

Career and Technical Education Districts (CTEDs)

CTEDs and CTED member districts spent \$67 million in fiscal year 2019 on career and technical education programs designed to prepare students for jobs in high-demand technical fields but do not have accurate and complete data to show whether they are effective in doing so

Special Study

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A Report to the Arizona Legislature

Lindsey A. Perry
Auditor General





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November 30, 2020

Members of the Arizona Legislature

The Honorable Doug Ducey, Governor

The Honorable Kathy Hoffman, State Superintendent of Public Instruction

Superintendents of Career and Technical Education Districts and Member Districts

Transmitted herewith is the Auditor General's report, *A Special Study of Career and Technical Education Districts*, conducted pursuant to Laws 2019, Ch. 263, §160, and under the authority vested in the Auditor General by Arizona Revised Statutes §41-1279.03. I am also transmitting within this report a copy of the Report Highlights for this study to provide a quick summary for your convenience.

My staff worked with officials from the career and technical education districts (CTEDs) and the Arizona Department of Education (ADE) and provided updates on the results of our work throughout the course of this study. Additionally, we provided officials from all CTEDs, member districts, and ADE the opportunity to review the report twice and provide us feedback, and we made changes to clarify information in our report based on this feedback. CTED, member district, and ADE officials indicated that the report recommendations directed to them are reasonable, and they plan to implement the recommendations.

My staff and I will be pleased to discuss or clarify items in the report.

Sincerely,

Lindsey A. Perry, CPA, CFE
Auditor General

Career and Technical Education Districts (CTEDs)

CTEDs and CTED member districts spent \$67 million in fiscal year 2019 on career and technical education (CTE) programs designed to prepare students for jobs in high-demand technical fields but do not have accurate and complete data to show whether they are effective in doing so

Special study purpose

To identify industry certifications earned by CTE students most associated with multi-year CTE programs that successfully prepare them for jobs in high-demand technical fields and to evaluate the effectiveness of CTEDs in preparing students for jobs in these fields.

Key findings

- We identified 37 State CTE programs that prepared students for jobs in high-demand technical fields and, based on feedback from business, industry, and higher education leaders, identified 88 associated industry certifications.
- CTEDs and member districts spent \$67 million in fiscal year 2019 on CTE programs designed to prepare students for jobs in high-demand technical fields.
- Although directed to collect student job placement and industry certification data, CTED and member districts' data was inaccurate and incomplete, putting them at risk of spending monies on programs that are not effective in preparing students for jobs in high-demand technical fields.
- The Arizona Department of Education (ADE) has not implemented a 2016 statutory requirement to track student job placement data for all CTED students and to report this information, along with other measures, in annual achievement profiles for CTEDs.
- CTEDs, member districts, and ADE did not take sufficient action to implement a 2017 Auditor General recommendation to consistently collect data for all CTE students to help evaluate CTE programs' effectiveness.
- Changes to statutory requirements and data collection procedures could help improve CTE data quality, enabling assessment of program effectiveness.

Key recommendations

The Legislature should consider revising statute to clarify and enhance reporting requirements for CTEDs and member districts to ensure job placement and industry certification data is required to be collected and reported for all CTED students.

CTEDs, member districts, and ADE should continue working together to fully implement the Auditor General's 2017 audit recommendation to develop and implement ways to consistently collect accurate, complete, and comparable data for all students participating in CTE programs, including industry certification data, and use this data to help evaluate the effectiveness of their CTE programs in preparing students for jobs related to their CTE program.

ADE should implement the 2016 statutory requirement to include each CTED in its annual achievement profiles and ensure its data-reporting processes allow districts to report performance data for all CTE students. It should also implement data-sharing agreements with other State agencies, industry certification providers, and other organizations to directly obtain students' postgraduation employment, industry certification data, and other data instead of relying solely on districts to collect and verify self-reported data.



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The Arizona Auditor General has conducted a special study of career and technical education districts (CTEDs) pursuant to Laws 2019, Ch. 263, §160, and under the authority vested in the Auditor General by Arizona Revised Statutes (A.R.S.) §41-1279.03. Specifically, the legislation directed us to collaborate with the Arizona Commerce Authority and business, industry, and higher education leaders to identify, on or before January 1, 2020, the industry certifications earned by career and technical education (CTE) students that are most associated with multiyear CTE programs that successfully prepare students for jobs in high-demand technical fields. See Appendix A on page a-1 of this report for a list of these certifications and Appendix C on page c-1 of this report for our methodology for this list. The legislation further directed us to evaluate the effectiveness of CTEDs in successfully preparing students for jobs in high-demand technical fields, which is what this study is regarding. We used 2 primary outcome measures in this study to evaluate CTEDs' effectiveness in successfully preparing students for jobs in high-demand technical fields: (1) students' postgraduation employment in high-demand technical fields related to their CTE program and (2) students earning associated industry certifications.¹ For more detailed information about the objectives, scope, and methodology of this study, see Appendix C on page c-1 of this report.

Arizona's CTE programs' purpose and design

According to State statute, the purpose of Arizona's high school CTE programs is to prepare students for high-need occupations that normally do not require a baccalaureate or advanced degree, lead to a certification or licensure if available, and provide students with sufficient skills for entry into an occupation.²

CTE students take specialized courses within specific programs that are designed to prepare them for careers in various fields, such as automotive, welding, health services, and construction. Each CTE program (e.g., Automotive Technologies) comprises a sequence of 2 or 3 specialized courses that are designed to prepare a student for entry-level employment in that field of study upon completion. Students who complete the entire sequence of courses in their program are commonly referred to as "completers." CTE students receive the majority

For more information about Arizona CTE and CTEDs and how they operate, see the Auditor General's [October 2017 Special Audit of Joint Technical Education Districts](#).¹ This special audit also reviewed the historical growth of CTEDs; reviewed differences in CTE programs' class sizes, instructional time, equipment, teacher experience, delivery models, and fiscal years 2012 through 2016 spending among CTEDs; and made recommendations to CTEDs, CTED member districts, and the Arizona Department of Education (ADE) to develop and implement consistent data collection methods to evaluate the effectiveness of CTE programs.

¹ Laws 2018, Ch. 311, §8 renamed joint technical education districts (JTEDs) to career technical education districts (CTEDs).

¹ CTED officials indicated that they believe additional measures could be used to evaluate their CTE programs' effectiveness, such as student satisfaction, instructor and equipment quality, leadership skills CTE students gain, and students' community college credit obtainment. Although some of these measures may contribute to helping districts achieve other program outcomes, this study was focused on evaluating program effectiveness in preparing students for jobs in high-demand technical fields, and having data to show whether any students who completed a CTE program actually pursued and obtained jobs or certifications in their fields is essential to evaluating the effectiveness of job preparation programs. Further, similar to the data issues we identify in Finding 1 (see page 6), data for these additional measures was not widely available for this study because districts were not required to systematically collect it. Therefore, we did not include these measures in our study and, instead, focused on those measures that most districts were required to collect.

² A.R.S. §§15-781 and 391.

of instructional time in a laboratory or work-based environment using specialized equipment and materials, and some CTE students have the option of participating in internships, apprenticeships, or other on-the-job training during schooling. CTE programs are also designed to prepare students to earn industry certifications during or shortly following the completion of their CTE program.

ADE has a process to approve a career field to become a recognized State CTE program, which includes reviewing labor market data from the Arizona Office of Economic Opportunity to identify instructional programs that prepare students for high-skill, high-wage, or in-demand occupations in Arizona. Additionally, to gain approval, the program must require specialized equipment and materials, lead to a certification or licensure if available, and completion of the program must qualify students for at least entry-level employment in their field of study. ADE reviews the State CTE programs every 2 years to ensure they still fill a vocation or industry need. For fiscal year 2019, ADE approved 69 State CTE programs that school districts throughout Arizona could offer.³

Because CTE programs are designed to prepare students to earn industry certifications, ADE also has a process to identify the certifications for each CTE program, which includes reviewing career opportunities for students who earn a certification and reviewing endorsement letters from Arizona businesses affirming that a certification is valuable in the field. For fiscal year 2019, ADE identified about 350 industry certifications for the 69 State CTE programs. Because Laws 2019, Ch. 263, §160, directed us to identify the industry certifications earned by CTE students that are most associated with multiyear CTE programs that successfully prepare students for jobs in high-demand technical fields, this special study focused on only these identified certifications. See Appendix A on page a-1 of this report for a list of these certifications and Appendix C on page c-1 of this report for our methodology for this list.

CTEDs offer high school students CTE through 2 models

In 1990, the Arizona Legislature enacted statutes that allowed the State's public school districts to form CTEDs (at that time called "joint technical education districts" or "JTEDs") for the purpose of improving CTE offerings for high school students and serving students more cost efficiently.⁴ The school districts that initially form a CTED or join an existing CTED are commonly referred to as "member districts." As shown in Figure 1 (see page 3), in fiscal year 2019, there were 14 CTEDs located across the State. These CTEDs were composed of 102 CTED member districts with total CTE course enrollment of about 153,000 students.⁵

CTEDs offer CTE programs through 2 models—In fiscal year 2019, CTEDs and member districts delivered CTE through 2 models—at a CTED central campus or at a CTED member district's regular high school campus.

- **CTED central campuses**—In this model, a CTED provides CTE programs at 1 or more central campuses to students from its member districts and may also provide CTE to students from charter schools, private schools, or home schools located within its boundaries. Students attending CTED central campuses usually spend part of their day at the high schools they regularly attend taking academic courses, and part of their day at the CTED central campus taking CTE courses that are typically offered daily in 2- to 3-hour blocks. Most CTEDs also partner with local community college districts to offer students the option of concurrently enrolling in CTE courses at community college campuses thereby receiving high school and college credit for the CTE courses. In fiscal year 2019, CTE course enrollment at central campuses was about 10,000 students.

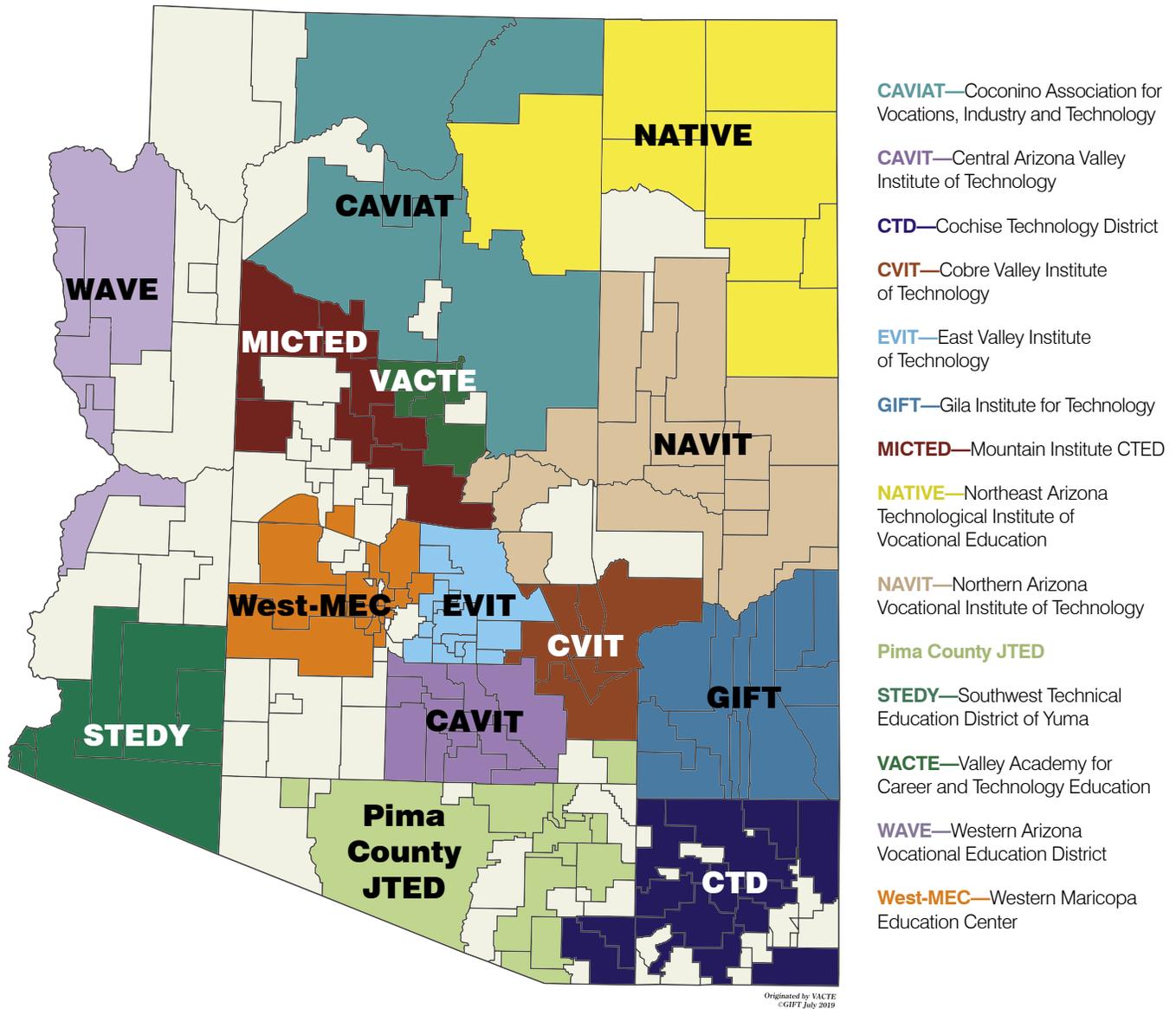
³ Because of the timing of this study, the most recent year for complete available data and other information was fiscal year 2019. For fiscal year 2019, ADE also approved 26 local occupational programs that certain school districts could offer. These CTE programs are approved on a district-by-district basis where a specific, local industry need has been identified that may not be an industry need State-wide. Fiscal year 2019 enrollment in these programs was about 3,600 students, almost all of which was for the United States Armed Forces Junior Reserve Officers' Training Corps (JROTC) program.

⁴ Laws 1990, Ch. 248, §1, enacted A.R.S. §15-391, et seq.; HB 2700 Summ., 05/09/06, 47th Leg., 2d Reg. Sess. Laws 2006. Laws 2018, Ch. 311, §8 renamed joint technical education districts (JTEDs) to career technical education districts (CTEDs).

⁵ CTE course-enrollment figures include a single student multiple times if that student was enrolled in multiple CTE courses during the year (e.g., Automotive Technologies and Welding Technologies). We used this CTE course-enrollment number for analysis in this report because a CTE student-enrollment number was not available from ADE.

- CTED member districts’ regular high school campuses**—In this model, member districts provide CTE programs on their regular high school campuses. Referred to as “satellite campuses” in statute and commonly referred to as “satellite programs,” these programs are operated by a CTED member district and receive support and oversight from the CTED. Students participating in CTE through this model spend their entire school day at the member district’s high school where they take CTE courses that are typically offered daily for 50 to 55 minutes each. In fiscal year 2019, CTE course enrollment at satellite campuses was about 143,000 students, or 93 percent of total CTE course enrollment.

Figure 1
Map of Arizona’s CTEDs



Source: Map courtesy of Gila Institute for Technology (GIFT), July 2019.

CTEDs are funded mainly from State, county, and local revenues like other Arizona school districts

Arizona CTEDs are primarily funded through State, local, and county revenues—the same primary revenue sources that fund other Arizona school districts—from the average daily membership (ADM) generated by the number of students attending CTE courses at CTED central campuses and member districts’ satellite campuses.⁶ Students enrolled in these CTE courses can generate additional ADM, and therefore additional revenues, above the 1.0 ADM limit that a student traditionally would generate for being enrolled in regular academic courses at his/her high school.⁷ In fiscal year 2019, students attending CTE courses at a CTED central campus could generate up to an additional 0.75 ADM, or about \$2,970 each, and students attending CTE courses at a member district’s satellite campus could generate up to an additional 0.25 ADM, or about \$990 each.⁸

Table 1
CTE funding by source for CTEDs and member districts
Fiscal years 2017 through 2019
(Unaudited)

Source	2017	2018	2019
State	\$ 92,783,734	\$ 101,046,781	\$ 118,371,928
Local	38,555,050	55,984,183	56,457,532
County	9,922,477	8,828,348	10,649,380
Federal	16,990,202	19,427,704	20,778,706
Other	80,151,251 ¹	9,679	142,344
Total	\$238,402,714	\$185,296,695	\$206,399,890

As shown in Table 1, in fiscal year 2019, CTEDs and member districts received about \$206 million in CTE funding, which are monies specifically restricted for CTE.⁹ Most of this funding, about \$163 million, was generated based on the additional ADM generated by student enrollment in central or satellite programs and was composed of State, local, and county revenues.¹⁰ Other CTE funding sources included federal grants, primarily from the Carl D. Perkins Act (Perkins Act), and the State vocational education block grant.¹¹

In 2019, the Arizona Industry Credentials Incentive Program (Incentive Program) was created to provide additional funding to school districts for each high school graduate who completed a CTE program (“completer”) and

¹ West-MEC received bond proceeds of about \$80 million in fiscal year 2017 that it spent primarily for construction in fiscal years 2017 through 2019.

Source: Auditor General staff analysis of fiscal years 2017 through 2019 district-reported accounting data.

⁶ ADM is a measure of total student enrollment based on the number of days a student is enrolled during the first 100 days of the school year. ADM is used for funding purposes and does not represent the actual number of students participating in CTE.

⁷ A.R.S. §15-393.

⁸ These dollar amounts do not include additional monies districts may receive based on other factors such as teacher experience and serving students with special needs. Further, these dollar amounts do not include other State monies districts receive through additional statutory formulas such as classroom site, instructional improvement, and district additional assistance formulas.

⁹ CTE spending is higher than CTE funding for CTEDs and member districts because member districts spend additional monies on their satellite programs from funding sources that are not restricted for CTE, primarily maintenance and operation monies, which include State, local, and county revenues. In fiscal years 2017, 2018, and 2019, member districts spent about \$67 million, \$74 million, and \$82 million, respectively, on their satellite programs from these other funding sources. A.R.S. §15-393 requires member districts to use the additional monies generated from students attending CTE courses at a satellite campus to supplement, not supplant, monies from other sources that were spent on CTE prior to joining a CTED.

¹⁰ To fund the ADM generated by their central and their member districts’ CTE students, CTEDs levy a local property tax at a rate of 5 cents per \$100 of secondary assessed value (A.R.S. §15-393), and the remainder is funded by State and county equalization assistance. For more information on how CTEDs and member districts are funded, see the Auditor General’s [October 2017 Special Audit of Joint Technical Education Districts](#).

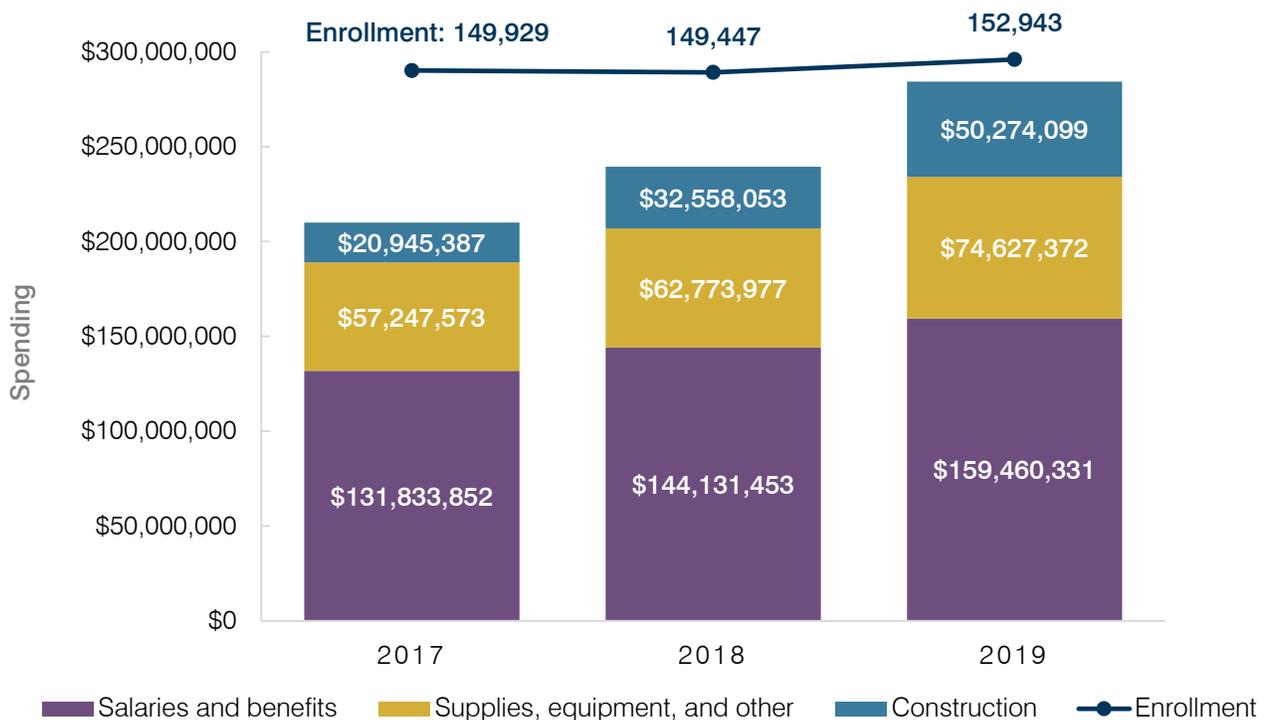
¹¹ The federal Carl D. Perkins Career and Technical Education Act of 2006 (known as Perkins IV), which was reauthorized and amended by the Strengthening Career and Technical Education for the 21st Century Act in 2018 (known as Perkins V), provides federal funding to states to improve secondary and postsecondary CTE programs. The State vocational education block grant was created to help satisfy a federal requirement that states must spend at least as much money on CTE each year as they spent the prior year to be eligible for federal Perkins grant monies.

obtained an industry certification.¹² Laws 2019, Ch. 263, §163, appropriated \$5 million from the State General Fund for each of fiscal years 2021 and 2022 for these incentive payments. Each year, ADE is required to work with the Office of Economic Opportunity, the Arizona Commerce Authority, and business and industry partners to determine which CTE programs and their associated certifications align with Arizona's in-demand occupations. For fiscal year 2019, 43 State CTE programs and 245 certifications were selected for inclusion in the Incentive Program.

CTED spending increased 35 percent between fiscal years 2017 and 2019

As shown in Figure 2, in fiscal year 2019, CTEDs and member districts spent about \$284 million on CTE.¹³ This is a \$74 million increase, or 35 percent, in spending since fiscal year 2017. During that same time period, CTE course enrollment increased by about 3,000 students, or 2 percent. The increased CTE spending was primarily driven by higher spending for construction of new CTE buildings and classrooms, increased salaries and benefits of CTE teachers, and hiring additional CTE teachers.

Figure 2
CTE spending by category and course enrollment for CTEDs and member districts
Fiscal years 2017 through 2019
(Unaudited)



Source: Auditor General staff analysis of fiscal years 2017 through 2019 district-reported accounting data and CTE course-enrollment data.

¹² A.R.S. §15-249.15. Beginning in fiscal year 2021, ADE will pay an incentive award of \$1,000 to school districts, charter schools, and CTEDs for each student who graduated in fiscal year 2019, completed a CTE program ("completer"), and earned a qualifying certificate, credential, or license. If the State-wide sum of all incentive awards exceeds the monies appropriated for the awards, each incentive award will be reduced proportionally to cover all awards.

¹³ CTE spending is higher than CTE funding for CTEDs and member districts because member districts spend additional monies on their satellite programs from funding sources that are not restricted for CTE, primarily maintenance and operation monies, which include State, local, and county revenues. In fiscal years 2017, 2018, and 2019, member districts spent about \$67 million, \$74 million, and \$82 million, respectively, on their satellite programs from these other funding sources. A.R.S. §15-393 requires member districts to use the additional monies generated from students attending CTE courses at a satellite campus to supplement, not supplant, monies from other sources that were spent on CTE prior to joining a CTED.



CTEDs and member districts spent \$67 million in fiscal year 2019 on programs designed to prepare students for jobs in high-demand technical fields but do not have accurate and complete data to show whether they are effective in doing so

CTEDs and member districts spent \$67 million in fiscal year 2019 on high-demand technical CTE programs and have been directed to collect certain measures to assess program effectiveness

In fiscal year 2019, CTEDs and member districts spent \$67 million directly on high-demand technical CTE programs that had course enrollment of 66,000 students.¹⁴ As referenced in this report's Introduction (see page 1), according to statute, the purpose of Arizona's high school CTE programs is to prepare students for high-demand occupations. To assess CTE programs' effectiveness, federal and State programs have established accountability measures related to key outcomes of CTE program completers. Two outcome measures that are common across federal and State accountability measures are CTE program completers' postgraduation employment and industry certifications earned. These measures provide important information about whether students who completed a CTE program acquired a job in their CTE field of study and learned the skills necessary to earn an industry certification, and recent reports from national research organizations like Advance CTE and Data Quality Campaign have also identified these measures as important for evaluating CTE programs' effectiveness.¹⁵ Additionally, during the course of our study, CTED and member district officials stated that student job placement and industry certifications students earn are both important outcome measures for evaluating their CTE programs' effectiveness in preparing students for jobs.

Because job placement and industry certifications earned have been identified as important measures to evaluate CTE programs' effectiveness, districts have been directed to collect this information. Specifically, districts that received federal Perkins Act funding were directed to track and report student job placement data and industry

¹⁴ Consistent with the requirement in Laws 2019, Ch. 263, §160, this study included only the CTE programs that are designed to prepare students for jobs in high-demand technical fields. See Appendix A, pages a-1 through a-6, for a list of these 37 CTE programs and the in-demand industries with which they are aligned. Additionally, see Appendix B, pages b-1 through b-15, for a table showing fiscal year 2019 course enrollment by CTED and member district in each of these 37 CTE programs. The most recent year for complete available data and other information for this study was fiscal year 2019. See Appendix C, pages c-1 through c-2, for the specific methods used for this study.

¹⁵ Advance CTE is a national nonprofit that represents state CTE directors and leaders and seeks to advance high-quality CTE policies and best practices. The Data Quality Campaign is a national nonprofit policy and advocacy group that seeks to improve the quality, accessibility, and use of education data. Education Strategy Group, Advance CTE, and Council of Chief State School Officers. (2018). *Credential Currency: How States Can Identify and Promote Credentials of Value*; New Skills for Youth, Advance CTE, Council of Chief State School Officers, Education Strategy Group, Data Quality Campaign, and Workforce Data Quality Campaign. (2019). *The State of Career Technical Education: Improving Data Quality and Effectiveness*; New Skills for Youth, Council of Chief State School Officers, Advance CTE, Education Strategy Group, and Achieve. (2019). *Making Career Readiness Count 3.0*; Results for America and MDRC. (2019). *What Works in Career and Technical Education: Evidence Underlying Programs and Policies that Work*.

certifications students earned to ADE.¹⁶ Further, districts that participated in the voluntary Arizona Industry Credentials Incentive Program (Incentive Program) were required to track and report student industry certification data to ADE to receive these program monies.¹⁷ Additionally, in February 2016, a law was passed that required ADE to include the student job placement rate as one component of CTEDs' annual achievement profiles.¹⁸ Lastly, in our October 2017 special audit of CTEDs, we recommended that the CTEDs, member districts, and ADE work together to develop and implement ways to consistently collect data for all students participating in CTE programs, including industry certification data, to help evaluate programs' effectiveness and efficiency.¹⁹ Collecting these measures would help assess effectiveness because CTEDs and member districts would have information about whether students pursued and obtained a job in their CTE field of study and whether they demonstrated the proficiency necessary to earn an industry certification.

Some CTEDs and member districts were required to collect student job placement and industry certification data, but their data was inaccurate and incomplete

CTEDs' and member districts' student job placement and industry certification data was inaccurate and incomplete—Although CTEDs and member districts participating in certain federal and State programs have been directed to collect student job placement and industry certification data, the districts either did not collect and report accurate and complete data to ADE or did not collect the job placement or industry certification data at all. The issues described below that we identified with the job placement and industry certification data we reviewed were pervasive, which made the data unreliable for purposes of evaluating CTE program effectiveness. Specifically:

- **Districts did not verify the accuracy of self-reported data**—The CTEDs and member districts that collected student job placement data did so by sending surveys to students, communicating with the students or their family members, reviewing students' social media, or asking the students' teachers if they knew whether the students were employed. However, the districts did not verify whether the self-reported information was accurate. Specifically, although ADE requires districts receiving Perkins Act funding to collect employers' names and contact information for student job placements, it does not require districts to use this contact information to verify the accuracy of this data, and the districts did not contact the employers to confirm the students' employment and that their jobs were related to their CTE programs of study.

The CTEDs and member districts that collected student industry certification data obtained it directly from certification providers as well as from students themselves. Districts reported having difficulties getting student industry certification directly from some certification providers due to privacy issues and the large number of certification providers. However, when obtaining information from the students themselves, districts relied on what students told them and did not always collect documentation, such as a copy of the certificate, to verify that the certifications students reported having earned were indeed earned and accurate.

¹⁶ The Perkins Act requires each state receiving Perkins Act funding (see this report's Introduction on page 4 for more information about Perkins Act funding) to report certain outcome measures, such as positive student placements, meaning that students are employed, attending postsecondary school, or serving in the military or on a religious mission. Beginning for fiscal year 2020, states are also required to report industry certifications earned by students. In preparation for fiscal year 2020, ADE requested all districts that received Perkins Act funding to submit student industry certification data to ADE starting in fiscal year 2019. This was in addition to the positive student placement information districts had already been required to submit to ADE in prior years. In fiscal year 2019, 1 of the 14 CTEDs and all 102 member districts received Perkins Act funding.

¹⁷ In 2019, the Arizona Industry Credentials Incentive Program was created to provide additional funding to school districts for each high school graduate who completed a CTE program ("completer") and obtained an industry certification. For more information, see this report's Introduction on page 4. According to ADE officials, all 14 CTEDs and 68 of the member districts submitted requests for Incentive Program monies for fiscal year 2019.

¹⁸ Laws 2016, Ch. 4, §1, enacted A.R.S. §15-393.01.

¹⁹ See Arizona Auditor General report 17-212. (2017). *Joint Technical Education Districts*.

Research supports the need to validate self-reported information to ensure it is accurate.²⁰ Although CTED and member district officials stated that having quality student job placement and industry certification data would help them evaluate their CTE programs, some district officials reported to us that the job placement and industry certification data they collected had limited value because it was potentially inaccurate.

- Districts did not correct apparent student errors in the student job placement data they collected and made additional errors when reporting the data to ADE**—Some students incorrectly reported that their jobs were related to their CTE programs. However, their districts further reported this information to ADE for Perkins Act reporting even though it was apparent that the students’ jobs were not related to their CTE programs. Further, some districts reported that students’ jobs were related to their CTE programs even though the students reported that they were not (see Table 2 for examples of these errors). Although these students may have learned general skills in their CTE programs that they could apply to many different jobs, having data that shows whether program completers got jobs in their CTE field of study is an integral performance measure for evaluating CTE program effectiveness.

Table 2
Examples of apparent student errors districts did not correct in student job placement data reported to ADE and errors districts made when reporting student job information to ADE

Student’s reported CTE program of study	Student’s reported job placement	Districts’ reporting errors
Pharmacy Support Services	Bank teller	Uncorrected errors —These students incorrectly reported that their jobs were related to their CTE programs, but the districts did not correct the apparent errors in the data.
Emergency Medical Services	Fast food restaurant	
Marketing	Auto garage	Incorrect reporting to ADE —The districts reported that these students’ jobs were related to their CTE programs even though the students reported that their jobs were not related to their CTE programs.
Marketing	Car wash	
Engineering	Developmental disabilities care provider	
Welding Technologies	Food concessions company	

Source: Auditor General staff analysis of fiscal year 2019 district-reported job placement data.

- Some districts did not collect job placement and industry certification data or only collected it for certain programs**—For fiscal year 2019, 6 of the 14 CTEDs and 4 member districts did not collect any job placement data or collected it only for students in certain programs. Further, 3 other member districts did not attempt to collect job placement data for all students, reaching out only to students who did not show up in postsecondary enrollment reports.²¹ These districts reported students who were identified as enrolled in postsecondary school as not working despite not gathering any information about these students’ employment status; these students could have been both working and going to school. Further, ADE’s reporting process did not allow districts to report job placement data for home-schooled students and some charter school students who attended CTED central programs. One CTED reported to us that charter school and home-schooled students comprised 20 percent of the district’s total CTE students in fiscal year 2019. Moreover, many CTED and member district officials reported that contacting and obtaining job placement

²⁰ New Skills for Youth, Advance CTE, Council of Chief State School Officers, Education Strategy Group, Data Quality Campaign, and Workforce Data Quality Campaign. (2019). *The State of Career Technical Education: Improving Data Quality and Effectiveness*.

²¹ The member districts and 1 CTED that received Perkins Act funding (see this report’s Introduction on page 4 for more information about Perkins Act funding) were required to report positive student placements, meaning that students are employed, attending postsecondary school, or serving in the military or on a religious mission. Therefore, many of these districts did not specifically determine whether CTE students were employed after graduation in a job related to their CTE program of study once they determined that they met one of the other positive student placements.

data from all students was extremely time consuming and resulted in incomplete data because they were unable to reach many students. Specifically, 2 CTEDs and 2 member districts reported being able to reach only between 20 and 50 percent of their CTE students to determine whether they had a job. Finally, some CTED and member district officials reported that the job placement data they collected had limited value because it was not complete.

In addition to some districts not collecting job placement data, for fiscal year 2019, 1 CTED and 6 member districts did not collect any industry certification data from their students. Further, 1 CTED and 1 member district collected certification data for only some CTE programs but not all. For many districts, fiscal year 2019 was the first year they attempted to collect student industry certification data because of additional Perkins Act funding requirements and the implementation of the Incentive Program. District officials reported struggling to implement collection procedures for fiscal year 2019 to ensure all student certification data was collected, and many indicated they were making changes to their procedures for the future. This resulted in districts collecting industry certification data in haphazard ways and some districts not collecting certification data for all CTE programs or all CTE students.

- **Some districts did not comply with ADE requirements for data collection**—ADE required districts to collect job placement data for Perkins Act reporting between October and December of 2019 for the spring 2019 graduates. However, some CTEDs and member districts collected job placement data over different time intervals, ranging from pregraduation plans, which are not actual job placements but were reported as such, through June 2020, which was the reporting deadline, not the data collection time period, for the fiscal year 2019 job placement data. Collecting job placement data over different time periods negatively impacts comparability between districts. For example, certain districts may have higher job placement numbers due to the inclusion of students who planned to but did not actually get jobs or obtained employment after December of the year of graduation.

CTEDs' and member districts' inaccurate and incomplete data put them at risk of spending monies on programs that are not effective in preparing students for jobs in high-demand technical fields—CTEDs and members districts have a fiduciary responsibility to ensure that the CTE programs they operate are meeting their statutory purpose to prepare students for high-demand occupations. However, because CTED and member district student job placement and industry certification data is inaccurate and incomplete, they do not have essential data needed to demonstrate whether their programs are meeting this purpose and, therefore, whether their programs are effective or not. Thus, it is unknown whether none, some, or all of the \$67 million Arizona CTEDs and member districts spent directly in fiscal year 2019 on the 37 CTE programs designed to prepare students for jobs in high-demand technical fields may have been better spent on other programs or something else altogether.

Although CTEDs and member districts do not have accurate and complete data to assess whether programs prepared students for high-demand occupations, anecdotal evidence from CTED business and industry partners suggests that some students obtained jobs related to their CTE programs of study. For example, an auto trade association that partners with multiple CTEDs, member districts, auto dealerships, and auto service shops reported to us that they helped place over 100 students who had completed an auto-related CTE program in fiscal year 2019 in auto-related jobs. Additionally, a masonry company that partners with a CTED's Construction Technologies program reported to us that they hire 6 to 8 program completers each year because they find students who complete this program are career ready.

Not all CTEDs and member districts were required to track and report student job placement and industry certification data because ADE did not implement statutory requirement and CTEDs, member districts, and ADE did not implement prior audit recommendation

ADE did not implement 2016 statutory reporting requirement, which would have required job placement data to be tracked for all students enrolled at CTEDs—A 2016 law revised State statute to require ADE to include each CTED in its annual achievement profiles and letter grade classification system, but ADE has not implemented this requirement.²² The annual achievement profiles and letter grade classifications are commonly referred to as “school report cards” and are available on ADE’s website for non-CTED districts.²³ The annual achievement profiles rate each school on an A through F scale based on performance indicators outlined in statute, such as student academic progress growth.²⁴ Statute requires that ADE develop specific criteria applicable to CTEDs for their annual achievement profiles and must include some specific performance indicators, including student job placement rates. However, despite the requirement for ADE to develop annual achievement profiles for CTEDs being in place since 2016, ADE has still not implemented it because, according to ADE officials, they anticipated legislation would be passed that would eliminate the requirement. However, no such legislation has been passed. Thus, despite a statutory requirement, ADE has not required the 14 CTEDs to collect and report job placement data to it for this purpose. Further, although not specifically listed in statute, if ADE were to implement the achievement profiles and letter grade classification system for CTEDs as required by law, among additional performance indicators, it could include industry certifications CTE students earned.

CTEDs, member districts, and ADE did not fully implement our 2017 audit recommendation to consistently collect data for all CTE students to help evaluate CTE programs’ effectiveness—In October 2017, we issued a special audit of CTEDs in which we recommended that the CTEDs, member districts, and ADE work together to develop and implement ways to consistently collect data for all students participating in CTE programs, including industry certification data, to help evaluate programs’ effectiveness and efficiency.²⁵ Despite agreeing that collecting this and other data is important and indicating that they planned to implement the recommendation, the magnitude of the data problems we found and discussed earlier illustrates that neither ADE nor the CTEDs and member districts took sufficient action to do so. CTED officials reported that they had started looking into whether a vendor could create a CTE data collection system but were told to stop because ADE was going to explore something similar. However, ADE officials reported that they were only planning to focus on improving CTE course-enrollment reporting. Ultimately, the CTEDs, member districts, and ADE did not fully implement our recommendation, and as a result, the data issues identified in 2017 remain unresolved, including not having the data needed from all CTEDs and member districts to assess CTE program effectiveness.

Changes to statutory requirements and data collection procedures could help improve CTE data quality, enabling assessment of program effectiveness

Collecting accurate, complete, consistent, reliable, and up-to-date data is critical for determining if programs designed to prepare students for jobs in high-demand technical fields have been effective in doing so. It is also critical for effective management of CTE programs, for helping determine potential areas for improvement, and for assessing program effectiveness as a whole. Further, quality data helps CTEDs and member districts demonstrate their stewardship of public monies.

²² Laws 2016, Ch. 4, §1, enacted A.R.S. §15-393.01.

²³ School report cards for regular (non-CTED) schools and districts can be found on ADE’s website at <https://azreportcards.azed.gov>.

²⁴ A.R.S. §15-241.

²⁵ See Arizona Auditor General report 17-212. (2017). *Joint Technical Education Districts*.

Legislature should consider revising annual achievement profile statute to clarify and enhance requirements for CTEDs and member districts—Specifically, the Legislature should:

- **Consider revising statute to clarify that ADE include CTED member districts in annual achievement profiles and publish data that is disaggregated by CTE program and district**—As discussed earlier, although A.R.S. §15-393.01 has required ADE to include each CTED in its annual achievement profiles since 2016, ADE has not yet done so. However, since this statutory requirement still exists and it is not clear whether these profiles should include CTED member districts’ data or only data from the CTED central campus, the Legislature should consider revising statute to ensure both CTEDs’ central program and member districts’ satellite program data is required to be included in these profiles to ensure the data reported to ADE is complete and the profiles ADE publishes are likewise complete. Further, the Legislature should consider revising statute to ensure ADE publishes data that is disaggregated, when appropriate, by CTE program and between CTED member district satellite programs and CTED central campus programs to allow users to review differences between programs.
- **Consider revising statute to include student industry certification data in districts’ annual achievement profiles**—The Legislature should also consider adding industry certifications earned by students as a performance indicator and thus a reporting requirement for the CTEDs’ annual achievement profiles. As discussed earlier, fiscal year 2019 was the first year many districts attempted to collect student industry certification data because of additional Perkins Act funding requirements and the implementation of the Incentive Program. However, because participation in the Incentive Program is voluntary and not all districts receive Perkins Act funding, 13 of the 14 CTEDs were not required to report student industry certification data to ADE. Revising statute to include industry certifications as a performance indicator in CTEDs’ and member districts’ annual achievement profiles would ensure this information is available for all CTEDs and member districts every year.

Although ADE, CTEDs, and member districts have worked together to identify additional performance measure data to collect, they should implement procedures to ensure data accuracy, consistency, and comparability—ADE, CTEDs, and member districts recently collaborated to identify additional performance measures they believe are important to evaluating CTE programs and created a CTE program quality- and compliance-monitoring tool based on the Association for Career and Technical Education’s program of study framework.²⁶ This new monitoring tool reviews CTE programs’ compliance with certain federal and State requirements, such as standards-aligned curriculum, appropriately certified teachers, and appropriate equipment; and reviews additional quality indicators, such as active outreach efforts to develop business and industry partnerships, maximizing meaningful student interaction with business and industry professionals, and using outcome measures such as job placement and industry certification data to continuously monitor and improve program effectiveness. ADE reported that it recently began using this tool in Fall 2020 to monitor and evaluate the CTE programs at 42 schools and 1 CTED central program, so none of these reviews were completed by the time of this study’s conclusion.²⁷ However, these reviews likely will be using the same inaccurate and incomplete student job placement and industry certification data we attempted to use for this study, which further supports the need to improve the quality of this data. Therefore, ADE, CTEDs, and member districts must ensure the accuracy, consistency, and comparability of any data collected to ensure ADE has quality data for these reviews and districts have quality data for their own program evaluations.

²⁶ The Association for Career and Technical Education is a national nonprofit education association that seeks to empower educators to deliver high-quality CTE programs that ensure all students are positioned for career success. It developed a program of study framework in 2018 to help CTE educators and administrators develop and improve the quality of their CTE programs of study.

²⁷ A.R.S. §15-393(V) requires ADE to review CTED programs and courses to ensure quality, compliance, and eligibility every 5 years beginning in 2020.

According to national research organizations like Advance CTE and Data Quality Campaign, states should adopt processes and protocols to review, validate, and certify career readiness data.²⁸ States can improve data quality by providing concrete data definitions and business rules for measures of career readiness and providing technical assistance and guidance to help local leaders improve data collection and validation. These processes and protocols can improve data quality by reducing errors and ensuring that state policymakers can trust the accuracy of the data states report. Specifically, to help ensure data accuracy, completeness, consistency, and comparability, ADE, CTEDs, and member districts should work together and develop guidance that addresses the following:

- Population of students districts should track and report on.
- Time period for which districts should collect data.
- Data verification procedures districts should perform.
- Supporting documentation districts should maintain.
- Other clarifications districts need.

ADE should implement data-sharing agreements with other State agencies, industry certification providers, and other organizations to directly obtain source data instead of relying solely on districts to collect and verify student self-reported data—

Recent reports from national research organizations like Advance CTE and Data Quality Campaign have found that most states collect career readiness data using outdated, inefficient, and unreliable methods such as surveys and student self-reported data, which are the methods Arizona CTEDs and member districts that collected student job placement and industry certification data for fiscal year 2019 used.²⁹ These reports note that these data collection methods result in significant response error, misreporting, and low response rates, all of which are issues we identified with student job placement and industry certification data collected by Arizona CTEDs and member districts for fiscal year 2019. Further, these reports found that student surveys of postgraduation outcomes are burdensome to administer, which is a challenge Arizona CTED and member district officials expressed, and students often feel pressure to report positive outcomes, which may inflate student job placement rates.

To solve some of these data collection issues and ensure that CTEDs, member districts, and State leaders have access to high-quality data on the effectiveness of CTE programs, these reports from national research organizations recommend that states centralize their data collection efforts and use more reliable sources of information by partnering with other state agencies, certification providers, and other organizations. Other states have successfully implemented these types of data-sharing agreements to collect outcome data for their CTE programs that could be replicated in Arizona. Specifically, ADE should implement the following:

- **Partner with the Arizona Department of Economic Security (DES) and other State agencies, as needed, to develop and implement data-sharing agreements to obtain employment and wage information**—Current best practices recommend that state education agencies utilize employment records, particularly state unemployment insurance data, to collect student job placement data. This type of administrative data sharing has already been implemented by the ARIZONA@WORK program, which tracks job placement and wage information of its program completers from quarterly unemployment insurance records provided by DES using program completers' Social Security numbers.³⁰ Although school districts do not generally collect Social Security numbers for their students, other states have partnered with additional state agencies to facilitate data matching to labor data. For example, New Jersey's Department of Education

²⁸ New Skills for Youth, Advance CTE, Council of Chief State School Officers, Education Strategy Group, Data Quality Campaign, and Workforce Data Quality Campaign, 2019; New Skills for Youth, Council of Chief State School Officers, Advance CTE, Education Strategy Group, and Achieve, 2019; Results for America and MDRC, 2019.

²⁹ Ibid.

³⁰ The ARIZONA@WORK program is the State's workforce development network with a stated mission to strengthen Arizona's economy by developing the workforce and matching employers with job seekers; helping employers recruit, develop, and retain the best employees for their needs; and serving job seekers of all ages, skill sets, and experience levels.

partnered with the state's Motor Vehicle Commission (similar to the Arizona Department of Transportation's Motor Vehicle Division) to match student names and birthdates to motor vehicle records to get a Social Security number that is then used to match CTE program completers to unemployment insurance records. The Arizona Department of Transportation collects Social Security numbers to verify the identity of driver license applicants, so such a solution may be possible in Arizona. The Data Quality Campaign and Workforce Data Quality Campaign released a detailed guide in 2018 to help state education agencies develop these administrative data-sharing agreements.³¹

- **Partner with industry certification providers, as needed, to develop and implement data-sharing agreements to obtain certification testing results and attainment data**—Current best practices recommend that state education agencies partner with certification providers to access administrative records for students' certification testing and attainment results. Other states, including Tennessee and North Carolina, have established data-sharing agreements with certification providers to share students' test results and certification attainment data directly with the states' education agencies.
- **Partner with the National Student Clearinghouse, as needed, to obtain postsecondary education enrollment data from a single credible data source**—Although not an effectiveness measure for this specific study, CTED and member district officials reported that tracking if students enrolled in postsecondary education was another important outcome measure for their CTE programs. Further, districts receiving federal funding through the Perkins Act must collect and report this data to ADE. Almost all districts that collected this data did so the same way they collected job placement data—by having students self-report this information through surveys or phone calls. Current best practices recommend that state education agencies partner with the National Student Clearinghouse, which is a national nonprofit organization that partners with 3,700 postsecondary education institutions, to collect data on students' postsecondary enrollment. The ARIZONA@WORK program subscribes to the National Student Clearinghouse to track postsecondary enrollment and outcomes for program participants. Additionally, other states, including Missouri and Colorado, subscribe to the National Student Clearinghouse to track postsecondary enrollment for their CTE students. Further, 3 member districts reported that they subscribe to the National Student Clearinghouse to collect postsecondary enrollment instead of relying solely on students' self-reported information.

ADE should share the data collected using the methods described above with CTEDs and member districts and ensure its data-sharing agreements address any security or privacy concerns with sharing this data with individual districts. Although some data limitations may still exist with these data collection methods, such as employment information not being available for students without Social Security numbers or postsecondary enrollment not being available for all colleges, CTEDs and member districts could supplement this missing data with student self-reported data they collect and verify. This would provide more accurate and complete employment, industry certification, and postsecondary enrollment information; reduce the administrative burden on districts of surveying all CTE program completers; reduce the need for districts to work individually with the large number of certification providers to obtain industry certification data; and provide additional information that most CTEDs and member districts are not currently capturing that would be useful for CTE program evaluation. For example, using unemployment insurance data also provides wage information, obtaining certification testing results directly from providers ensures data on students' failed certification attempts is also collected, and using clearinghouse data can also provide districts with whether their students went on to earn a degree and if so, the degree earned. Implementing recommendations to improve data quality, especially for program completers who would be expected to have learned the skills taught in their programs, is important for districts and others to be able to evaluate CTE program effectiveness.

Recommendations

1. The Legislature should consider:
 - a. Revising A.R.S. §15-393.01 to clarify that ADE should include CTED member districts in the annual

³¹ Data Quality Campaign and Workforce Data Quality Campaign. (2018). *Roadmap for K-12 and Workforce Data Linkages: Key Focus Areas to Ensure Quality Implementation*.

achievement profiles and publish data that is disaggregated, when appropriate, by CTE program and district.

- b. Revising A.R.S. §15-393.01 to include industry certifications students earned as a performance indicator in CTEDs' and CTED member districts' annual achievement profiles.
2. To ensure accurate, complete, and comparable data is available to assess CTE program effectiveness, CTEDs, CTED member districts, and ADE should:
 - a. Fully implement the Auditor General's 2017 audit recommendation by continuing to work together to develop and implement ways to consistently collect data for all students participating in CTE programs, including industry certification data, and use this data to help evaluate the effectiveness of their CTE programs in preparing students for jobs related to their CTE program.
 - b. Ensure districts are consistent in how they collect CTE program data by developing guidance that addresses what population of students will be tracked and reported on, the time period districts will collect data, verification procedures districts should perform, supporting documentation districts should maintain, and any other clarification districts need.
 3. ADE should:
 - a. Implement the requirement in A.R.S. §15-393.01 to include each CTED in its annual achievement profiles and letter grade classification system.
 - b. Ensure its reporting processes allow all CTEDs and CTED member districts to report performance data, such as student job placement and industry certification data, for all their CTE students to ADE in a manner that identifies whether the student completed the program at a CTED central or CTED member district satellite campus.
 - c. Implement data-sharing agreements with DES and other State agencies, as needed, to obtain CTE students' postgraduation employment and wage information.
 - d. Implement data-sharing agreements with industry certification providers, as needed, to obtain CTE students' certification testing results and attainment data directly from providers.
 - e. Partner with the National Student Clearinghouse, as needed, to obtain CTE students' postgraduation postsecondary enrollment and outcome data from a single credible source.
 - f. Ensure its data-sharing agreements allow it to share CTE students' data with their CTED or member district and work with CTEDs and member districts to supplement any missing information.



The 37 CTE programs designed to prepare students for jobs in high-demand technical fields and associated industry certifications

Table 3 (see page a-2) of this appendix lists the 37 CTE programs that we identified as being designed to successfully prepare students for jobs in high-demand technical fields, and in collaboration with the Arizona Commerce Authority (ACA); the Office of Economic Opportunity (OEO); and business, industry, and higher education leaders, we identified their associated industry certifications that successfully prepare students for these jobs.³² CTE programs and their associated industry certifications are grouped together by the in-demand industry with which they align. See Appendix C, pages c-1 through c-2, for our methodology for identifying the CTE programs that are designed to prepare students for jobs in high-demand technical fields and our methodology for identifying the associated industry certifications that successfully prepare students for these jobs. See this report's Introduction, pages 1 through 5, for descriptions of and additional information about CTE programs.

Note on the scope of our study—One of the objectives of our study was to evaluate the effectiveness of CTEDs in preparing students for jobs in high-demand technical fields. A.R.S. §15-781 defines CTE programs as those that prepare students for occupations that normally do not require a baccalaureate or an advanced degree and provide them sufficient skills for entry into an occupation. Therefore, our study focused on CTE programs that are designed to prepare students for jobs in high-demand technical fields that they would be qualified for upon completion of a CTE program. A CTE program's absence from our list does not indicate that the program does not prepare students for other jobs or does not fill an industry need. For example, the Accounting CTE program did not meet our criteria for inclusion because according to occupational demand data provided by the OEO, most jobs in the accounting field require a bachelor's degree, and while there was high demand for accounting-related jobs requiring a bachelor's degree, there was low demand for accounting-related jobs that do not require a bachelor's degree. Many stakeholders we collaborated with for this study believe that CTE programs lead students to enroll in postsecondary education, helping create a pipeline of students who, upon completion of a bachelor's degree, would then be qualified for certain jobs in high-demand technical fields. However, assessing whether these programs successfully prepare students for postsecondary education or for jobs after their postsecondary education was not part of the study's legislative scope.

Another objective of our study was to identify the industry certifications students can earn related to these CTE programs that successfully prepare them for jobs in high-demand technical fields. Because of our study's scope, a certification's absence from our list does not indicate that the certification does not prepare students for jobs in other fields or that it does not serve another purpose. For example, the business and industry leaders we surveyed did not rate any certifications identified by ADE for the Cabinetmaking and Carpentry CTE programs as effective in successfully preparing students for jobs in those fields. However, these certifications, such as the Precision Measuring certification from the National Coalition of Certification Centers (NC3) and the Career Connections Certification, may have value to students who earn them by serving as resume/application boosters over similarly qualified candidates.

³² Laws 2019, Ch. 263, §160.

Table 3

CTE programs designed to prepare students for jobs in high-demand technical fields and associated industry certifications by industry

Construction

CTE program	Industry certification
Architectural Drafting	Autodesk Certified User (ACU)—AutoCAD
	Autodesk Certified User (ACU)—Revit Architecture
	Certified Drafter—Advanced High School
Cabinetmaking	No certifications
Carpentry	No certifications
Construction Technologies	National Center for Construction Education and Research (NCCER)—Construction Technologies
	National Center for Construction Education and Research (NCCER)—Core
Electrical and Power Transmission Installation	Occupational Safety and Health Administration (OSHA) 10 Construction Industry
Heating, Ventilation and Air Conditioning	National Center for Construction Education and Research (NCCER)—Core
	National Center for Construction Education and Research (NCCER)—HVAC
	Occupational Safety and Health Administration (OSHA) 10 Construction Industry
Heavy Equipment Operations	National Center for Construction Education and Research (NCCER)—Core
	National Center for Construction Education and Research (NCCER)—Heavy Equipment Operator
	Occupational Safety and Health Administration (OSHA) 10 Construction Industry
Industrial Electrician ¹	Occupational Safety and Health Administration (OSHA) 10 Construction Industry
Mechanical Drafting	Autodesk Certified User (ACU)—Fusion 360 CAD
	Autodesk Certified User (ACU)—Inventor
	Certified SolidWorks Associate (CSWA)

¹ This program is scheduled to end and be incorporated into the Electrical and Power Transmission Installation program for fiscal year 2022.

Health care and social assistance

CTE program	Industry certification
Dental Assisting	Occupational Safety and Health Administration (OSHA) 10 Healthcare
	Radiation Health and Safety (RHS)
Emergency Medical Services	Emergency Medical Technician (EMT)
Home Health Aide	Direct Care Worker (DCW)
Laboratory Assisting	Certified Phlebotomy Technician (CPT)
Medical Assisting Services	Clinical Medical Assistant (CCMA)
	Registered Medical Assistant (RMA)
Medical Records Technologies	Certified Electronic Health Records Specialist
Nursing Services	Certified Nursing Assistant (CNA)
	Licensed Nursing Assistant (LNA)
Pharmacy Support Services	Certified Pharmacy Technician (CPhT)
Sports Medicine and Rehabilitation	Certified Personal Trainer (CPT)
	Certified Physical Therapy Aide (CPTA)
	Emergency Medical Responder (EMR)
Veterinary Assisting	Approved Veterinary Assistant (AVA)

Professional, scientific, and technical services; and finance and insurance

CTE program	Industry certification
Business Operations	A*S*K (Assessment of Skills and Knowledge for Business) Certifications
Finance	No certifications
Marketing	No certifications

Manufacturing

CTE program	Industry certification
Automation and Robotics	Association Connecting Electronics Industries (IPC)—Hand Soldering
	Association Connecting Electronics Industries (IPC)—J-STD-001 Certification
	Certified SolidWorks Associate (CSWA)
Cabinetmaking	No certifications
Electronics Drafting	Autodesk Certified User (ACU)—AutoCAD
Engineering	Autodesk Certified User (ACU)—AutoCAD
Mechanical Drafting	Autodesk Certified User (ACU)—Fusion 360 CAD
	Autodesk Certified User (ACU)—Inventor
	Certified SolidWorks Associate (CSWA)
Precision Machining	Certified SolidWorks Associate (CSWA)
	Computer Numerical Control (CNC) Operator Certificate
	Mastercam
	National Institute for Metalworking Skills (NIMS) Certifications
Welding Technologies	American Welding Society (AWS)—Certified Welder (GMAW)
	American Welding Society (AWS)—Certified Welder (GTAW)
	American Welding Society (AWS)—Certified Welder (SMAW)

Transportation and warehousing

CTE program	Industry certification
Air Transportation	Federal Aviation Administration (FAA)—Control Tower Operator
	Federal Aviation Administration (FAA)—Fundamentals of Instrumentation
	Federal Aviation Administration (FAA)—Ground Instruction Basic
	Federal Aviation Administration (FAA)—Ground School
	Federal Aviation Administration (FAA)—Instrument Pilot
	Federal Aviation Administration (FAA)—Private Pilot
Aircraft Mechanics	Federal Aviation Administration (FAA)—Airframe Mechanic
	Federal Aviation Administration (FAA)—Powerplant Mechanic
Automotive Collision Repair	Automotive Service Excellence (ASE)/Inter-Industry Conference on Auto Collision Repair (I-CAR)—Electrical
	Automotive Service Excellence (ASE)/Inter-Industry Conference on Auto Collision Repair (I-CAR)—Mechanical
	Automotive Service Excellence (ASE)/Inter-Industry Conference on Auto Collision Repair (I-CAR)—Non-Structural Repair
	Automotive Service Excellence (ASE)/Inter-Industry Conference on Auto Collision Repair (I-CAR)—Paint and Refinishing
	Automotive Service Excellence (ASE)/Inter-Industry Conference on Auto Collision Repair (I-CAR)—Structural Repair
	Inter-Industry Conference on Auto Collision Repair (I-CAR)—Platinum Series
Automotive Technologies	Automotive Service Excellence (ASE)—A1 Engine Repair
	Automotive Service Excellence (ASE)—A3 Manual Drive Train & Axles
	Automotive Service Excellence (ASE)—A4 Suspension & Steering
	Automotive Service Excellence (ASE)—A5 Brakes
	Automotive Service Excellence (ASE)—A6 Electrical/Electronic Systems
	Automotive Service Excellence (ASE)—A7 Heating & Air Conditioning
	Automotive Service Excellence (ASE)—A8 Engine Performance
	Automotive Service Excellence (ASE)—Automobile Service Technology
	Automotive Service Excellence (ASE)—G1 Maintenance and Light Repair
	National Coalition of Certification Centers (NC3)—Automotive Scanner Diagnostics
	National Coalition of Certification Centers (NC3)—Mechanical and Electrical Torque
	National Coalition of Certification Centers (NC3)—Multimeter
	National Coalition of Certification Centers (NC3)—Wheel Service and Alignment
Diesel Engine Repair	Automotive Service Excellence (ASE)—T2 Diesel Engines
	Automotive Service Excellence (ASE)—T3 Drive Train
	Automotive Service Excellence (ASE)—T4 Brakes
	Automotive Service Excellence (ASE)—T5 Suspension and Steering
	Automotive Service Excellence (ASE)—T6 Electrical/Electronic Systems
	Automotive Service Excellence (ASE)—T7 HVAC
	Automotive Service Excellence (ASE)—T8 Preventative Maintenance Inspection

Information technology

CTE program	Industry certification
Computer Maintenance	Computing Technology Industry Association (CompTIA)—A+
	Computing Technology Industry Association (CompTIA)—IT Fundamentals
	Computing Technology Industry Association (CompTIA)—Network+
	Computing Technology Industry Association (CompTIA)—Security+
Electronic Technologies	No certifications
Network Security	Cisco Certified Network Associate (CCNA) Routing and Switching Certification
	Computing Technology Industry Association (CompTIA)—A+
	Computing Technology Industry Association (CompTIA)—IT Fundamentals
	Computing Technology Industry Association (CompTIA)—Network+
	Computing Technology Industry Association (CompTIA)—Security+
Software and App Design	No certifications
Web Page Development ²	No certifications

² This program ended and was incorporated into the Software and App Design program for fiscal year 2021.

Source: Auditor General staff analysis of fiscal years 2019 and 2020 State-wide CTE programs and associated industry certifications identified by ADE; workforce and labor market data provided by the ACA and the OEO; and analysis of survey results of business, industry, and higher education leaders.



Central and satellite course enrollment in the 37 CTE programs designed to prepare students for jobs in high-demand technical fields by CTED

Table 4 of this appendix presents fiscal year 2019 student course enrollment in the 37 State CTE programs we identified as being designed to prepare students for jobs in high-demand technical fields for each of the 14 CTEDs and the 89 CTED member districts that had students enrolled in these programs in fiscal year 2019.^{33, 34} See Appendix C, pages c-1 through c-2, for our methodology for identifying the CTE programs that are designed to successfully prepare students for jobs in high-demand technical fields. See this report's Introduction, pages 1 through 5, for descriptions of and additional information about CTE programs, CTEDs, and CTED member districts.

Table 4
CTEDs' central and member districts' satellite course enrollment in the 37 CTE programs designed to prepare students for jobs in high-demand technical fields
Fiscal year 2019
 (Unaudited)

CAVIAT—Coconino Association for Vocations, Industry and Technology

CTE program	CTED central enrollment	CTED member districts' satellite enrollment ¹				
		Total satellite enrollment	Flagstaff USD	Fredonia-Moccasin USD	Page USD	Williams USD
Air Transportation	0	0	0	0	0	0
Aircraft Mechanics	0	0	0	0	0	0
Architectural Drafting	0	29	0	0	29	0
Automation and Robotics	0	0	0	0	0	0
Automotive Collision Repair	0	121	0	0	121	0
Automotive Technologies	0	361	220	19	87	35
Business Operations	0	0	0	0	0	0

³³ Because of the timing of this study, the most recent year for complete available data and other information was fiscal year 2019.

³⁴ CTE course-enrollment figures include a single student multiple times if that student was enrolled in multiple CTE courses during the year (e.g., Automotive Technologies and Welding Technologies). We used this CTE course-enrollment number for analysis in this report because a CTE student-enrollment number was not available from ADE.

CAVIAT—Coconino Association for Vocations, Industry and Technology (continued)

CTE program	CTED central enrollment	CTED member districts' satellite enrollment ¹				
		Total satellite enrollment	Flagstaff USD	Fredonia-Moccasin USD	Page USD	Williams USD
Cabinetmaking	0	38	38	0	0	0
Carpentry	0	0	0	0	0	0
Computer Maintenance	3	93	0	0	93	0
Construction Technologies	2	102	0	0	99	3
Dental Assisting	0	0	0	0	0	0
Diesel Engine Repair	0	0	0	0	0	0
Electrical and Power Transmission Installation	0	0	0	0	0	0
Electronic Technologies	0	0	0	0	0	0
Electronics Drafting	0	0	0	0	0	0
Emergency Medical Services	10	0	0	0	0	0
Engineering	11	234	234	0	0	0
Finance	0	0	0	0	0	0
Heating, Ventilation and Air Conditioning	0	0	0	0	0	0
Heavy Equipment Operations	0	0	0	0	0	0
Home Health Aide	0	107	0	0	107	0
Industrial Electrician	0	0	0	0	0	0
Laboratory Assisting	0	0	0	0	0	0
Marketing	0	0	0	0	0	0
Mechanical Drafting	0	0	0	0	0	0
Medical Assisting Services	2	0	0	0	0	0
Medical Records Technologies	0	0	0	0	0	0
Network Security	0	32	0	0	32	0
Nursing Services	7	0	0	0	0	0
Pharmacy Support Services	0	0	0	0	0	0
Precision Machining	0	45	45	0	0	0
Software and App Design	0	0	0	0	0	0
Sports Medicine and Rehabilitation	0	185	92	0	93	0
Veterinary Assisting	9	0	0	0	0	0
Web Page Development	0	0	0	0	0	0
Welding Technologies	0	341	214	12	89	26
Total enrollment	44	1,688	843	31	750	64

¹ The following CAVIAT member districts did not have any students enrolled in the 37 State CTE programs designed to prepare students for jobs in high-demand technical fields in fiscal year 2019: Grand Canyon USD.

CAVIT—Central Arizona Valley Institute of Technology

CTE program	CTED central enrollment	Total satellite enrollment	CTED member districts' satellite enrollment				
			Casa Grande UHSD	Coolidge USD	Florence USD	Maricopa USD	Santa Cruz Valley UHSD
Air Transportation	0	0	0	0	0	0	0
Aircraft Mechanics	0	0	0	0	0	0	0
Architectural Drafting	0	0	0	0	0	0	0
Automation and Robotics	0	0	0	0	0	0	0
Automotive Collision Repair	0	0	0	0	0	0	0
Automotive Technologies	0	169	75	0	0	94	0
Business Operations	0	22	0	0	22	0	0
Cabinetmaking	0	0	0	0	0	0	0
Carpentry	0	0	0	0	0	0	0
Computer Maintenance	0	110	0	0	0	110	0
Construction Technologies	0	143	137	0	0	0	6
Dental Assisting	86	0	0	0	0	0	0
Diesel Engine Repair	0	0	0	0	0	0	0
Electrical and Power Transmission Installation	0	0	0	0	0	0	0
Electronic Technologies	0	0	0	0	0	0	0
Electronics Drafting	0	0	0	0	0	0	0
Emergency Medical Services	0	0	0	0	0	0	0
Engineering	0	113	42	32	39	0	0
Finance	0	0	0	0	0	0	0
Heating, Ventilation and Air Conditioning	0	0	0	0	0	0	0
Heavy Equipment Operations	0	0	0	0	0	0	0
Home Health Aide	0	0	0	0	0	0	0
Industrial Electrician	0	0	0	0	0	0	0
Laboratory Assisting	0	0	0	0	0	0	0
Marketing	0	257	125	0	0	132	0
Mechanical Drafting	0	0	0	0	0	0	0
Medical Assisting Services	129	0	0	0	0	0	0
Medical Records Technologies	0	0	0	0	0	0	0
Network Security	0	45	0	0	23	22	0
Nursing Services	149	0	0	0	0	0	0
Pharmacy Support Services	0	0	0	0	0	0	0
Precision Machining	0	0	0	0	0	0	0
Software and App Design	0	0	0	0	0	0	0
Sports Medicine and Rehabilitation	0	92	0	22	61	9	0
Veterinary Assisting	102	0	0	0	0	0	0
Web Page Development	0	0	0	0	0	0	0
Welding Technologies	0	13	0	0	0	0	13
Total enrollment	466	964	379	54	145	367	19

CTD—Cochise Technology District

CTE program	CTED central enrollment	CTED member districts' satellite enrollment ²							
		Total satellite enrollment	Benson USD	Bisbee USD	Douglas USD	Sierra Vista USD	St. David USD	Tombstone USD	Willcox USD
Air Transportation	46	0	0	0	0	0	0	0	0
Aircraft Mechanics	0	0	0	0	0	0	0	0	0
Architectural Drafting	0	102	0	0	102	0	0	0	0
Automation and Robotics	0	0	0	0	0	0	0	0	0
Automotive Collision Repair	0	122	0	0	0	122	0	0	0
Automotive Technologies	0	314	0	0	182	81	0	0	51
Business Operations	0	23	0	0	0	0	23	0	0
Cabinetmaking	0	20	0	0	0	0	0	20	0
Carpentry	0	119	0	0	0	0	0	0	119
Computer Maintenance	0	0	0	0	0	0	0	0	0
Construction Technologies	0	147	97	50	0	0	0	0	0
Dental Assisting	0	0	0	0	0	0	0	0	0
Diesel Engine Repair	0	0	0	0	0	0	0	0	0
Electrical and Power Transmission Installation	0	0	0	0	0	0	0	0	0
Electronic Technologies	0	0	0	0	0	0	0	0	0
Electronics Drafting	0	0	0	0	0	0	0	0	0
Emergency Medical Services	0	72	0	0	0	72	0	0	0
Engineering	0	100	0	0	30	70	0	0	0
Finance	0	130	0	0	130	0	0	0	0
Heating, Ventilation and Air Conditioning	1	0	0	0	0	0	0	0	0
Heavy Equipment Operations	0	0	0	0	0	0	0	0	0
Home Health Aide	14	6	0	0	0	6	0	0	0
Industrial Electrician	0	0	0	0	0	0	0	0	0
Laboratory Assisting	0	0	0	0	0	0	0	0	0
Marketing	0	274	0	0	247	27	0	0	0
Mechanical Drafting	0	0	0	0	0	0	0	0	0
Medical Assisting Services	0	0	0	0	0	0	0	0	0
Medical Records Technologies	0	0	0	0	0	0	0	0	0
Network Security	9	98	0	0	98	0	0	0	0
Nursing Services	109	136	25	29	0	64	15	3	0
Pharmacy Support Services	0	0	0	0	0	0	0	0	0
Precision Machining	0	0	0	0	0	0	0	0	0
Software and App Design	0	0	0	0	0	0	0	0	0
Sports Medicine and Rehabilitation	0	222	0	0	81	141	0	0	0
Veterinary Assisting	0	0	0	0	0	0	0	0	0
Web Page Development	0	0	0	0	0	0	0	0	0
Welding Technologies	9	51	51	0	0	0	0	0	0
Total enrollment	188	1,936	173	79	870	583	38	23	170

² The following CTD member districts did not have any students enrolled in the 37 State CTE programs designed to prepare students for jobs in high-demand technical fields in fiscal year 2019: Bowie USD, San Simon USD, and Valley UHSD.

CVIT—Cobre Valley Institute of Technology

CTE program	CTED central enrollment	CTED member districts' satellite enrollment ³				
		Total satellite enrollment	Globe USD	Hayden-Winkelman USD	Miami USD	San Carlos USD
Air Transportation	0	0	0	0	0	0
Aircraft Mechanics	0	0	0	0	0	0
Architectural Drafting	0	0	0	0	0	0
Automation and Robotics	0	41	17	0	0	24
Automotive Collision Repair	0	0	0	0	0	0
Automotive Technologies	0	0	0	0	0	0
Business Operations	0	8	0	8	0	0
Cabinetmaking	0	0	0	0	0	0
Carpentry	0	0	0	0	0	0
Computer Maintenance	0	0	0	0	0	0
Construction Technologies	0	19	0	0	19	0
Dental Assisting	22	11	11	0	0	0
Diesel Engine Repair	0	0	0	0	0	0
Electrical and Power Transmission Installation	0	0	0	0	0	0
Electronic Technologies	0	0	0	0	0	0
Electronics Drafting	0	0	0	0	0	0
Emergency Medical Services	0	0	0	0	0	0
Engineering	0	0	0	0	0	0
Finance	0	0	0	0	0	0
Heating, Ventilation and Air Conditioning	0	0	0	0	0	0
Heavy Equipment Operations	0	0	0	0	0	0
Home Health Aide	0	0	0	0	0	0
Industrial Electrician	0	0	0	0	0	0
Laboratory Assisting	0	0	0	0	0	0
Marketing	0	0	0	0	0	0
Mechanical Drafting	0	0	0	0	0	0
Medical Assisting Services	45	0	0	0	0	0
Medical Records Technologies	0	0	0	0	0	0
Network Security	0	0	0	0	0	0
Nursing Services	17	0	0	0	0	0
Pharmacy Support Services	0	0	0	0	0	0
Precision Machining	0	0	0	0	0	0
Software and App Design	0	83	0	0	83	0
Sports Medicine and Rehabilitation	0	50	50	0	0	0
Veterinary Assisting	0	0	0	0	0	0
Web Page Development	0	0	0	0	0	0
Welding Technologies	30	12	12	0	0	0
Total enrollment	114	224	90	8	102	24

³ The following CVIT member districts did not have any students enrolled in the 37 State CTE programs designed to prepare students for jobs in high-demand technical fields in fiscal year 2019: Ray USD and Superior USD.

EVIT—East Valley Institute of Technology

CTE program	CTED central enrollment	CTED member districts' satellite enrollment ⁴								
		Total satellite enrollment	Chandler USD	Gilbert USD	Higley USD	J.O. Combs USD	Mesa USD	Queen Creek USD	Scottsdale USD	Tempe UHSD
Air Transportation	120	0	0	0	0	0	0	0	0	0
Aircraft Mechanics	0	0	0	0	0	0	0	0	0	0
Architectural Drafting	0	173	65	0	0	0	108	0	0	0
Automation and Robotics	0	0	0	0	0	0	0	0	0	0
Automotive Collision Repair	11	0	0	0	0	0	0	0	0	0
Automotive Technologies	137	1,483	152	228	0	0	937	0	0	166
Business Operations	0	1,195	0	415	0	0	75	0	0	705
Cabinetmaking	0	579	226	213	0	0	140	0	0	0
Carpentry	0	137	0	0	0	0	0	137	0	0
Computer Maintenance	26	240	0	29	0	0	211	0	0	0
Construction Technologies	71	207	0	0	0	0	0	0	0	207
Dental Assisting	154	0	0	0	0	0	0	0	0	0
Diesel Engine Repair	64	0	0	0	0	0	0	0	0	0
Electrical and Power Transmission Installation	0	0	0	0	0	0	0	0	0	0
Electronic Technologies	0	0	0	0	0	0	0	0	0	0
Electronics Drafting	0	0	0	0	0	0	0	0	0	0
Emergency Medical Services	145	0	0	0	0	0	0	0	0	0
Engineering	44	2,580	252	246	250	0	657	66	183	926
Finance	16	335	0	0	0	0	0	0	335	0
Heating, Ventilation and Air Conditioning	25	0	0	0	0	0	0	0	0	0
Heavy Equipment Operations	0	0	0	0	0	0	0	0	0	0
Home Health Aide	5	0	0	0	0	0	0	0	0	0
Industrial Electrician	0	0	0	0	0	0	0	0	0	0
Laboratory Assisting	0	0	0	0	0	0	0	0	0	0
Marketing	0	2,362	626	278	294	0	446	95	128	495
Mechanical Drafting	0	0	0	0	0	0	0	0	0	0
Medical Assisting Services	445	0	0	0	0	0	0	0	0	0
Medical Records Technologies	0	0	0	0	0	0	0	0	0	0
Network Security	61	0	0	0	0	0	0	0	0	0
Nursing Services	323	422	191	0	0	74	0	91	66	0
Pharmacy Support Services	63	0	0	0	0	0	0	0	0	0
Precision Machining	17	26	0	0	0	0	26	0	0	0
Software and App Design	52	1,698	531	489	45	37	294	0	100	202
Sports Medicine and Rehabilitation	0	2,757	803	367	323	72	459	171	377	185
Veterinary Assisting	273	0	0	0	0	0	0	0	0	0
Web Page Development	0	0	0	0	0	0	0	0	0	0
Welding Technologies	187	775	0	0	0	0	775	0	0	0
Total enrollment	2,239	14,969	2,846	2,265	912	183	4,128	560	1,189	2,886

⁴ The following EVIT member districts did not have any students enrolled in the 37 State CTE programs designed to prepare students for jobs in high-demand technical fields in fiscal year 2019: Apache Junction USD, Cave Creek USD, and Fountain Hills USD.

GIFT—Gila Institute for Technology

CTE program	CTED central enrollment	CTED member districts' satellite enrollment						
		Total satellite enrollment	Duncan USD	Ft. Thomas USD	Morenci USD	Pima USD	Safford USD	Thatcher USD
Air Transportation	0	0	0	0	0	0	0	0
Aircraft Mechanics	0	0	0	0	0	0	0	0
Architectural Drafting	0	0	0	0	0	0	0	0
Automation and Robotics	0	0	0	0	0	0	0	0
Automotive Collision Repair	0	0	0	0	0	0	0	0
Automotive Technologies	12	163	0	40	0	0	123	0
Business Operations	0	217	0	0	0	97	120	0
Cabinetmaking	0	169	44	0	6	81	0	38
Carpentry	0	80	0	48	0	0	0	32
Computer Maintenance	0	0	0	0	0	0	0	0
Construction Technologies	0	14	0	0	0	14	0	0
Dental Assisting	0	0	0	0	0	0	0	0
Diesel Engine Repair	0	0	0	0	0	0	0	0
Electrical and Power Transmission Installation	0	0	0	0	0	0	0	0
Electronic Technologies	0	0	0	0	0	0	0	0
Electronics Drafting	0	0	0	0	0	0	0	0
Emergency Medical Services	0	0	0	0	0	0	0	0
Engineering	0	0	0	0	0	0	0	0
Finance	0	0	0	0	0	0	0	0
Heating, Ventilation and Air Conditioning	0	0	0	0	0	0	0	0
Heavy Equipment Operations	0	0	0	0	0	0	0	0
Home Health Aide	0	0	0	0	0	0	0	0
Industrial Electrician	19	0	0	0	0	0	0	0
Laboratory Assisting	1	0	0	0	0	0	0	0
Marketing	0	12	12	0	0	0	0	0
Mechanical Drafting	39	4	0	0	4	0	0	0
Medical Assisting Services	1	0	0	0	0	0	0	0
Medical Records Technologies	0	0	0	0	0	0	0	0
Network Security	0	0	0	0	0	0	0	0
Nursing Services	76	0	0	0	0	0	0	0
Pharmacy Support Services	6	0	0	0	0	0	0	0
Precision Machining	0	0	0	0	0	0	0	0
Software and App Design	0	0	0	0	0	0	0	0
Sports Medicine and Rehabilitation	30	0	0	0	0	0	0	0
Veterinary Assisting	0	0	0	0	0	0	0	0
Web Page Development	0	0	0	0	0	0	0	0
Welding Technologies	28	87	0	0	30	57	0	0
Total enrollment	212	746	56	88	40	249	243	70

MICTED—Mountain Institute CTED

CTE program	CTED central enrollment	CTED member districts' satellite enrollment ⁵					Total enrollment
		Total satellite enrollment	Ash Fork Joint USD	Bagdad USD	Chino Valley USD	Humboldt USD	
Air Transportation	0	0	0	0	0	0	0
Aircraft Mechanics	0	0	0	0	0	0	0
Architectural Drafting	0	55	0	0	55	0	0
Automation and Robotics	0	0	0	0	0	0	0
Automotive Collision Repair	24	0	0	0	0	0	0
Automotive Technologies	79	77	0	0	0	0	77
Business Operations	0	0	0	0	0	0	0
Cabinetmaking	0	0	0	0	0	0	0
Carpentry	0	0	0	0	0	0	0
Computer Maintenance	0	0	0	0	0	0	0
Construction Technologies	0	16	0	16	0	0	0
Dental Assisting	0	0	0	0	0	0	0
Diesel Engine Repair	0	0	0	0	0	0	0
Electrical and Power Transmission Installation	0	0	0	0	0	0	0
Electronic Technologies	0	0	0	0	0	0	0
Electronics Drafting	0	0	0	0	0	0	0
Emergency Medical Services	0	0	0	0	0	0	0
Engineering	0	0	0	0	0	0	0
Finance	0	0	0	0	0	0	0
Heating, Ventilation and Air Conditioning	0	0	0	0	0	0	0
Heavy Equipment Operations	0	0	0	0	0	0	0
Home Health Aide	0	0	0	0	0	0	0
Industrial Electrician	0	4	0	4	0	0	0
Laboratory Assisting	0	0	0	0	0	0	0
Marketing	0	142	0	0	0	142	0
Mechanical Drafting	0	0	0	0	0	0	0
Medical Assisting Services	51	0	0	0	0	0	0
Medical Records Technologies	0	0	0	0	0	0	0
Network Security	0	362	0	0	0	362	0
Nursing Services	18	28	0	0	0	28	0
Pharmacy Support Services	0	0	0	0	0	0	0
Precision Machining	0	0	0	0	0	0	0
Software and App Design	0	0	0	0	0	0	0
Sports Medicine and Rehabilitation	0	124	0	0	39	85	0
Veterinary Assisting	0	0	0	0	0	0	0
Web Page Development	0	0	0	0	0	0	0
Welding Technologies	70	54	33	21	0	0	0
Total enrollment	242	862	33	41	94	617	77

⁵ The following MICTED member districts did not have any students enrolled in the 37 State CTE programs designed to prepare students for jobs in high-demand technical fields in fiscal year 2019: Mayer USD and Seligman USD.

NATIVE—Northeast Arizona Technological Institute of Vocational Education

CTE program	CTED central enrollment	CTED member districts' satellite enrollment								
		Total satellite enrollment	Chinle USD	Ganado USD	Kayenta USD	Pinon USD	Red Mesa USD	Sanders USD	Tuba City USD	Window Rock USD
Air Transportation	0	0	0	0	0	0	0	0	0	0
Aircraft Mechanics	0	0	0	0	0	0	0	0	0	0
Architectural Drafting	0	62	33	24	0	0	0	0	5	0
Automation and Robotics	0	0	0	0	0	0	0	0	0	0
Automotive Collision Repair	0	0	0	0	0	0	0	0	0	0
Automotive Technologies	0	140	58	0	0	15	0	0	45	22
Business Operations	0	0	0	0	0	0	0	0	0	0
Cabinetmaking	0	0	0	0	0	0	0	0	0	0
Carpentry	0	22	0	0	0	0	0	22	0	0
Computer Maintenance	0	0	0	0	0	0	0	0	0	0
Construction Technologies	0	337	62	36	52	46	71	0	52	18
Dental Assisting	0	0	0	0	0	0	0	0	0	0
Diesel Engine Repair	0	0	0	0	0	0	0	0	0	0
Electrical and Power Transmission Installation	0	0	0	0	0	0	0	0	0	0
Electronic Technologies	0	54	54	0	0	0	0	0	0	0
Electronics Drafting	0	0	0	0	0	0	0	0	0	0
Emergency Medical Services	0	0	0	0	0	0	0	0	0	0
Engineering	0	0	0	0	0	0	0	0	0	0
Finance	0	0	0	0	0	0	0	0	0	0
Heating, Ventilation and Air Conditioning	0	0	0	0	0	0	0	0	0	0
Heavy Equipment Operations	0	39	39	0	0	0	0	0	0	0
Home Health Aide	105	172	52	43	0	0	0	17	0	60
Industrial Electrician	0	0	0	0	0	0	0	0	0	0
Laboratory Assisting	0	0	0	0	0	0	0	0	0	0
Marketing	0	135	0	0	35	0	47	0	0	53
Mechanical Drafting	0	0	0	0	0	0	0	0	0	0
Medical Assisting Services	0	0	0	0	0	0	0	0	0	0
Medical Records Technologies	0	0	0	0	0	0	0	0	0	0
Network Security	0	0	0	0	0	0	0	0	0	0
Nursing Services	0	0	0	0	0	0	0	0	0	0
Pharmacy Support Services	0	0	0	0	0	0	0	0	0	0
Precision Machining	0	0	0	0	0	0	0	0	0	0
Software and App Design	0	0	0	0	0	0	0	0	0	0
Sports Medicine and Rehabilitation	0	0	0	0	0	0	0	0	0	0
Veterinary Assisting	0	0	0	0	0	0	0	0	0	0
Web Page Development	0	0	0	0	0	0	0	0	0	0
Welding Technologies	0	491	69	49	65	34	55	102	58	59
Total enrollment	105	1,452	367	152	152	95	173	141	160	212

NAVIT—Northern Arizona Vocational Institute of Technology

CTE program	CTED central enrollment	Total satellite enrollment	CTED member districts' satellite enrollment										
			Blue Ridge USD	Heber-Overgaard USD	Holbrook USD	Joseph City USD	Payson USD	Round Valley USD	Show Low USD	Snowflake USD	St. Johns USD	Whiteriver USD	Winslow USD
Air Transportation	0	0	0	0	0	0	0	0	0	0	0	0	0
Aircraft Mechanics	0	0	0	0	0	0	0	0	0	0	0	0	0
Architectural Drafting	0	32	0	0	0	0	0	0	0	0	0	0	32
Automation and Robotics	4	43	36	0	7	0	0	0	0	0	0	0	0
Automotive Collision Repair	0	86	0	0	86	0	0	0	0	0	0	0	0
Automotive Technologies	34	287	49	0	0	0	88	49	0	0	31	70	0
Business Operations	0	69	69	0	0	0	0	0	0	0	0	0	0
Cabinetmaking	0	67	36	0	0	0	0	31	0	0	0	0	0
Carpentry	0	8	0	0	0	8	0	0	0	0	0	0	0
Computer Maintenance	0	0	0	0	0	0	0	0	0	0	0	0	0
Construction Technologies	10	450	0	24	66	6	87	0	83	80	0	62	42
Dental Assisting	0	0	0	0	0	0	0	0	0	0	0	0	0
Diesel Engine Repair	0	0	0	0	0	0	0	0	0	0	0	0	0
Electrical and Power Transmission Installation	0	0	0	0	0	0	0	0	0	0	0	0	0
Electronic Technologies	0	0	0	0	0	0	0	0	0	0	0	0	0
Electronics Drafting	0	0	0	0	0	0	0	0	0	0	0	0	0
Emergency Medical Services	0	0	0	0	0	0	0	0	0	0	0	0	0
Engineering	0	0	0	0	0	0	0	0	0	0	0	0	0
Finance	0	35	0	0	0	0	0	0	0	0	0	0	35
Heating, Ventilation and Air Conditioning	0	0	0	0	0	0	0	0	0	0	0	0	0
Heavy Equipment Operations	0	0	0	0	0	0	0	0	0	0	0	0	0
Home Health Aide	0	0	0	0	0	0	0	0	0	0	0	0	0
Industrial Electrician	9	0	0	0	0	0	0	0	0	0	0	0	0
Laboratory Assisting	0	0	0	0	0	0	0	0	0	0	0	0	0
Marketing	0	118	0	0	0	0	118	0	0	0	0	0	0
Mechanical Drafting	0	69	0	0	69	0	0	0	0	0	0	0	0
Medical Assisting Services	54	0	0	0	0	0	0	0	0	0	0	0	0
Medical Records Technologies	0	0	0	0	0	0	0	0	0	0	0	0	0
Network Security	0	146	0	0	0	0	89	0	0	57	0	0	0
Nursing Services	34	0	0	0	0	0	0	0	0	0	0	0	0
Pharmacy Support Services	0	0	0	0	0	0	0	0	0	0	0	0	0
Precision Machining	0	0	0	0	0	0	0	0	0	0	0	0	0
Software and App Design	0	0	0	0	0	0	0	0	0	0	0	0	0
Sports Medicine and Rehabilitation	0	121	27	0	0	0	0	0	0	0	0	0	94
Veterinary Assisting	0	0	0	0	0	0	0	0	0	0	0	0	0
Web Page Development	0	0	0	0	0	0	0	0	0	0	0	0	0
Welding Technologies	97	188	0	0	97	30	0	27	0	0	34	0	0
Total enrollment	242	1,719	217	24	325	44	382	107	83	137	65	132	203

Pima County JTED

CTE program	CTED member districts' satellite enrollment ⁶													
	CTED central enrollment	Total satellite enrollment	Amphitheater USD	Catalina Foothills USD	Flowing Wells USD	Mammoth-San Manuel USD	Marana USD	Nogales USD	Sahuarita USD	Santa Cruz Valley USD	Sunnyside USD	Tanque Verde USD	Tucson USD	Vail USD
Air Transportation	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aircraft Mechanics	44	0	0	0	0	0	0	0	0	0	0	0	0	0
Architectural Drafting	0	66	33	0	0	0	33	0	0	0	0	0	0	0
Automation and Robotics	0	32	0	0	0	0	32	0	0	0	0	0	0	0
Automotive Collision Repair	0	337	0	0	0	0	0	0	0	0	167	0	170	0
Automotive Technologies	49	1,894	126	0	107	18	481	110	124	0	111	0	709	108
Business Operations	28	479	0	0	0	0	0	0	0	61	86	0	332	0
Cabinetmaking	0	101	0	0	0	10	0	91	0	0	0	0	0	0
Carpentry	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Computer Maintenance	0	77	0	0	0	0	0	50	0	27	0	0	0	0
Construction Technologies	71	399	52	0	0	32	0	0	75	0	0	0	143	97
Dental Assisting	0	30	0	0	0	0	30	0	0	0	0	0	0	0
Diesel Engine Repair	0	109	109	0	0	0	0	0	0	0	0	0	0	0
Electrical and Power Transmission Installation	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electronic Technologies	0	222	46	0	0	0	0	0	0	0	0	0	176	0
Electronics Drafting	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Emergency Medical Services	47	211	0	0	0	0	59	0	0	0	152	0	0	0
Engineering	0	853	116	112	3	0	104	0	69	84	49	0	137	179
Finance	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heating Ventilation and Air Conditioning	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heavy Equipment Operations	31	0	0	0	0	0	0	0	0	0	0	0	0	0
Home Health Aide	0	93	0	0	0	0	0	0	0	0	0	0	93	0
Industrial Electrician	12	0	0	0	0	0	0	0	0	0	0	0	0	0
Laboratory Assisting	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marketing	0	277	0	0	0	0	123	0	0	0	49	38	39	28
Mechanical Drafting	0	305	0	0	0	0	0	0	0	0	160	15	130	0
Medical Assisting Services	42	212	0	0	0	0	0	0	0	0	0	0	0	212
Medical Records Technologies	13	0	0	0	0	0	0	0	0	0	0	0	0	0
Network Security	26	69	0	0	0	0	0	68	0	0	0	0	1	0
Nursing Services	363	51	0	0	0	0	0	20	0	31	0	0	0	0
Pharmacy Support Services	0	66	0	0	0	0	0	0	0	0	0	0	66	0
Precision Machining	69	263	0	0	0	0	0	0	0	0	130	0	133	0
Software and App Design	0	1,024	319	0	25	0	173	0	29	0	103	11	319	45
Sports Medicine and Rehabilitation	0	1,974	327	142	54	0	367	0	117	155	185	29	429	169
Veterinary Assisting	99	33	0	0	0	0	0	0	0	0	0	0	0	33
Web Page Development	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Welding Technologies	0	604	21	0	0	27	283	0	0	0	0	0	243	30
Total enrollment	894	9,781	1,149	254	189	87	1,685	339	414	358	1,192	93	3,120	901

⁶ The following Pima County JTED member districts did not have any students enrolled in the 37 State CTE programs designed to prepare students for jobs in high-demand technical fields in fiscal year 2019: Ajo USD and Baboquivari USD.

STEDY—Southwest Technical Education District of Yuma

CTE program	CTED central enrollment	CTED member districts' satellite enrollment		
		Total satellite enrollment	Antelope UHSD	Yuma UHSD
Air Transportation	0	0	0	0
Aircraft Mechanics	0	0	0	0
Architectural Drafting	0	0	0	0
Automation and Robotics	0	0	0	0
Automotive Collision Repair	0	0	0	0
Automotive Technologies	0	367	10	357
Business Operations	0	119	0	119
Cabinetmaking	0	0	0	0
Carpentry	0	0	0	0
Computer Maintenance	0	130	0	130
Construction Technologies	0	346	12	334
Dental Assisting	0	0	0	0
Diesel Engine Repair	0	0	0	0
Electrical and Power Transmission Installation	0	0	0	0
Electronic Technologies	2	0	0	0
Electronics Drafting	0	0	0	0
Emergency Medical Services	0	151	0	151
Engineering	0	279	0	279
Finance	0	0	0	0
Heating, Ventilation and Air Conditioning	3	0	0	0
Heavy Equipment Operations	0	0	0	0
Home Health Aide	0	67	0	67
Industrial Electrician	0	0	0	0
Laboratory Assisting	0	0	0	0
Marketing	0	0	0	0
Mechanical Drafting	0	0	0	0
Medical Assisting Services	37	109	0	109
Medical Records Technologies	0	0	0	0
Network Security	0	0	0	0
Nursing Services	0	344	0	344
Pharmacy Support Services	0	0	0	0
Precision Machining	0	0	0	0
Software and App Design	12	0	0	0
Sports Medicine and Rehabilitation	0	692	0	692
Veterinary Assisting	0	0	0	0
Web Page Development	0	0	0	0
Welding Technologies	0	486	0	486
Total enrollment	54	3,090	22	3,068

VACTE—Valley Academy for Career and Technology Education

CTE program	CTED central enrollment	CTED member districts' satellite enrollment			
		Total satellite enrollment	Camp Verde USD	Mingus UHSD	Sedona-Oak Creek Joint USD
Air Transportation	0	0	0	0	0
Aircraft Mechanics	0	0	0	0	0
Architectural Drafting	0	0	0	0	0
Automation and Robotics	0	0	0	0	0
Automotive Collision Repair	0	0	0	0	0
Automotive Technologies	0	175	60	115	0
Business Operations	0	41	0	41	0
Cabinetmaking	0	44	44	0	0
Carpentry	0	0	0	0	0
Computer Maintenance	0	0	0	0	0
Construction Technologies	11	0	0	0	0
Dental Assisting	0	0	0	0	0
Diesel Engine Repair	0	0	0	0	0
Electrical and Power Transmission Installation	0	0	0	0	0
Electronic Technologies	0	0	0	0	0
Electronics Drafting	0	0	0	0	0
Emergency Medical Services	0	0	0	0	0
Engineering	0	24	0	24	0
Finance	0	0	0	0	0
Heating, Ventilation and Air Conditioning	0	0	0	0	0
Heavy Equipment Operations	0	0	0	0	0
Home Health Aide	0	0	0	0	0
Industrial Electrician	0	0	0	0	0
Laboratory Assisting	13	0	0	0	0
Marketing	0	0	0	0	0
Mechanical Drafting	0	49	10	39	0
Medical Assisting Services	16	0	0	0	0
Medical Records Technologies	0	0	0	0	0
Network Security	0	0	0	0	0
Nursing Services	10	0	0	0	0
Pharmacy Support Services	0	0	0	0	0
Precision Machining	0	0	0	0	0
Software and App Design	0	0	0	0	0
Sports Medicine and Rehabilitation	0	247	66	128	53
Veterinary Assisting	0	0	0	0	0
Web Page Development	0	0	0	0	0
Welding Technologies	0	96	0	96	0
Total enrollment	50	676	180	443	53

WAVE—Western Arizona Vocational Education District

CTE program	CTED member districts' satellite enrollment					
	CTED central enrollment	Total satellite enrollment	CTED member districts' satellite enrollment			
			Colorado River UHSD	Kingman USD	Lake Havasu USD	Parker USD
Air Transportation	0	0	0	0	0	0
Aircraft Mechanics	0	0	0	0	0	0
Architectural Drafting	0	54	0	54	0	0
Automation and Robotics	0	0	0	0	0	0
Automotive Collision Repair	15	0	0	0	0	0
Automotive Technologies	15	199	0	65	87	47
Business Operations	0	64	64	0	0	0
Cabinetmaking	0	181	0	85	96	0
Carpentry	0	134	134	0	0	0
Computer Maintenance	0	0	0	0	0	0
Construction Technologies	0	0	0	0	0	0
Dental Assisting	0	0	0	0	0	0
Diesel Engine Repair	0	0	0	0	0	0
Electrical and Power Transmission Installation	0	0	0	0	0	0
Electronic Technologies	0	0	0	0	0	0
Electronics Drafting	0	0	0	0	0	0
Emergency Medical Services	0	0	0	0	0	0
Engineering	0	28	0	0	28	0
Finance	0	0	0	0	0	0
Heating, Ventilation and Air Conditioning	4	0	0	0	0	0
Heavy Equipment Operations	0	0	0	0	0	0
Home Health Aide	0	0	0	0	0	0
Industrial Electrician	0	0	0	0	0	0
Laboratory Assisting	0	0	0	0	0	0
Marketing	0	36	0	0	36	0
Mechanical Drafting	0	10	0	10	0	0
Medical Assisting Services	17	19	19	0	0	0
Medical Records Technologies	0	0	0	0	0	0
Network Security	11	0	0	0	0	0
Nursing Services	50	470	130	183	157	0
Pharmacy Support Services	0	0	0	0	0	0
Precision Machining	0	0	0	0	0	0
Software and App Design	17	188	73	0	115	0
Sports Medicine and Rehabilitation	10	335	96	224	15	0
Veterinary Assisting	0	0	0	0	0	0
Web Page Development	0	0	0	0	0	0
Welding Technologies	56	93	66	0	0	27
Total enrollment	195	1,811	582	621	534	74

West-MEC—Western Maricopa Education Center

CTE program	CTED member districts' satellite enrollment											
	CTED central enrollment	Total satellite enrollment										
			Agua Fria UHSD	Buckeye UHSD	Deer Valley USD	Dysart USD	Glendale UHSD	Paradise Valley USD	Peoria USD	Saddle Mountain USD	Tolleson UHSD	Wickenburg USD
Air Transportation	0	0	0	0	0	0	0	0	0	0	0	0
Aircraft Mechanics	62	0	0	0	0	0	0	0	0	0	0	0
Architectural Drafting	0	503	0	101	47	149	206	0	0	0	0	0
Automation and Robotics	0	0	0	0	0	0	0	0	0	0	0	0
Automotive Collision Repair	18	0	0	0	0	0	0	0	0	0	0	0
Automotive Technologies	95	966	0	86	0	156	0	188	400	0	136	0
Business Operations	0	603	0	0	43	0	178	0	0	0	382	0
Cabinetmaking	0	472	0	89	0	0	182	201	0	0	0	0
Carpentry	0	0	0	0	0	0	0	0	0	0	0	0
Computer Maintenance	0	96	0	0	0	53	0	43	0	0	0	0
Construction Technologies	31	668	127	0	0	0	0	0	388	72	0	81
Dental Assisting	128	0	0	0	0	0	0	0	0	0	0	0
Diesel Engine Repair	33	0	0	0	0	0	0	0	0	0	0	0
Electrical and Power Transmission Installation	35	0	0	0	0	0	0	0	0	0	0	0
Electronic Technologies	34	0	0	0	0	0	0	0	0	0	0	0
Electronics Drafting	0	0	0	0	0	0	0	0	0	0	0	0
Emergency Medical Services	26	0	0	0	0	0	0	0	0	0	0	0
Engineering	0	2,732	352	0	397	290	605	305	635	0	119	29
Finance	0	437	0	0	159	0	0	0	106	0	172	0
Heating, Ventilation and Air Conditioning	16	0	0	0	0	0	0	0	0	0	0	0
Heavy Equipment Operations	0	0	0	0	0	0	0	0	0	0	0	0
Home Health Aide	0	0	0	0	0	0	0	0	0	0	0	0
Industrial Electrician	0	0	0	0	0	0	0	0	0	0	0	0
Laboratory Assisting	0	98	0	0	0	98	0	0	0	0	0	0
Marketing	0	4,163	592	0	382	575	1,370	383	484	0	377	0
Mechanical Drafting	0	37	0	0	0	0	37	0	0	0	0	0
Medical Assisting Services	325	1,164	0	31	0	0	0	0	528	0	605	0
Medical Records Technologies	0	0	0	0	0	0	0	0	0	0	0	0
Network Security	89	93	0	0	0	62	31	0	0	0	0	0
Nursing Services	0	451	0	0	101	0	209	66	75	0	0	0
Pharmacy Support Services	90	0	0	0	0	0	0	0	0	0	0	0
Precision Machining	25	90	0	69	0	0	0	21	0	0	0	0
Software and App Design	104	2,565	156	64	442	188	757	51	433	32	442	0
Sports Medicine and Rehabilitation	0	4,030	857	235	481	1,238	0	0	671	0	548	0
Veterinary Assisting	241	0	0	0	0	0	0	0	0	0	0	0
Web Page Development	0	0	0	0	0	0	0	0	0	0	0	0
Welding Technologies	65	497	0	70	0	0	96	153	66	0	112	0
Total enrollment	1,417	19,665	2,084	745	2,052	2,809	3,671	1,411	3,786	104	2,893	110

Source: Auditor General staff analysis of fiscal year 2019 district-reported CTE course-enrollment data.



Objectives, scope, and methodology

The Arizona Auditor General has conducted this special study of CTEDs pursuant to Laws 2019, Ch. 263, §160(A) (2), and under the authority vested in the Auditor General by A.R.S. §41-1279.03. Specifically, the legislation directed us to:

- Collaborate with the ACA and business, industry, and higher education leaders to identify, on or before January 1, 2020, the industry certifications earned by CTE students that are most associated with multiyear CTE programs that successfully prepare students for jobs in high-demand technical fields.
- Evaluate the effectiveness of CTEDs in preparing students for jobs in high-demand technical fields.

To fulfill these requirements, we scoped our work to include only the CTE programs that were designed to prepare students for jobs in high-demand technical fields. We used various methods to meet our objectives, including the following specific methods:

- To identify Arizona's jobs in high-demand technical fields and the CTE programs that are designed to prepare students for those jobs, we collaborated with the ACA and the OEO and used workforce and labor market data provided by the OEO to identify high-demand, high-skill, and high-wage occupations in Arizona and the CTE programs that are designed to prepare students for those jobs (see textbox for information regarding these 2 agencies).³⁵ These occupations were aligned with State CTE programs and the 7 in-demand industries identified by Arizona's State-wide workforce development network, known as ARIZONA@WORK, for the State's 2020-2024 Unified Workforce Development Plan.³⁶ Our study included CTE programs such as Emergency Medical Services, Electrical and Power Transmission Installation, and Construction Technologies. We limited the scope of our study by excluding CTE programs that are designed to prepare students for relatively low-demand, low-skill, or low-wage jobs based on the workforce and labor market data provided by the OEO. This excluded CTE programs such as Stagecraft, Therapeutic Massage, and Cosmetology and Related Services. Among the 69 ADE-approved, State-wide CTE programs for fiscal year 2019, we identified 37 CTE programs that are designed to prepare students for jobs in high-demand technical fields. See Table 3 in Appendix A (pages a-1 through a-6) for a list of these 37 CTE programs and the in-demand industries with which they are aligned.

Arizona Commerce Authority—Overseen by a public-private sector board chaired by the Governor and provides leadership in growing and diversifying Arizona's economy.

Office of Economic Opportunity—Coordinates Arizona's workforce planning, provides economic and labor market data and projections for developing Arizona's workforce strategy, and provides analytical support to the ACA.

³⁵ We did not include occupations requiring a minimum education level of a bachelor's degree or higher in our study because, according to State statute, the purpose of Arizona's high school CTE programs is to prepare students for high-need occupations that normally do not require a baccalaureate or advanced degree.

³⁶ The in-demand industries were identified using workforce and labor market data and in consultation with the Workforce Arizona Council, Arizona Chamber of Commerce, Arizona Department of Economic Security, ACA, OEO, and ADE's Career and Technical and Adult Education Divisions.

- To identify the industry certifications earned by CTE students that successfully prepare students for jobs in high-demand technical fields, we reviewed the 245 certifications that ADE identified for fiscal years 2019 and 2020 for the 37 CTE programs (see previous bullet for how we identified these 37 CTE programs). Because statute requires CTEDs and member districts to partner with business and industry, we requested the CTEDs and a sample of the larger member districts provide us their business and industry partners' contact information.³⁷ We also requested they provide us contact information for their higher education partners. Using the CTEDs' and member districts' contacts, we surveyed 993 business and industry leaders from across the State as well as 207 higher education leaders, to have them identify the industry certifications they believe successfully prepare students for the high-demand technical jobs we identified. We received a total of 182 survey responses that met our data integrity criteria. Based on the 182 survey responses, 88 of 245 certifications were rated moderately or very effective at successfully preparing students for entry-level jobs in high-demand technical fields. See Appendix A (pages a-1 through a-6) for a list of these certifications and the CTE programs with which they are associated.
- To identify measures of effectiveness in preparing students for jobs in high-demand technical fields, we gathered background information to better understand CTE program and reporting requirements and reviewed applicable federal and State laws, including the federal Carl D. Perkins Career and Technical Education Act of 2006 (known as Perkins IV), the federal Strengthening Career and Technical Education for the 21st Century Act of 2018 (known as Perkins V), and A.R.S. §§15-391 through 397 and §§15-781 through 791. Further, we reviewed literature related to evaluating CTE program effectiveness and interviewed various individuals, such as officials from ADE's Career and Technical Education Division, an expert in the field of CTE research, business and industry leaders, and various CTED and member district superintendents and/or CTE directors. Additionally, we reviewed other state websites and reports to determine what measures other states used to evaluate their CTE programs.
- To determine whether CTED and member district students obtained (1) employment related to their CTE program of study following graduation and (2) industry certifications that indicate successful job preparation, we surveyed all 14 CTEDs and 102 member districts to determine if they collected postgraduation employment and industry certification data for their students for fiscal year 2019; how complete, accurate, and supported this data was; if the districts were making any changes to their data collection procedures for fiscal year 2020; and if they partner with business and industry to provide on-the-job training for their students and, if so, who their significant business and industry partners are. All CTEDs and member districts responded to the survey. Based on these responses, we sampled 10 CTEDs and 36 member districts for additional information. We interviewed district officials at these sampled districts about their data collection and verification procedures and, in some cases, requested this data and supporting documentation. We also reviewed the sampled districts' fiscal year 2019 postgraduation employment and industry certification data that they submitted to ADE.
- To determine whether CTEDs and member districts partner with business and industry to provide CTE students with on-the-job or work-based training opportunities (e.g., internships) to create a pipeline to employment following graduation, we relied on the survey discussed in the previous bullet and asked CTEDs and member districts to identify their significant business partners. Based on these responses, we interviewed district officials and their significant business partners to determine how they work together to support CTE programs, offer on-the-job training for students, or recruit and hire students after they complete the CTE programs.

We selected our study samples to provide sufficient evidence to support the information, findings, and recommendations in this report. Unless otherwise noted, the results of our testing using these samples were not intended to be projected to the entire population.

We express our appreciation to the CTEDs' and CTED member districts' board members, superintendents, and staff; staff at ADE, OEO, and ACA; and the business, industry, and higher education leaders we contacted for their cooperation and assistance throughout the study.

³⁷ A.R.S. §15-391.

