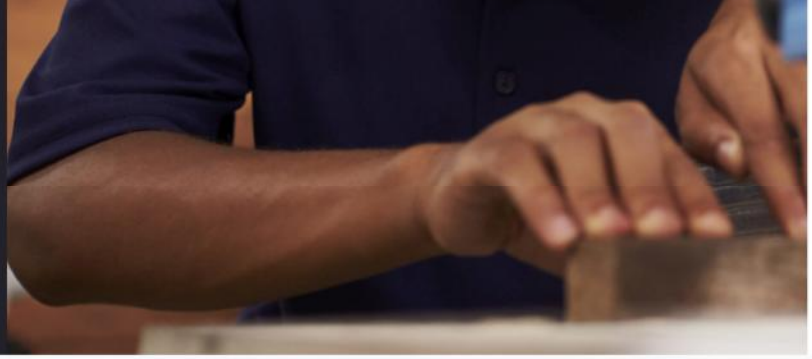
Eight years after their expected graduation date, students who focused on career and technical education (CTE) courses while in high school had higher median annual earnings than students who did not focus on CTE.

EXPLORE THIS DATA STORY

Bridging the Skills



Gap: Career and Technical Education in High School

SEPTEMBER 2019 | U.S. DEPARTMENT OF EDUCATION

Career and technical education (CTE) provides an important pathway to success for high school students and offers each student opportunities to personalize his or her education based on their career interests and unique learning needs. CTE refers to courses and programs designed to prepare students for careers in current or emerging professions. At the high school level, CTE provides students with opportunities to explore a career theme of interest while learning a set of technical and employability skills that integrate into or complement their academic studies. High school CTE is meant to connect with and lead to postsecondary programs of study or additional training after high school, which may include more specialized technical instruction. These pathways can culminate in postsecondary degrees or certificates, apprenticeships, or employment. Learn more about CTE 🕮.

A critical workforce challenge in the United States is the skills gap, particularly among jobs that require either a high school diploma, postsecondary certificate, or associate's degree.[1] Jobs requiring these "middle skills" outnumber the adults in the workforce who possess them, and this gap presents a barrier to American economic competitiveness. There are 30 million jobs in the United States that do not require a bachelor's degree that pay median earnings of $55,000 or more.[2] CTE provides an important avenue for young adults to gain these skills beginning in high school. How do we engage a new generation of young Americans and prepare them for rewarding careers? Last year, Congress reauthorized the *Strengthening Career and Technical Education Act for the 21st Century* (also referred to as *Perkins V*), the federal legislation that supports CTE programs and whose purpose is to address these critical issues.[3]

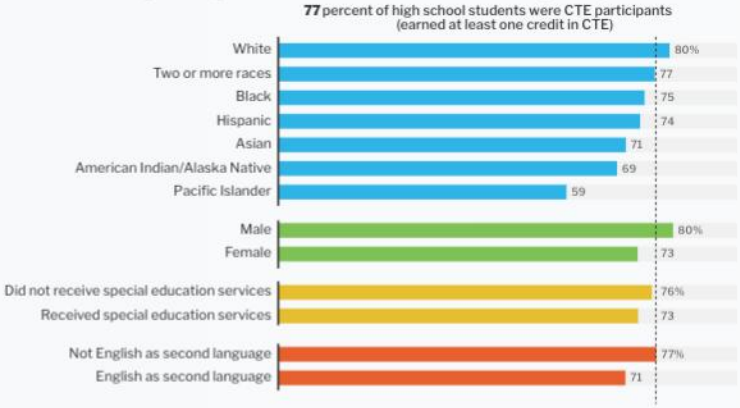
This data story explores both access to and participation in CTE in high school, as well as the outcomes of students who concentrate their studies in CTE, using national and state-level data from the Department. Learn more about the data sources 🕮.

While definitions vary by state, the U.S. Department of Education (the Department) issued non-regulatory guidance on two different measures of student participation in CTE. At the high school level, the term *CTE participant* refers to a student who earned at least one credit in any CTE course. The term *CTE concentrator* refers to a student who earned two or

more credits within a single program of study, such as Health Science or Business Management and Administration. Learn more about CTE participants and CTE concentrators 🕮.

Student participation in high school CTE was relatively high (77 percent).

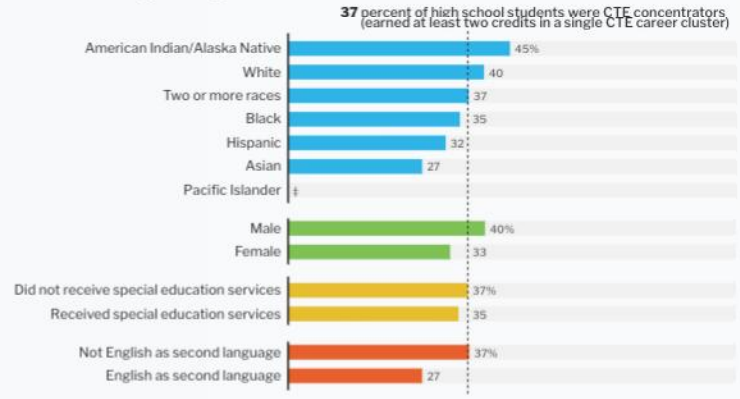
Percentage of high school students who were CTE participants



Over three-fourths of 9th-grade public school students in 2009 had participated in CTE by their senior year in 2013 (77 percent). These students had earned at least one CTE credit in high school. Percentages of students who participated varied across some demographic characteristics such as sex and race/ethnicity. These percentages included all public school students, regardless of high school graduation status. Learn more about CTE participants by select student characteristics 🕮.

However, less than half of CTE participants in high school went on to concentrate in a specific area of CTE (37 percent).

Percentage of high school students who were CTE concentrators

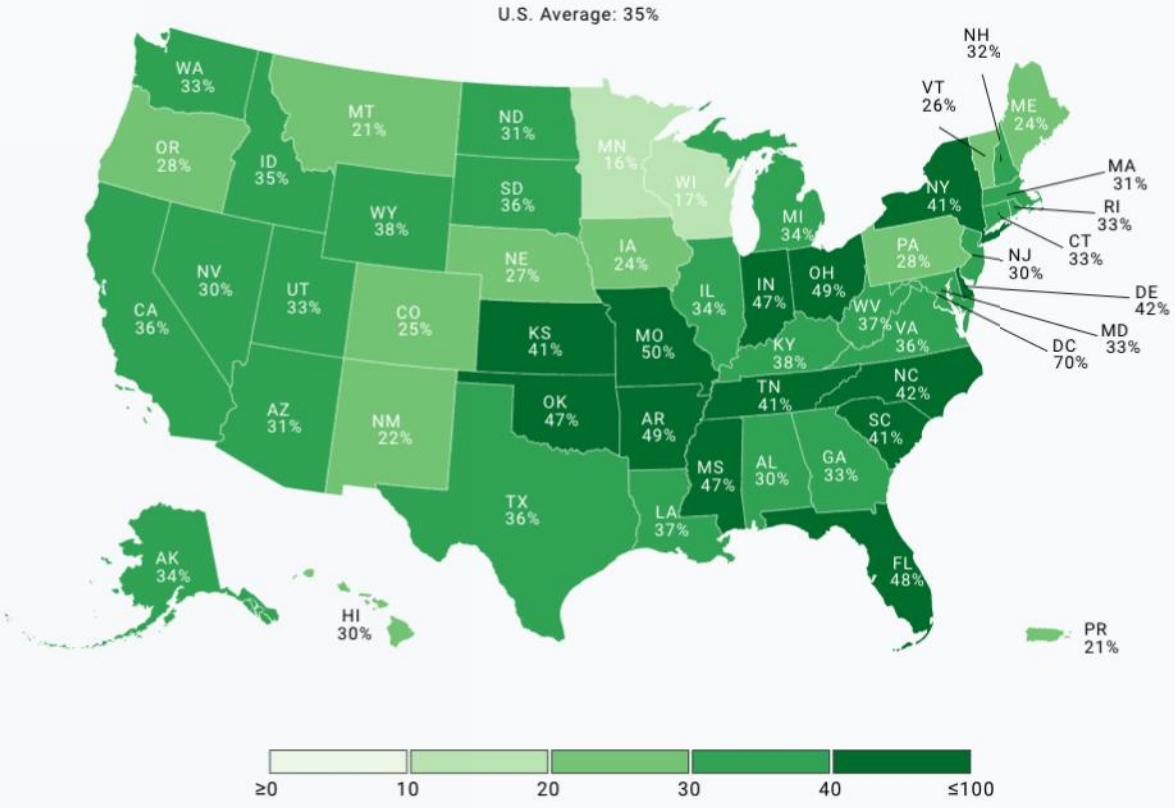


Over one-third of 9th-grade public school students (37 percent) in 2009 had concentrated in CTE by 2013. These students had earned two or more credits in a at least one

program of study in high school. Percentages of students who concentrated varied across some demographic characteristics such as sex and race/ethnicity. These percentages included all public school students, regardless of high school graduation status. Learn more about CTE concentrators by select student characteristics 🕮.

CTE concentrations in STEM and STEM-related career clusters represented one-third of all CTE concentrations in high school. However, the percentage of concentrations in these career clusters varied widely by state.

Percentage of high school CTE concentrations in STEM and STEM-related career clusters, by state: 2016–17



Science, Technology, Engineering, and Mathematics (STEM) subjects are critical disciplines for a society whose economic growth and adaptability are dependent upon innovation. In 2017, CTE concentrations [4] in STEM and STEM-related (Health Science; Agriculture, Food, and Natural Resources; and Information Technology) career clusters represented 35 percent of all CTE concentrations in high school. Learn more about career clusters 🕮.

In the 50 states, the District of Columbia, and Puerto Rico, the jurisdictions having the five highest percentages of CTE

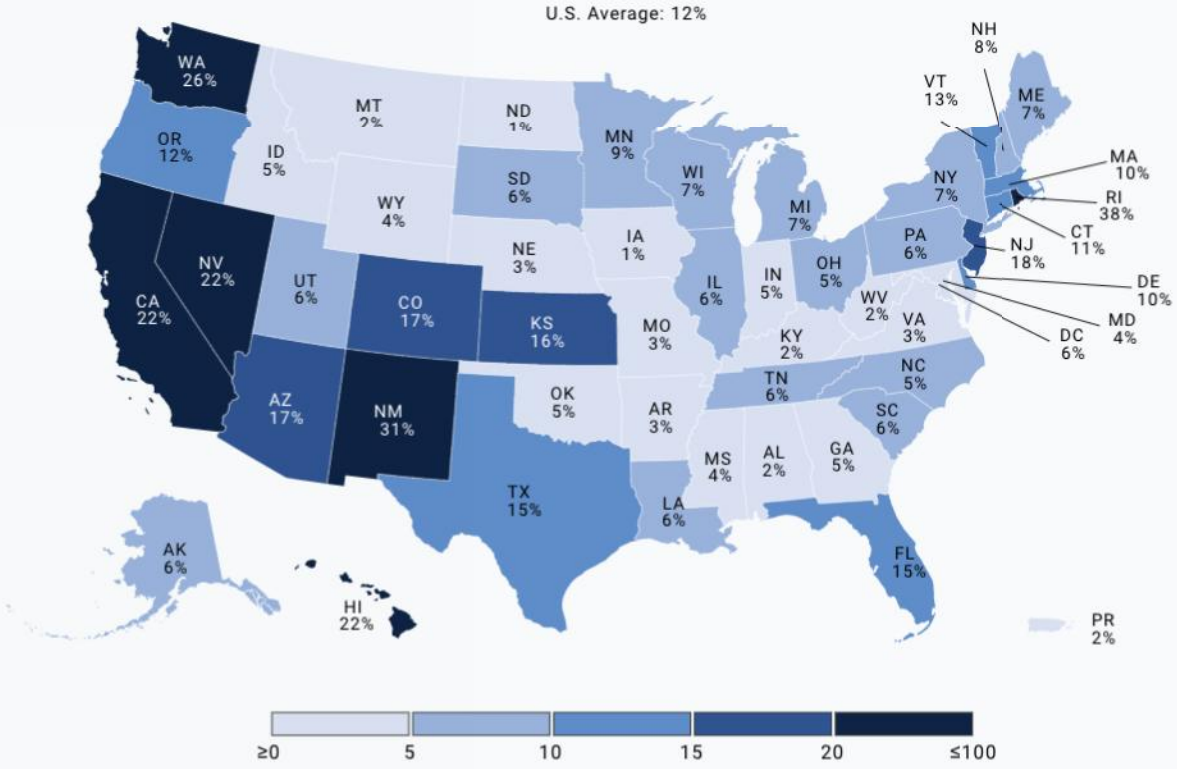
concentrations in STEM and STEM-related career clusters in 2017 were the District of Columbia (70 percent), Missouri (50 percent), Ohio (49 percent), Arkansas (49 percent), and Florida (48 percent).

The top three most prevalent career clusters in the nation's high schools were: (1) Arts, Audio-Visual Technology, and Communication; (2) Business Management and Administration; and (3) Health Science.

Percentage of high school CTE concentrations in the most popular career clusters, by state: 2016–17

Choose a career cluster from the following dropdown menu:

Arts, Audio-Visual Technology, and Communication



In 2017, the most popular career cluster out of all 16 career clusters in the nation's high schools was Arts, Audio-Visual Technology, and Communication (420,000 concentrations, or 12 percent of all CTE concentrations), followed by Business Management and Administration (410,000 concentrations, or 11 percent of all CTE concentrations) and Health Science (390,000 concentrations, or 11 percent of all CTE concentrations). The percentages of concentrations in these career clusters varied by state. Learn more about state CTE concentrations by career cluster 🕮.

Nearly all public school districts offered CTE programs to high school students. About three-fourths of these districts offered CTE courses that earn both high school and postsecondary credit, commonly called dual credit.

CTE can offer career exploration and career-building activities in the classroom as well as hands-on learning experiences outside the classroom. Almost all public school districts (98 percent) offered CTE programs to high school students during the 2016–17 school year, but the activities offered in these CTE programs varied by district. Among districts that offered CTE programs, the most common CTE activity or feature was work-based learning opportunities, such as on-the-job training, internships, practicums, clinical experiences, or cooperative education (77 percent); followed by CTE courses that earned both high school and postsecondary credits, sometimes referred to as "dual credit" or "concurrent credit" (73 percent); mentoring by local employers (65 percent); and student-run enterprises or services (55 percent). Learn more about public school districts offering dual credit 🕮.

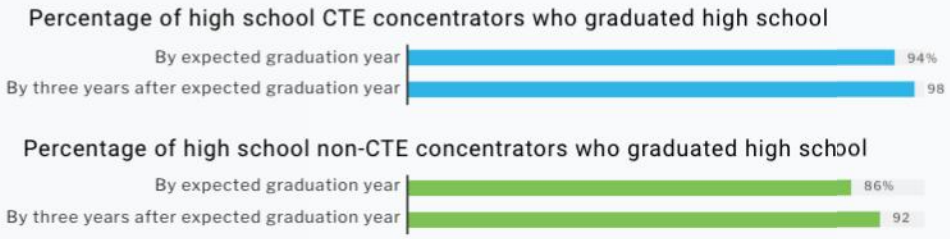
CTE programs were delivered in varied locations, including high schools and part-time CTE centers.

The most common locations in which school districts offered CTE programs to high school students were traditional high schools in the district (83 percent), followed by part-time CTE

centers (43 percent) and 2-year community or technical colleges or 4-year colleges or universities (35 percent). About 30 percent of school districts also offered CTE programs online (including in blended/hybrid courses).

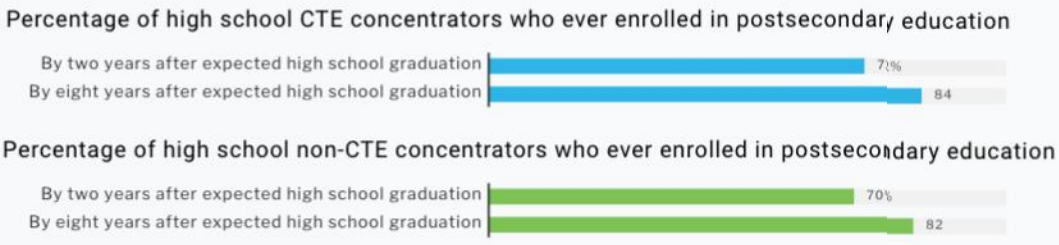
In this section, we explore descriptive data related to the education and labor market outcomes of CTE concentrators and non-CTE concentrators (also referred to as "non-concentrators" in this data story). It is important to note that the findings in this section cannot be used to draw conclusions about the effectiveness of CTE because these data do not account for differences in both observable and unobservable characteristics. Such descriptive data do not imply causation.

High school students who were CTE concentrators graduated from high school at higher rates than their non-concentrator peers.



Among 9th-grade public school students in 2009 who went on to concentrate in CTE in high school, 94 percent graduated from high school[5] by their expected year of graduation, and 98 percent earned their high school diplomas within three years of their expected graduation date. Among 9th-grade public school students in 2009 who were non-concentrators in high school, 86 percent had graduated from high school by 2013, and 92 percent had graduated from high school by 2016.

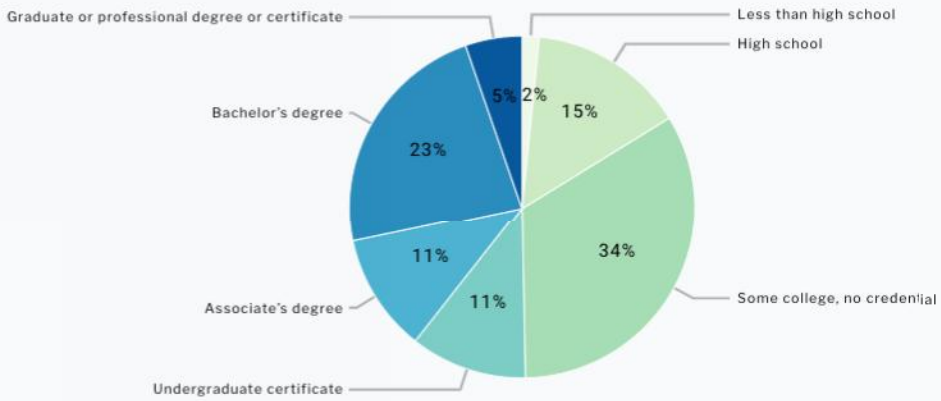
High school students who were CTE concentrators enrolled in postsecondary education within eight years of their expected high school graduation at slightly higher rates than non-concentrators.



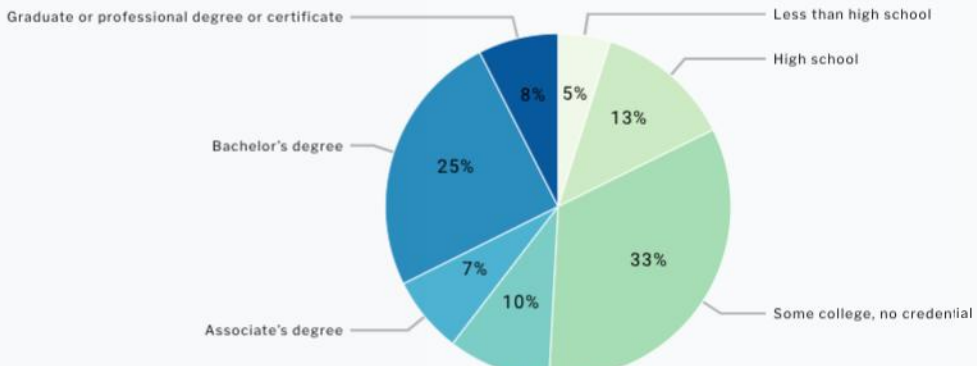
Enrollment in postsecondary education is considered a major stepping stone for high school students who choose to pursue that educational pathway. Among 10th-grade public school students in 2002 who were CTE concentrators in high school, 72 percent enrolled in postsecondary education by 2006, or two years after their expected year of high school graduation, and 84 percent enrolled by 2012, or eight years after their expected year of high school graduation. Among 10th-grade public school students in 2002 who were non-concentrators in high school, 70 percent enrolled in postsecondary education by 2006 and 82 percent enrolled by 2012.

About half of both CTE concentrators and non-concentrators earned a postsecondary credential within eight years of their expected high school graduation. There was no measurable difference between CTE concentrators and non-concentrators earning a bachelor's degree; about one-quarter of CTE concentrators and non-concentrators earned a bachelor's degree. However, high school students who were CTE concentrators were more likely than non-concentrators to earn an associate's degree as their highest level of educational attainment within eight years of their expected high school graduation.

Percentage distribution of high school **CTE concentrators** by highest level of educational attainment eight years after expected high school graduation



Percentage distribution of high school **non-CTE concentrators** by highest level of educational attainment eight years after expected high school graduation

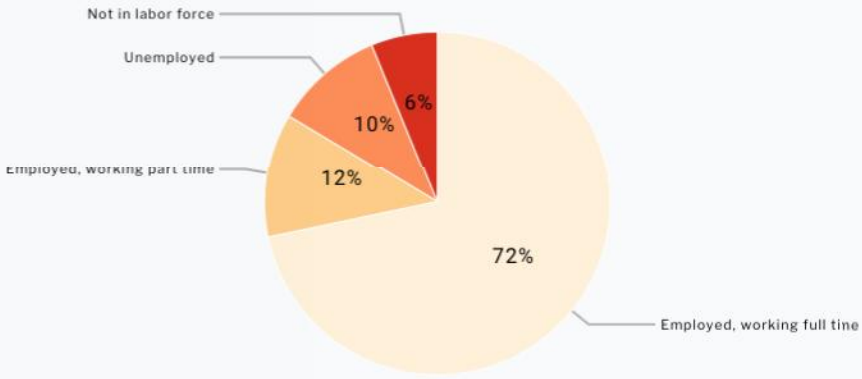


Among 10th-grade public school students in 2002 who were CTE concentrators in high school, 50 percent had completed a college degree or credential as their highest level of educational attainment by 2012 (eight years after their expected year of high school graduation). About 28 percent of students who were CTE concentrators in high school earned a bachelor's degree or higher, while 11 percent earned an associate's degree, and 11 percent earned a postsecondary certificate by 2012.

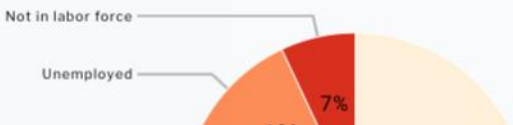
Non-concentrators were more likely than CTE concentrators to not have attained a high school diploma by 2012 (5 percent compared with 2 percent) but were more likely to earn a graduate or professional degree (8 percent compared with 5 percent).

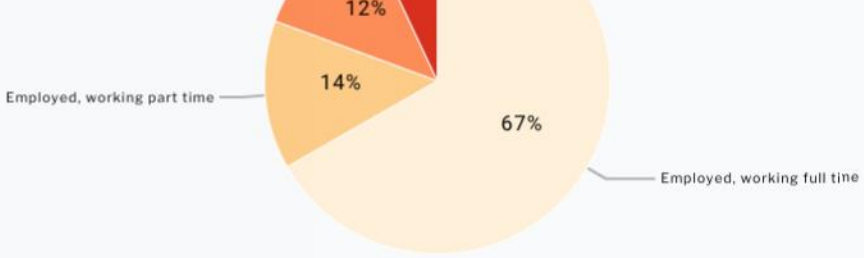
High school students who were CTE concentrators were employed full-time at higher rates eight years after their expected high school graduation compared to non-concentrators.

Percentage distribution of high school **CTE concentrators** by employment status eight years after expected high school graduation



Percentage distribution of high school **non-CTE concentrators** by employment status eight years after expected high school graduation

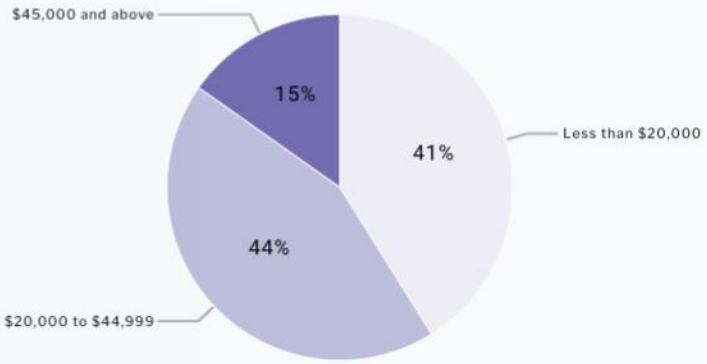




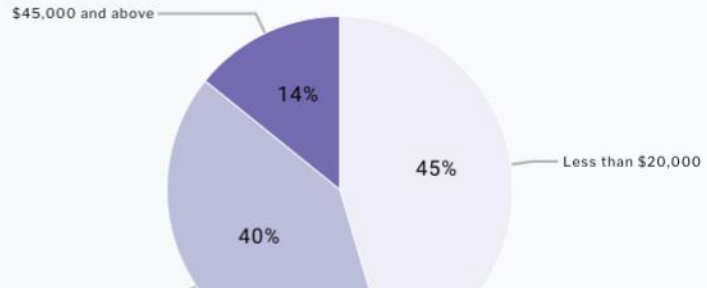
Examining employment outcomes for CTE concentrators provides a snapshot of their long-term outcomes. Among 10th-grade public school students in 2002 who were CTE concentrators in high school, 72 percent were employed full-time in 2012, compared to 67 percent of non-concentrators. In addition, a lower percentage of CTE concentrators than of non-concentrators were employed part time or unemployed in 2012.

Eight years after their expected high school graduation, the median annual earnings for CTE concentrators were higher than for non-concentrators.

Percentage distribution of high school **CTE concentrators** by employment earnings eight years after expected high school graduation



Percentage distribution of high school **non-CTE concentrators** by employment earnings eight years after expected high school graduation



Among 10th-grade public school students in 2002 who were CTE concentrators in high school, the median annual earnings eight years after high school were $23,950, compared to $20,015 for non-concentrators—almost a $4,000 difference. In addition, 41 percent earned less than $20,000, compared to 45 percent of non-concentrators.

The data explored in this story highlight CTE access, participation, and educational and labor market outcomes. They tell an interesting story of the potential benefits of a concentrated sequence of CTE courses in high school. Concentrating in CTE can provide students with a strong foundation of technical knowledge and employability skills to complement their academic studies and prepare them for both college and career options.

DATA NOTES

High School Longitudinal Study of 2009

National participation data were based on a longitudinal study using a nationally-representative sample of a cohort of students from the High School Longitudinal Study of 2009 (HSLS:09), conducted by the National Center for Education Statistics (NCES), Institute of Education Sciences, U.S. Department of Education. The cohort consisted of 9th-grade public school students in fall 2009 and followed up with a collection of high school transcripts in 2013 to examine course credits earned during high school. The study included over 23,000 9th-graders from 944 schools in 2009.

Education Longitudinal Study of 2002

National outcome data were based on a longitudinal study using a nationally-representative sample of a cohort of students from the Education Longitudinal Study of 2002 (ELS:02), conducted by the National Center for Education Statistics (NCES), Institute of Education Sciences, U.S. Department of Education, to permit analysis of longer-term education and labor market outcomes. The cohort consisted of 10th-grade public school students in spring 2002 and followed up with a collection of high school transcripts in 2005 to examine course credits during high school. The study included over 15,000 10th-graders from 750 schools in 2002.

Fast Response Survey System

The Fast Response Survey System (FRSS) survey "Career and Technical Education Programs in Public School Districts" (FRSS 208) collected nationally representative data on career and technical education (CTE) programs for the 2016–17 school year. The topics covered included entities that provide the CTE programs, the locations at which the CTE programs are offered to high school students, and work-based learning activities and employer involvement in CTE

programs, as well as barriers preventing the school district from offering CTE programs and barriers to student participation in CTE programs. The survey was mailed to approximately 1,800 public school districts with high school grades in the 50 states and the District of Columbia. The unweighted survey response rate was 87 percent, and the weighted response rate using the initial base weights was 86 percent. The report *Career and Technical Education Programs in Public School Districts: 2016–17* (NCES 2018-028) presents selected findings from the survey.

Consolidated Annual Report

The Consolidated Annual Report (CAR) is a single reporting instrument developed by the Department of Education that enables eligible agencies to submit the narrative performance report pursuant to 2 CFR 200.328 and 34 CFR 76.720, the financial reports pursuant to 2 CFR 200.327 and 34 CFR 76.720, and the performance data reports pursuant to section 113 of the Perkins Act. Data submission for the previous fiscal year is due by December 31 of each year.

DATA LIMITATIONS

High school graduation rates: In this data story, a CTE concentrator is defined as a student who has completed at least two course credits in a single career and technical education (CTE) subject, according to the student's high school transcript(s), while a non-concentrator could be any student who did not meet this criterion. Because they are required to have completed at least two course credits in a single subject during high school, CTE concentrators may be more likely to have complete transcript data and/or have completed high school than non-concentrators. Please use caution when comparing the high school graduation rates of these two groups.

Employment earnings (including median earnings): The analysis of employment earnings in this data story includes all students in the sample who have data available. It is not restricted to students who were working full time and full year. Due to differences in employment status between CTE concentrators and non-concentrators, please use caution when comparing the earnings data of these two groups.

NOTE ON SIGNIFICANT DIFFERENCES

Only statistically significant differences (at $p < .05$) are discussed except where noted. If differences between groups are not statistically significant, we use the phrase "no measurable difference."

REFERENCES

[1] Burrowes, J., Young, A., Restuccia, D., Fuller, J., and Raman, M. *Bridge the Gap: Rebuilding America's Middle Skills*, 2014. Retrieved from : https://www.hbs.edu/competitiveness/Documents/bridge-the-gap.pdf

[2] Georgetown University Center on Education and the Workforce, *Good Jobs That Pay without a BA: A State-by-State Analysis*, 2017. Retrieved from: https://goodjobsdata.org/wp-content/uploads/Good-Jobs-States.pdf

[3] Pettey, Richard. It's Time to Rethink Career and Technical Education. *Homeroom: The Official Blog of the U.S. Department of Education*, December 19, 2018. Retrieved from: https://blog.ed.gov/2018/12/time-rethink-career-technical-education/

[4] For state data, the term CTE "concentrations" is used instead of CTE "concentrators" because a subset of students might have concentrated in more than one career cluster and would be counted in each applicable career cluster.

[5] "Graduated from high school" is defined in this data story as having obtained a regular high school diploma, a GED or other high school equivalency, or a certificate of attendance.

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