiries regarding the grant. NJDOE reported that 275 individuals expressed interest through the collaboration with NJDOL, although none ultimately matched with district need and completed the program.

However, even when Industry Fellows were recruited and placed within a district, progressing through the program became a problem. Some participants had trouble completing the coursework at Brookdale Community College, and because of institutional student privacy policies, grant coordinators could not receive updates on participant progress to strategize on appropriate supports in advance. Grant coordinators discussed having participants sign waivers to allow for that progress monitoring if the program had continued. In addition, grantee staff explained that some Industry Fellows decided to skip the co-teaching portion of the program after receiving offers for full-time positions to teach in districts, either where they had been placed through the NJDOE connection or a position they had found on their own. Although these CTE teacher candidates entered the classroom, which helps alleviate teacher shortages, by bypassing this component, grant coordinators felt the Industry Fellows missed out on the process of transitioning and receiving induction into a classroom setting that may have been beneficial for their long-term retention in the profession.



GRANTEE CASE STUDY |

Portland Community College, Oregon

PCC in Oregon was awarded a CTE TPI grant to increase the number of high school CTE teachers through a new, mostly online cohort-based EPP, Pathways to CTE Licensure, focused on recruiting in the advanced manufacturing, construction, healthcare, and information technology industries. Seventy-five participants — 48 industry professionals new to CTE teaching and 27 fully licensed teachers adding a CTE endorsement — enrolled across four cohorts through summer 2022. For both populations, PCC provided opportunities for community building, networking, and CTE mentorship. The grantee evolved its mentoring model across the life of the grant, recognizing the need to provide flexibility, expose the participants to a larger number of educators in aligned industries, and support state efforts to provide guidance and structure for professional development and community in industry areas.

PCC Focus <<<<

- Online cohort-based educator preparation program for industry professionals
- Development of a new course summarizing CTE in Oregon, mandatory for CTE certification statewide (required for both current teachers seeking CTE certification and those coming from industry)
- Evolution of mentoring model from 1:1 to exposure to many CTE mentors in a community of practice
- Statewide CTE content-specific community building and networking

Grant Program Components

Educator Preparation Program Coursework | In the 2020–21 academic year, the state of Oregon approved PCC's CTE Educator Certificate program as an alternative pathway to CTE teaching for those coming from industry. The cost of the 19-credit program is approximately \$2,600. Courses include (a) instructional strategies for math or English, (b) applied learning theory, (c) classroom management, (d) introduction to CTE in Oregon, (e) multicultural education: applications, and (f) human development. Five courses were adapted from existing teacher preparation courses within the Education Department at PCC, but through the grant, PCC developed the new online course, *Introduction to CTE in Oregon*. All new CTE teachers — both those already licensed to teach in other content areas and those new to the profession coming from industry — must enroll in the new state-required course to pursue a CTE teaching license. The course provides new CTE teachers with an understanding of the historical and legislative development of CTE in the United States, CTE programs in Oregon, teacher certification and licensure processes, curricular planning and academic standards, special populations, CTE student organizations, and how to improve advocacy for their CTE programs. The three-credit course is approximately \$400 per participant. Reimbursement for \$500–\$1,000 in program expenses was available through the grant to completers of the individual course or the CTE Educator Certificate. Industry professionals transitioning to teaching must take 19 credits of educator preparation coursework to move from a restricted license to a preliminary license, which they can complete in three years if needed (Exhibit 3). To work toward a preliminary license, aspiring CTE teachers need to identify a sponsor,²⁰ which often means gaining employment within a district. The sponsorship allows industry professionals to teach CTE classes under a provisional license while completing the required coursework for full teacher licensure at PCC or elsewhere. As part of the grant, both types of teacher candidates also attended a two-

²⁰ Sponsors may include public schools and districts, charter schools, regional education service districts, postsecondary institutions, private prekindergarten through grade 12 schools, and other entities approved by the Oregon Department of Education.



day summer institute before beginning the program and participated in a professional learning community (PLC) during the school year.

CTE teacher candidates must also work with a regional coordinator. CTE regional coordinators in Oregon play a critical role in supporting the licensure of new CTE teachers. A CTE regional coordinator, as defined by Oregon state statute, is an individual employed by a local education agency or community college responsible for coordinating CTE in a specific region. Oregon's 16 regional coordinators must apply CTE teacher licensure and CTE program of study rules and regulations. They help CTE teacher candidates — whether from industry or fully licensed teachers outside of CTE — through the licensing process, including documenting 2,000 hours of industry employment, crafting individualized professional development plans (PDPs) necessary to obtain licensure, and establishing committees to review whether aspiring CTE teachers have met their requirements.

Mentoring | Early on in the grant period, PCC explored an in-person, one-on-one mentoring model but evolved it into an online model in which CTE teachers had access to a broader pool of experienced CTE teachers in their content area and could get one-on-one mentoring as needed. Approximately 20 mentors participated during the grant period. Mentors participated in a two-week online course in summer 2019 called *Kickstart Your CTE Mentoring*. After the initial two-week training, PCC held a summer institute in Portland with both mentors and mentees to begin building their relationships and to encourage more active engagement in the mentoring process. Mentors then participated in monthly online mentor trainings throughout the academic year and actively participated in the online PLC. Mentors received stipends for training (\$250), attending the summer institute (\$450), and participating yearly (\$2,000).

Professional Learning Community | A PLC was established online in 2019 before the pandemic. Meeting weekly throughout the school year, the PLC intended to foster opportunities for networking, collaboration, and resource exchange. Participants had access to all mentors to enable more community building. PLC sessions were based on the Association for Career and Technical Education's Quality CTE Program of Study Framework²¹ and adapted to participant needs and interests. In the 2020–21 academic year, the PLC covered 10 topics, including (1) starting the school year online, (2) engaging CTE students in a distance learning format, (3) student engagement, (4) curriculum and standards, (5) assessment, (6) social-emotional learning and addressing trauma in our students and ourselves, (7) project-based learning, (8) getting ready to transition back to in-person instruction, (9) marketing your CTE program, and (10) forecasting for future enrollment. Interviewed and surveyed participants spoke positively of the online PLC, describing the conversations and support as in depth and content specific, as well as particularly important for new CTE teacher survival during the pandemic.

Statewide Health PLC | As PCC leads for this work collaborated with their counterparts at the Oregon Department of Education (ODE) during the grant period, they had conversations regarding the need for more standardized professional development guidance and CTE industry-specific community across the state. To that end, PCC worked with ODE to plan an online, statewide PLC for educators in the health field. ODE invited approximately 100 individuals with a CTE health services endorsement to participate in professional development and a virtual conference from the National Consortium for Health Educators, as well as presentations from current health educators. Over time, the hope is that PLCs will be created and maintained across other content areas, and new CTE teachers will have a statewide community to join for content-specific support and mentoring. ODE is developing statewide programs of study and corresponding professional development recommendations, starting with computer science, business and management, and industrial arts, which they hope will include such structures as statewide PLCs.

²¹ <https://www.acteonline.org/wp-content/uploads/2019/01/HighQualityCTEFramework2018.pdf>



Challenges and Strategies to Help Address Them²²

Networks to Address Professional Isolation | Mentees, mentors, and grant staff all expressed the challenge of overcoming the professional isolation typical of new CTE teachers. They explained that the division of labor in high schools often results in CTE teachers being somewhat isolated from the remainder of the school community and high school ecosystem, left largely alone in their subjects as the sole instructors of the content at their campuses, if not the entire school district. Not only is this isolation socially challenging, but also educators often come into a position in which they must create a program and curriculum from scratch quickly with few, if any, interpersonal relationships to rely on at the school for support. As many new CTE teachers come from industry and do not have prior teaching experience, they often struggle to organize their classrooms, set up industry-specific equipment, establish classroom management, or navigate school and district requirements for CTE programs.

Matching the new teacher to an educator from the same industry can help address these issues, but much is dependent on whether a good fit or connection is established. PCC learned that a mentee may gain more by having access to a wider professional network. The evolution to the frequent, online PLC in which all mentors participated and the advent of the statewide health PLC made the grantee and new CTE teachers hopeful that this type of model may be more effective and sustainable in the state moving forward beyond the grant. One grant staff person stated:

“The pandemic has pointed out how important partnership is. To connect with other people, share strategies, lesson plans, something someone has created that’s worked really well, that has been a lifesaver for our teachers this year.”

Meeting Work Experience Requirements | During the 2019 data collection, many participants noted difficulty in securing the 2,000 hours of industry experience—equivalent to approximately 50 weeks of full-time employment—necessary to advance their CTE licensure. This issue affected mostly current teachers looking to transition into CTE teaching, who often tried to combine multiple summers of externships or part-time weekend employment they had secured on their own to meet requirements. However, securing industry experience also became an issue for industry professionals sometimes when the regional coordinator identified gaps in developing the individualized PDP. Later in the grant period, the pandemic exacerbated this challenge as teachers and administrators reported less ability to connect with industry to fulfill these requirements. Regional coordinators, district staff, and ODE staff could sometimes help to broker these relationships between industry and aspiring CTE teachers, but they felt it was not reliably accomplished at the necessary scale. The regional, district, and state staff hoped establishing more statewide infrastructure, possibly through the statewide programs of study and PLCs, could help create more systematic opportunities to gain hours of industry experience.

²² Please note the strategies described are not necessarily evidenced-based and do not represent implementation recommendations. Grantees chose to implement the described strategies in response to their challenges.



GRANTEE CASE STUDY |

Southeast Kansas Education Service Center (Greenbush)

The SKESC, also known as “Greenbush,” was awarded the CTE TPI grant to evolve and expand a mentoring program for new CTE teachers. Across four years, the program trained 63 mentors and 165 new teachers who participated in at least one year of mentoring, a CoP, needs assessment, goal setting, and observation. During the time period of the grant, program staff worked on challenges in striking the right balance of requirements for new CTE teachers, so that they had an experience in which they felt connected and supported in growth but not overwhelmed. Program staff also designed a sustainable online system to house and monitor mentor–mentee interactions.

SKESC Focus <<<<

- Evolving an existing mentoring program to an online model that includes a CoP, new teacher needs assessment, goal setting, and observation
- Developing online content for both mentor training and broad CTE topics to support new teachers
- Building an online platform to house mentor–mentee interaction and allow for program administrator monitoring capability.

Grant Program Components

In partnership with the [Kansas Center for Career and Technical Education](#) (KCCTE) at Pittsburg State University, SKESC used grant funds to transition an in-person CTE teacher mentoring program into a sustainable virtual model known as the Kansas Statewide CTE Mentoring Network initiative. The program matches CTE teachers in their first two years of teaching with an experienced CTE teacher in the same content area, which new CTE teachers may not have available within their school districts, particularly in rural areas.²³ The program was free of charge to new teachers during the grant period.²⁴ Mentor training was developed as part of the grant. Five university faculty facilitators, referred to as “consultants,” with expertise in the relevant CTE content areas guided and monitored the mentors. These five faculty consultants oversaw separate CoPs.²⁵ New teachers (mentees) completed a needs assessment process and goal setting with their mentors and interacted with other new teachers and mentors in a virtual CoP and discussion forum. In addition to completing video observations of peers, as well as of their own teaching, mentees had access to 16 Exploration modules developed with grant funds, which are online content developed by university faculty partners²⁶ in areas determined to be key to the professional survival of new CTE teachers during their first two years in the classroom. Participants received professional development points across the different program components. In addition to developing the mentoring infrastructure, the program used grant funds to implement a statewide public marketing campaign to increase awareness of CTE mentoring opportunities.

Mentor Preparation and Role | Mentors were recruited through university faculty facilitators’ knowledge of and connections to the statewide educator community within that CTE industry area, as well as by word of mouth through involved university faculty contributors. Nineteen mentors were recruited in the first year of program

²³ The program is an authorized provider of the two years of mentoring required upon entering the profession for teachers in Kansas.

²⁴ The program will cost approximately \$1,000 a year to participants outside of the grant period, which KCCTE says will go directly toward compensating mentors. The amount that teachers will pay will vary by district. Districts may apply for some state funding to be reimbursed for mentoring costs.

²⁵ The five communities of practice were (1) Agriculture; (2) Business Media and Technology; (3) Design, Production, and Repair; (4) Family and Consumer Science; and (5) Law, Health, and Public Service.

²⁶ In addition to KCCTE at Pittsburg State University, university partners included faculty at Kansas State University and Fort Hays State University.



implementation (2018–19), followed by 42 in 2019–20, and only two new mentors in 2020–21.²⁷ SKESC contracted with the New Teacher Center to establish a Beginning Mentor Institute offered in the summer of the first year. The institute provided asynchronous training for three weeks, taking approximately 20 hours and covering topics in mentoring relationships, such as building trust, mentoring language and stances, observation cycle and conversations, self-reflection and self-assessment, and effective feedback. In subsequent grant years, KCCTE developed and provided a New Mentor Academy with 12 online modules in which participants viewed a presentation on a topic,²⁸ completed tasks to familiarize themselves with the software platform that housed the online CoP to interact with others, and completed quizzes to verify acquired knowledge. In addition to guiding their mentee in the key activities, such as needs sensing, goal setting, observation, and module completion, mentors developed a relationship with mentees and checked in with them regularly, acting as a resource for any questions. New CTE teachers typically had in-school mentors as well who provided district- and school-level guidance but may not have been within CTE. Each month, mentors submitted interaction records for each contact with mentees indicating whether the communication was via email, text message, phone, in person, or other.

Needs Assessment and Goal Setting | To encourage an individualized experience they hoped would sustain participation, grant staff required that mentees, guided by their mentor CTE teachers, assess their needs and articulate goals for their participation in the program before the start of each school year. Mentees had at their disposal a self-assessment instrument, including a worksheet and a goal-setting form, which were completed online. Mentees assessed their competencies in the areas of (a) learner and learning environment, (b) content knowledge, (c) instructional practice, and (d) professional responsibility; they rated themselves for each area as either developing, effective, or highly effective in their competency. In the same online portal in which mentees conducted their self-assessment, they submitted three goals to guide their progress in the mentorship program.

Discussion Forum, Community of Practice, and Mentee Explorations | In the first two years of the grant, SKESC used a commercially available software and platform called TORSH Talent to facilitate online discussions in its CoP. This software had annual per-user licensing fees of approximately \$150 paid for by the grant. To move into a sustainable alternative post-grant, SKESC contracted with a local business to develop a virtual instructional interface called Peer Link Pro (PLP), to facilitate ongoing mentoring and CoP interactions in the program. PLP allows facilitators to monitor mentor and mentee engagement in the CoP through user data, as well as to examine mentee progress across each of the 16 explorations, or short online courses, that the grantee developed to assist with training mentees.²⁹ The 16 explorations are not mandatory, and mentees can spend as much or as little time as they require in each of these courses, thus allowing them to tailor their learning to their specific needs, which they also discuss with their mentors. The explorations offer a touchpoint between mentors and mentees, who use their discussions to go deeper into topics introduced in the explorations.

Peer and Video Observations | The program required mentees to observe a minimum of two peer teachers of any content area within their schools or districts each year to gain insight into noteworthy practices to incorporate into their classrooms. Mentees completed a peer observation form for each visit. In addition, mentors observed mentees twice via video during the first year and once during the second year in the program. Of the two observations in the first year, one had to be of the educational environment of the mentee (recorded), providing an introduction of the lab and classroom layout to the mentor. The second observation in the first year was a recorded instruction of the mentee teacher that aligned with the items of need from their needs assessment

²⁷ Grant implementation ended in Kansas in September 2021 after four years. The year of grant award, 2017–18, was a planning year.

²⁸ Mentor training modules include (1) mentor roles and responsibilities, (2) using the platform, (3) relationship building, (4) conducting a needs assessment with your mentees, (5) observation requirements, (6) best instructional practices, (7) conflict management, (8) enhancing communication and building relationships as a professional, (9) time management, (10) developing knowledge of institution/district policies, (11) privacy and confidentiality, and (12) review and planning next steps.

²⁹ 22 The titles of the 16 explorations are Classroom and Lab Assessment, Classroom Management, Career and Technical Student Organizations, Establishing and Enforcing Policies and Procedures, Establishing Positive Relationships With Critical People, Lab Management, Lesson Planning, Marketing Your CTE Program, Professionalism, Project-Based Learning, Safety and Liability, Technology in the Classroom, Virtual Learning, Work-Based Learning, Working With Advisory Committees, and Working With CTE Students With Special Needs.



conducted by the mentor and mentee. Also, in the second year, the mentee completed a second recording of their instruction and provided it to their mentor for feedback, which the online platform facilitated.

Challenges and Strategies to Help Address Them³⁰

Reducing the Time Intensity of Mentee Requirements | Early in the grant period, an original challenge involved reconfiguring the new CTE teacher mentee explorations modules to improve their usability. Five explorations were originally intended to be developed to support in-depth mentee professional development and shepherd them into CTE instruction. However, after implementation of two explorations, teachers found them to be too time intensive; therefore, the completion rate was low. Mentees reported being overwhelmed with the amount of content, given that they had not expected time investment at the level of an EPP. Grant coordinators then revised the explorations to a level that provided just-in-time or survival content to new CTE teachers, introducing them to a larger number of topics they should understand at some level to operate their classrooms and programs well.

Grant coordinators indicated that making the explorations modules immediately applicable on the job became a priority as they worked to revise them. They adopted an applied approach as they adapted the asynchronous content and worked to incorporate the following changes into the reformed mentorship program. First, they decided to restructure the 16 explorations, moving from five, in-depth, mandatory modules to 15 optional ones. As part of this design, mentees would work with their mentors—as well as referring to the professional development plans they co-created through the mentee self-assessment—to identify the explorations most relevant to their professional development. Mentees could thus peruse modules they deemed necessary. Second, the grantee changed the content of the explorations, reducing background and theory and increasing practical content.

For example, whereas initially an Exploration module might have described the principles and history of a given topic, grant coordinators redesigned the module to provide instruction on implementing strategies needed for effective CTE programming, such as how to engage advisory boards for a given CTE industry.

Finally, grant coordinators and faculty consultant facilitators guided mentors to be more flexible with how much they engaged with mentees. Mentors used the mentee's professional development goals, which they identified together, to customize the mentoring program to be as responsive as possible to the new teacher's needs.

Participating teachers reported in the March 2022 survey from AIR that most mentees had a positive overall experience with the mentorship program because of the network of support it created, despite sometimes acknowledging the extra time involved. One survey respondent who had a positive experience wrote:

"I found my mentor to be very helpful. I will admit the extra time it took to do the assignments/discussions was daunting, but mostly because I'm working on my masters and it's just more work. The discussions were actually helpful though."

Even as the explorations were reconceptualized and became optional, four of the 10 teacher survey respondents mentioned the time intensity of the requirements and what they perceived as the inflexibility of their mentor as a challenging aspect, underscoring the importance of the mentor-mentee fit in a one-on-one program.

^{30 30} Please note the strategies described are not necessarily evidenced-based and do not represent implementation recommendations. Grantees chose to implement the described strategies in response to their challenges.



Developing a Sustainable Online Platform to House the Mentoring Program

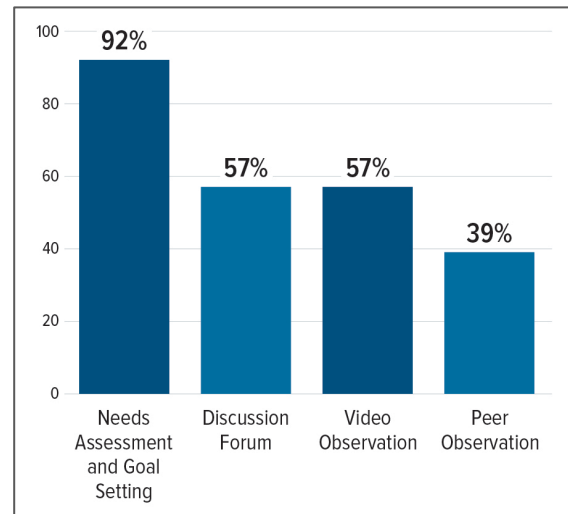
| The university faculty consultants identified the functionality necessary to support the mentoring program requirements and better meet the needs of the mentors, mentees, consultants, and the platform administrator in monitoring mentoring interactions sustainably and efficiently over time. As mentioned, KCCTE contracted with a local software development firm to create an improved platform to avoid licensing fees. The new platform launched in July 2021 for the Returning Mentor Institute, with mentees beginning in fall 2021.

Program Completion and Indicators of Success in Addressing CTE Teacher Shortages

| Although the grantee intended for new CTE teachers to participate for two years ideally, 68 percent of the 165 mentees participated in only one year of the program. Fourteen participants (not included in the count of 165) began the first year of the program but did not continue. The grant administrators did not require mentees to complete all requirements, particularly during the pandemic. Only approximately 20 percent of mentees completed all five mentoring program requirements in their entirety according to the professional development points awarded by the grantee staff. Program requirements included full interaction with their mentor, needs assessment and goal setting, discussion forum, video observation, and peer observation. As displayed in Exhibit 7, 92 percent of new CTE teachers completed the needs assessment and goal-setting requirement, and 57 percent participated in the discussion forum as intended, according to professional development point data reported by the grantee for year three (2019–20) and year four (2020–21) of the grant. Fifty-seven percent completed the video observation of their own classrooms for mentor feedback. Thirty-nine percent of mentees completed the two requested peer observations.

In 2021, grant staff followed up with mentees and verified that 94 percent were still in the teaching profession, whereas 5 percent had left teaching and 1 percent could not be located. Like other grantees, they indicated that data on retention of new CTE teachers and open positions for CTE teachers unable to be filled were not systematically available at the state level. Interviewed grant staff and university faculty consultants said that a district-level survey helped with gathering some information on unfilled CTE positions, but that reporting of the career pathway names and types of openings was not consistent, and completion of the survey was not universal.

Exhibit 7. Completion of SKESC Mentoring Program Requirements ($n = 127$)



Note: The denominator used is 127, the number of new CTE teacher mentees in year three and year four of the grant combined.

Source: Evaluation conducted by the grantee.



GRANTEE CASE STUDY |

Tennessee Department of Education

Through the CTE TPI grant, the TNDOE focused on standardizing the requirements of occupational EPPs to align with all other EPPs in the state, developing district-led EPPs, and fostering a regional model of CTE mentoring. As of spring 2022, 61 teachers had enrolled in one of two new EPPs within a school district, and 39 teachers had participated in mentoring under the new piloted regional model. The grantee encountered challenges in ensuring EPP requirements could produce high-quality programs and experiences for aspiring teachers—while remaining feasible for institutions to implement—to increase availability of programs geographically across the state. TNDOE also explored implementing an industry co-teaching model, which was not pursued.

TNDOE Focus <<<<

- Auditing statewide educator preparation programs and standardizing requirements
- Supporting development of district-led educator preparation programs and a toolkit for entities applying to operate EPPs
- Fostering a regional consortium model of CTE mentorship and development of a statewide mentoring handbook

Grant Program Components

Audits of Occupational Educator Preparation Programs to Ensure High Quality | In 2017, the Tennessee State Board of Education adopted policies intended to align occupational EPPs with expectations to produce educators with the teaching skills needed to advance students' college and career readiness. As a part of the grant, TNDOE audited existing occupational EPPs within institutions of higher education across the state to help identify areas in need of support to meet newly enacted standards. TNDOE conducted audits in spring 2018 by implementing virtual reviews of program components with the eight operating EPPs.³¹ Academic EPPs already had to adhere to these standards, which occupational EPPs began to implement in fall 2019. The policy change establishes a consistent expectation of what components any EPP should include to develop educators. Occupational EPPs now must demonstrate alignment with the Interstate Teacher Assessment and Support Consortium (InTASC) Standards³² and the respective Tennessee Literacy Standards,³³ and occupational EPPs must demonstrate how enrolled teachers gained this knowledge through their programs.

In addition, policy changes required stronger primary partnerships with districts to address their needs in content expertise and pedagogy. Updates to the state application for operating an EPP included enhanced guidance on how to meet the Council for the Accreditation of Educator Preparation (CAEP) standard requirements—for example, by pulling in specific language from the *Tennessee Comprehensive Review Handbook* used to evaluate aspiring EPP applications.³⁴ In addition, to be eligible for licensure renewal and advancement under the new policy, occupational educators must pass the Principles of Learning and Teaching Grades 7–12 test.³⁵ Two of the state's eight occupational EPPs decided to cease operations during the audit process, which reinforced the need for additional avenues to establish occupational EPPs.

³¹ Tennessee Department of Education. (n.d.). 2019–20 Tennessee comprehensive review handbook for educator preparation providers. https://www.tn.gov/content/dam/tn/education/licensure/ed-prep/TNCR_handbook.pdf

³² Professional education standards approved by the Interstate Teacher Assessment and Support Consortium (InTASC). See <https://ccsso.org/taxonomy/term/208> for more information.

³³ State literacy standards to be applied throughout content and grade level. Tennessee Department of Education. (n.d.). Non-ELA middle and secondary, career and technical education, and pre-K–12 program proposal guidelines for EPP literacy standards implementation. https://www.tn.gov/content/dam/tn/education/licensure/ed-prep/NonELA_Proposal_Guidance_508CR.pdf

³⁴ Tennessee Department of Education. TN Comprehensive Review (TNCR) handbook [Presentation]. <https://www.tn.gov/content/dam/tn/stateboardofeducation/documents/2019-sbe-meetings/april-16%2C-2019-educator-prep-%26-lice-subcommittee-mtg/4-16-19%202%2010%20TN%20Comprehensive%20Review%20Handbook%20Presentation.pdf>

³⁵ <https://www.ets.org/praxis/about/>



Rutherford County Public Schools Educator Preparation Program (RCPS EPP) | To address CTE teacher shortages driven by a lack of EPPs, TNDOE funded RCPS to develop a district-led EPP. The state approved an RCPS application to implement a job-embedded, two-year EPP for academic and occupational CTE teachers. The first cohort of 15 teachers began the EPP in late July 2019. As of November 2021, the RCPS EPP had 43 new CTE teachers hired from industry participating across three cohorts, with the third cohort starting in July 2021. As of spring 2022, four teachers from the first cohort had completed the licensure exam to become a professionally licensed teacher, six had left the district, and the remaining teachers were still completing the program or had not taken their licensing exam yet. Participants can enroll in the EPP (a) if they are hired into a position in RCPS or a participating nearby district and (b) if they meet the education and work experience requirements specific to both their industry and the occupational endorsement they are pursuing under the practitioner license (Exhibit 3). Participants hired and employed by RCPS agree to teach for three years in RCPS and pay a nonrefundable \$500 fee to enroll in the EPP. Out-of-county participants who enroll in the EPP pay a \$1,000 fee to participate. During the pandemic, many components of the program were moved online through webinars and virtual training sessions.

RCPS EPP participants complete 180–190 coursework hours depending on the year of the grant in which they completed the EPP. These hours include attending a required TNDOE's occupational new teacher training (40 hours) and a six-day summer induction (48 hours), followed by two evening meetings in August (six hours) prior to the start of their first school year, a four-day summer training between their first and second years of teaching (32 hours), three full-day trainings across three semesters (24 hours), and three-hour evening classes across two school years (48 hours). RCPS EPP uses the [Teaching to Lead](#) curriculum from the Southern Regional Education Board (SREB), which intertwines topics related to planning lessons and classroom management. In addition to the *Teaching to Lead* curriculum, RCPS EPP includes intensive mentoring and coaching support.

RCPS had an extensive mentoring program in place for new teachers that was enhanced for the RCPS EPP. RCPS members, including principals, assistant principals, and Response to Instruction and Intervention (RTI2)³⁶ coaches, engaged in nonevaluative coaching cycles with all new teachers and conducted monthly new teacher meetings to provide professional development. These groups provided targeted support to new CTE teachers. The RCPS members were given an overview of the curriculum at a day-long EPP launch event in April 2019, which researchers observed. RTI2 coaches were trained on the [Vision of Excellent Career and Technical Education Instruction](#), a set of standards developed by TNDOE. After the training, coaches embedded an hour on CTE support into their regular monthly coaching meetings to make sure they were up to speed on the new EPP. In addition to the RTI2 coaches, CTE teachers in the EPP had full-time support from the EPP coordinator, which included meetings once per month and individual sessions as needed. New teachers also had the opportunity to observe instruction from their peers.

Knox County Educator Preparation Program | Knox County Schools, in partnership with other regional districts, created an EPP (KCS EPP)—supported by and modeled on the RCPS program—to address CTE teacher shortages in their region. Starting in 2021, KCS enrolled 18 teachers in the first cohort of their program. To be eligible to participate in the EPP, participants must be (a) hired by KCS or one of their partnering districts and (b) meet requirements to be licensed under the practitioner occupational license. With these two criteria satisfied, potential participants complete a nonbinding interest survey and follow-up conversation with a KCS EPP administrator to ensure they understand the purpose of the program. After completing these steps, potential participants formally apply to the program. Participants pay \$600 per semester, or \$2,400 total, to participate in the four-semester program. Districts that send participants to the KCS EPP may offer different incentives for their

³⁶ The RTI2 framework in Tennessee focuses on intervening at the first signs of academic challenges—often called a “response to intervention” (RTI) method—to address deficits in student learning. Tennessee has taken an approach called “RTI2: Response to Instruction and Intervention.” Implementation of Tennessee’s RTI2 Framework has been mandatory for all K–12 public schools in all grade levels since the 2016–17 school year. See <https://www.tn.gov/education/instruction/tdoe-rti2/rti2-rediect/rti-current-update.html> for more information.



teachers; KCS allows participants to apply for reimbursement of the entire tuition and fees after they have worked in KCS for three years.

The KCS EPP uses the SREB curriculum, *Teaching to Lead*, along with SREB instructors for the coursework component of its EPP. KCS EPP follows a multiyear plan to bring instruction into the district by having EPP specialists observe SREB training the first year, lead some trainings with coaching from SREB instructors during the second year, and lead EPP instruction without coaching support in the third year. Participants attend an initial week of training in the summer and an additional two days of training prior to the start of their first school year as a teacher. During the school year, participants attend a monthly two-hour training. In the spring, participants complete another full day of training. Participants must complete pre- and post-work after each monthly meeting. Assigned work should be applicable to their classroom and should require the participant to practice the skill in the classroom, reflect on and improve their execution, and bring this reflection back to the monthly meeting to discuss with fellow participants.

In addition to the *Teaching to Lead* curriculum, participants also are matched with mentors. Each district recruits and funds mentors for EPP participants in its district. KCS EPP administrators reported that because mentor pay is set by each district, rates for mentorship vary across participating districts. SREB instructors train mentors and provide additional support through mentor network meetings. Mentors must complete and submit a mentoring log that KCS EPP administrators use to identify the frequency and types of interactions mentors have with program participants.

Southeast Tennessee Occupational Teacher Mentoring Consortium | A 10-district mentoring consortium addresses CTE teacher shortages in southeastern Tennessee. The consortium, in partnership with the University of Tennessee at Chattanooga (UTC), provides mentoring supports and, through UTC, an EPP for new CTE teachers not affiliated with or developed through the grant. District CTE directors must establish whether their participants have the necessary experience and credentials to obtain a practitioner license (Exhibit 3). As part of the UTC EPP, participants complete 12 hours of credit-bearing coursework and 3 hours of portfolio work with mentoring support from their respective districts. The consortium provides training, a mentoring handbook, and support for mentors working with CTE teachers enrolled in the EPP.

Mentors support new teachers for three years: two years during the EPP and one additional year to ensure new teachers can complete their licensure exam. All mentors hold a professional occupational license and participate in a day of professional development at the beginning of the program. To support mentors, the consortium created a set of mentoring materials comprising four components: (1) a mentoring handbook with state and local mentoring materials; (2) mentor resources, such as a mentor directory and reimbursement procedures; (3) professional development resources for new CTE teachers; and (4) a new teacher technology section that was under development at the time of this report.

The mentoring handbook outlines specific requirements for mentor-mentee interactions across the mentoring relationship and ensures that mentors observe instruction using the *Vision of Excellent Career and Technical Education Instruction*, an instructional framework developed by TNDOE, which includes a sample list of concrete classroom behaviors demonstrating excellent CTE instruction. The framework intentionally aligns teacher behavior with Tennessee's teacher evaluation system. The mentoring handbook also includes a collection of recorded sessions and supporting documentation on topics relevant to first-year CTE teachers' roles and responsibilities. Sessions include classroom management, early postsecondary opportunities, instructional assessment, instructional technology, student recruitment and program marketing, as well as an explanation of the *Vision of Excellent CTE Instruction* rubric and self-evaluation for growth to be used by new CTE teachers. Four additional regions in the state are auditing the mentoring handbook and materials. As a consortium, each district supplies one mentor per CTE



teacher enrolled in the UTC EPP. Mentors are teachers with a professional licensure in CTE. They hold the same CTE certification as the EPP participant, when possible, but this content match is not always available. Mentor compensation varies across districts, and districts vary on whether they require participants to pay the cost of mentoring.

Challenges and Strategies to Help Address Them³⁷

Difficulty Implementing an Industry Co-teaching Model | TNDOE intended to fund competitive grants of \$50,000 to assist districts in creating new CTE programs of study aligned with in-demand industries. They envisioned districts could use grant funds to cover some of an industry professional's time to develop a curriculum and co-teach with a general education teacher, especially when a district was finding it difficult to hire a CTE teacher and secure any equipment needed to open a CTE pathway. However, in speaking with superintendents and a group of 70 CTE directors across the state, TNDOE learned that districts felt they could not implement this model. They noted that general education teachers did not want to move into this type of role. District administrators also anticipated a lack of willingness on the part of businesses they partnered with to release a significant amount of an employee's time to develop or co-teach a CTE course. In addition, they felt that the funding amount offered would not adequately cover the start-up costs for the type of new CTE pathways they would like to open for students. For example, administrators anticipated it would cost hundreds of thousands of dollars to open and operate a mechatronics laboratory for an advanced manufacturing pathway when one did not exist. TNDOE had some conversations with industry representatives about the feasibility of receiving teacher externships within the co-teaching model in exchange for providing an employee some release time to develop a curriculum and co-teach in a school. Ultimately, the grant administrators did not find it feasible to pursue the activity and thought the funds could be more impactful if used within other strategies to address CTE teacher shortages.

Replicating the District and Community College-Led EPPs Statewide | Some interviewees also expressed concern regarding the ability of the district and community college EPP models to expand in the state. Interviewees described the tension between holding a high bar of quality and making sure that the EPP application process was reasonable enough for districts or community colleges to find it feasible. They described needing to make the process thorough enough to ensure quality in all program components to adequately prepare educators. They also acknowledged the amount of effort it takes district or community college staff who have other jobs within their schools and are not attuned to holistically designing this type of program and demonstrating in detail how it meets state standards. In a demonstration of this difficulty, a community college was provided grant funds to develop an EPP that did not advance because of the state's assessment that the program would not meet the new occupational standards. TNDOE staff said that they could use what they learned from this process to build out and refine a toolkit to support districts and community colleges interested in creating their own EPPs, with the goal of providing a low-tuition program that could attract new CTE teachers. The toolkit included multiple meetings with TNDOE and feedback on proposals to help strengthen district and community college EPPs. The KCS EPP, with support from RCPS, was the first district-led EPP to successfully apply for and complete the process using the new state toolkit. In addition, both the RCPS and KCS EPPs provided job-embedded programs to participants at a reduced tuition rate.

Providing Comprehensive and Consistent Supports for New CTE Teachers Across Districts | Challenges expressed by district-led EPP developers and participants included difficulty finding a common time period for teachers across multiple schools or districts to participate in the EPP, balancing requirements and pacing

³⁷ Please note the strategies described are not necessarily evidenced-based and do not represent implementation recommendations. Grantees chose to implement the described strategies in response to their challenges.



of the EPP with the requirements of teaching in a school, and finding and compensating mentors. District-led EPPs scheduled multiple meeting times or offered a combination of virtual and in-person meetings for participants to alleviate some scheduling issues. Program developers for the KCS EPP found that teachers hired after the start of the school year who had to make up course time they had missed during the summer were more likely to leave the district. To better support these late-hire teachers, developers deferred their summer work for one year and required they attend the state department's week-long January training for new CTE teachers.

The Southeast Tennessee Occupational Teacher Mentoring Consortium had difficulty matching mentees with mentors from similar career clusters because of the limited number of CTE teachers in rural districts. Coordinators also shared that grant funds did not cover all mentor compensation. Each district provided funding for its mentors, which resulted in varying levels of pay and district-supported mentor hours for each mentor. The program developed a list of necessary tasks associated with the mentoring and required all mentors to sign an agreement that they understood the estimated number of hours and tasks they needed to complete. Program developers shared that, although CTE mentees and mentors were not necessarily located in the same career cluster, mentees still had the opportunity to travel and observe high-quality instruction provided by a CTE teacher in their pathway and could be connected with other mentors in the event they had pathway-specific questions



APPENDIX A | Allowable Uses of Grant Funds

Exhibit A1. Nine Allowable Uses of Grant Funds

1. Establish, improve, or expand activities to recruit secondary CTE teachers for CTE programs that align to an in-demand industry sector or occupation.
2. Establish, improve, or expand teacher preparation programs to better meet the demand for effective secondary CTE teachers for CTE programs that align to an in-demand industry sector or occupation.
3. Establish, improve, or expand alternative routes for state certification of secondary CTE teachers for CTE programs that align to an in-demand industry sector or occupation.
4. Establish, improve, or expand teacher residency programs to recruit and retain secondary CTE teachers for CTE programs that align to an in-demand industry sector or occupation.
5. Establish, improve, or expand local partnerships of community organizations, institutions of higher education, and school districts that support mid-career business and industry professionals, military veterans, parents, students, community members, and paraprofessionals in becoming CTE teachers for CTE programs that align to an in-demand industry sector or occupation as identified by the grantee and its partners.
6. Implement differential pay or other financial incentives, such as signing bonuses, student loan repayment, or scholarships, to recruit and retain secondary CTE teachers for CTE programs that align to an in-demand industry sector or occupation.
7. Establish, improve, or expand teacher induction and mentoring programs to improve the preparation and retention of new secondary CTE teachers for CTE programs that align to an in-demand industry sector or occupation.
8. Establish or expand interstate teacher certification or licensure reciprocity agreements to enable CTE teachers who are licensed or certified in one state to teach in another state without completing additional licensure or certification requirements in CTE programs that align to an in-demand industry sector or occupation.
9. Develop and implement programs and initiatives to remove barriers to recruiting and retaining secondary CTE teachers for CTE programs that align to an in-demand industry sector or occupation.

Source: Applications for New Awards; High School Career and Technical Education Teacher Pathway Initiative. 82 F.R. 27047³⁸

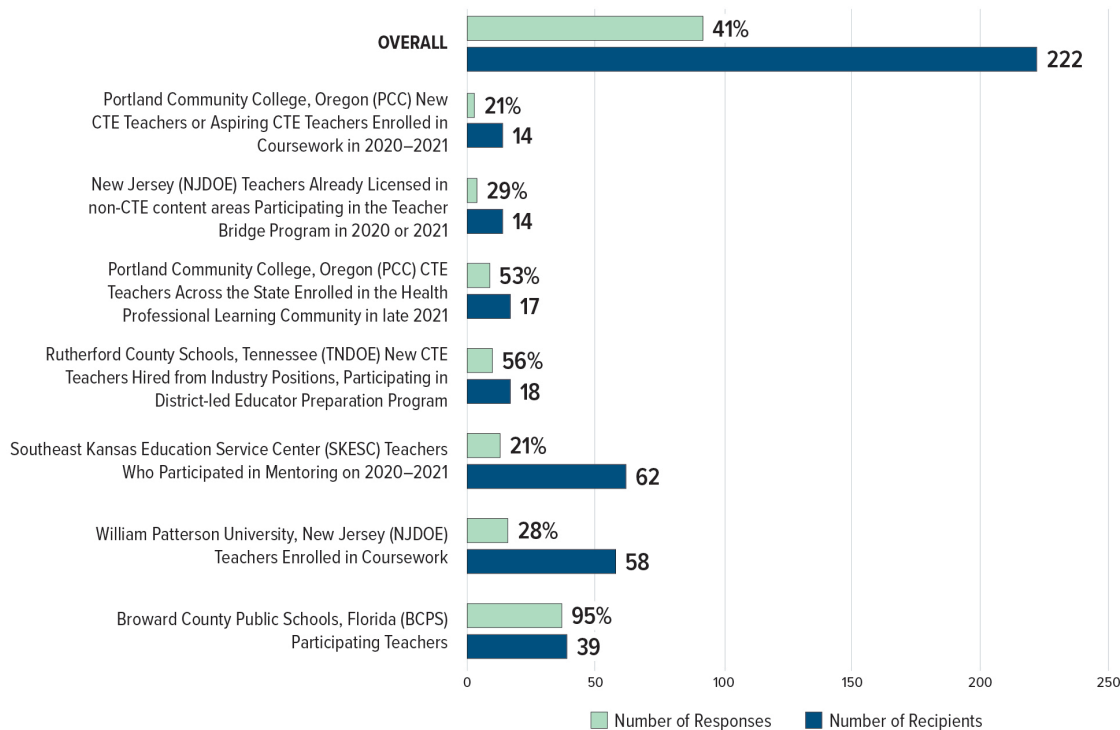
³⁸ <https://www.federalregister.gov/documents/2017/06/13/2017-12132/applications-for-new-awards-high-school-career-and-technical-education-teacher-pathway-initiative>



APPENDIX B | Gathering Data from Teachers

When AIR researchers began the second data collection for the study in 2021, they requested updated rosters from grant coordinators of the teachers or aspiring teachers who had been involved in grant activities since the onset of the pandemic. AIR requested teacher names, emails, and teaching licensures or certifications held or pursued through the grant. Two hundred twenty-two teachers were identified. Beginning in fall 2021, while interviewing others who were also part of the grant, AIR offered virtual focus groups via Zoom during a variety of times and dates for teachers to participate and share their experiences. Although nine teachers participated as described in the report, AIR and OCTAE discussed offering an additional avenue for teachers to provide feedback. Many teachers responded that, although they would like to share their experiences and thoughts about supports most important for new CTE teachers, their schedules were even more prohibitive than normal because of their recent return to in-person learning that school year. Throughout fall 2021, many classrooms also had periodic returns to remote learning as cases of COVID-19 fluctuated around the country. Therefore, as a result of the low focus group and interview participation at scheduled times via Zoom, AIR developed a short online survey that asked teachers and grant activity participants to describe their participation in grant activities, whether they would recommend the experience to other states and local entities trying to address CTE teacher shortages, and what supports they felt were important for new CTE teachers. Exhibit B1 describes each group of teachers or aspiring teachers surveyed across grantees, how many teachers were sent the survey from that group, and how many teachers responded.³⁹

Exhibit B1. Survey Responses per Grantee Group for Teachers Participating in Activities Since the Onset of the Pandemic



³⁹ Surveys were open for at least 1 month in spring 2022, and participants were sent an email about the opportunity multiple times by AIR and those administering the grant program with which they were familiar. Respondents were assured that all information they provided would remain confidential, and only the small AIR research team reviewed individual responses.

