

The Impact of Career and Technical Education on Postsecondary Outcomes in Nebraska and South Dakota

Education leaders in Nebraska and South Dakota partnered with the Regional Educational Laboratory Central to examine how completing a sequence of career and technical education (CTE) courses in high school affects students' rates of on-time high school graduation and their rates of postsecondary education enrollment and completion within two and five years. The study found that CTE concentrators (students who complete a sequence of CTE courses aligned to a specific career field such as manufacturing or education and training) were 7 percentage points more likely than non-CTE concentrators to graduate from high school on time and 10 percentage points more likely to enroll in any type of postsecondary education within two years of their expected high school graduation year. The study also found that CTE concentrators were 3 percentage points more likely than non-CTE concentrators to earn a postsecondary award, such as a professional certificate, diploma, or associate's or bachelor's degree, within five years of their expected high school graduation year. CTE concentrators were 4 percentage points more likely than non-CTE concentrators to obtain up to an associate's degree as their highest postsecondary award within five years of their expected high school graduation year but 1 percentage point less likely to obtain a bachelor's degree or higher.

Why this study?

State and local education agency leaders are focusing on broadening and strengthening career and technical education (CTE) programs to increase students' success after high school. Federal and state legislation, such as the Strengthening Career and Technical Education for the 21st Century Act, also demonstrate this increased interest in CTE programs. CTE programs are broadly defined as programs that offer high school courses aligned to specific career fields and that provide students with the academic and technical skills to succeed in college or the workforce.¹ Participating in CTE programs has been associated with decreased dropout rates as well as increased rates of high school attendance, college enrollment, and employment.²

The Nebraska Department of Education and the South Dakota Department of Education partnered with the Regional Educational Laboratory Central to explore the short- and longer-term education impacts of CTE participation among students in Nebraska and South Dakota who become CTE concentrators. A CTE concentrator is a student who takes a sequence of two or three CTE courses aligned to a specific career field such as manufacturing or education and training. Across the 2012/13–2016/17 school years approximately 46 percent of students in Nebraska and 52 percent of students in South Dakota became CTE concentrators.

1. Dougherty, S. M. (2016). *Career and technical education in high school: Does it improve student outcomes?* Thomas B. Fordham Institute. <https://eric.ed.gov/?id=ED570132>.

2. Dougherty, 2016. Dougherty, S. M. (2018). The effect of career and technical education on human capital accumulation: Causal evidence from Massachusetts. *Education Finance and Policy*, 13(2), 119–148. <https://eric.ed.gov/?id=EJ1175151>. Lee, I. H., Rojewski, J. W., & Gregg, N. (2016). Causal effects of career-technical education on postsecondary work outcomes of individuals with high-incidence disabilities. *Exceptionality*, 24(2), 79–92. <https://eric.ed.gov/?id=EJ1093654>.

What was studied and how?

The study addressed the following research questions:

1. What is the impact of being a CTE concentrator on high school graduation, two-year and five-year postsecondary enrollment and completion, and type of postsecondary award attained?
2. How do high school graduation and two-year and five-year postsecondary outcomes vary by career cluster?

This impact study was designed to meet What Works Clearinghouse group design standards with reservations³ and used a quasi-experimental design (that is, a study design that does not assign students to groups randomly) to compare the education outcomes of CTE concentrators and non-CTE concentrators who had similar demographic characteristics and grade 8 state assessment results.

Data used in the study included high school students' status as CTE concentrators or non-CTE concentrators as well as the career clusters of the CTE concentrators. CTE programs provided by schools and districts are designed to align to one or more of the 16 career clusters in the National Career Cluster Framework.⁴ Examples of career clusters include architecture and construction, finance, and information technology. Additional data included students' expected four-year high school graduation year (based on the year they first enrolled in grade 9), student demographics, grade 8 math and reading state assessment results, district locale (for example, town or city), percentage of district students eligible for the national school lunch program, number of career clusters addressed by a district's CTE programming, and students' on-time (four-year) high school graduation status. Postsecondary outcome data included postsecondary enrollment status, postsecondary completion status, and postsecondary award type attained (professional certificate, diploma, or associate's degree; or bachelor's degree or higher).

The sample used to examine the impact of being a CTE concentrator on high school graduation and two-year postsecondary outcomes included 112,764 students in Nebraska and South Dakota whose four-year expected high school graduation year was between 2012/13 and 2016/17. The sample used to examine the impact of being a CTE concentrator on five-year postsecondary outcomes was composed of 42,398 students, which included only students from the 2012/13 and 2013/14 graduation cohorts because five-year outcome data were not yet available for the later cohorts. Baseline equivalence for both samples was established through analyses showing the CTE concentrator and non-CTE concentrator groups to be statistically similar on key baseline (that is, prestudy) variables.

The study team used logistic regression to examine the impact of being a CTE concentrator on high school graduation, postsecondary enrollment and completion, and type of postsecondary award attained. Logistic regression is a statistical analysis that can be used to examine a program's impact on a dichotomous outcome such as high school graduation status after students' background characteristics are controlled for. The study team used descriptive analyses (methods that describe or summarize data for a sample) to examine the percentage of students who concentrated in each of the 16 career clusters and who achieved each of the study outcomes. Additional details about the study methods can be found in the main report and appendix B.

3. What Works Clearinghouse. (2020). *Standards handbook* (Version 4.1). U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance. Retrieved August 20, 2020, from <https://ies.ed.gov/ncee/wwc/Handbooks>.

4. Advance CTE. (n.d.). *Career clusters*. Retrieved August 20, 2020, from <https://careertech.org/career-clusters>.

Findings

- **CTE concentrators were more likely than non-CTE concentrators to graduate from high school on time.** CTE concentrators were 7 percentage points more likely than non-CTE concentrators to graduate from high school on time.
- **CTE concentrators were more likely than non-CTE concentrators to enroll in postsecondary education.** CTE concentrators had a 10 percentage point greater likelihood of postsecondary enrollment within two years of their expected high school graduation year and an 8 percentage point greater likelihood of postsecondary enrollment within five years. Postsecondary enrollment included being enrolled full- or part-time in a professional certificate program, a diploma-granting program, or a two-year or four-year institution.
- **CTE concentrators were more likely than non-CTE concentrators to earn any kind of postsecondary award within two years of and within five years of their expected high school graduation year.** CTE concentrators were 2 percentage points more likely than non-CTE concentrators to earn any kind of postsecondary award within two years of their expected high school graduation year and 3 percentage points more likely to do so within five years.
- **CTE concentrators were more likely than non-CTE concentrators to attain a postsecondary award up to an associate's degree but slightly less likely to attain a bachelor's degree or higher within five years of their expected high school graduation year.** CTE concentrators were 4 percentage points more likely than non-CTE concentrators to attain a professional certificate, diploma, or associate's degree as their highest postsecondary award within five years of their expected high school graduation year. However, CTE concentrators were 1 percentage point less likely than non-CTE concentrators to attain a bachelor's degree or higher within five years.
- **High school graduation rates for CTE concentrators were consistently high, regardless of career cluster.** A vast majority (94 percent or more) of CTE concentrators in each career cluster graduated from high school on time. These percentages were above the two-state average for all CTE concentrators and non-CTE concentrators in Nebraska and South Dakota (92 percent).
- **Students who concentrated in finance, marketing, health sciences, and government and public administration had the highest two-year and five-year postsecondary enrollment rates.** The percentage of CTE concentrators who enrolled in any kind of postsecondary education within two years of their expected high school graduation year was highest among students who concentrated in finance (86 percent), marketing (85 percent), health sciences (85 percent), and government and public administration (85 percent). The two-year postsecondary enrollment rate was lowest among students who concentrated in transportation, distribution, and logistics (51 percent); manufacturing (61 percent); and hospitality and tourism (64 percent). For the majority of the career clusters, two-year postsecondary enrollment rates among CTE concentrators were higher than the two-state average for Nebraska and South Dakota (69 percent). The five-year postsecondary enrollment rate for CTE concentrators was higher than the two-state average (73 percent) in all but four career clusters. The percentage of CTE concentrators who enrolled in any kind of postsecondary education within five years of their expected high school graduation year was highest among those who concentrated in marketing (90 percent), health sciences (89 percent), finance (88 percent), and government and public administration (88 percent). The five-year postsecondary enrollment rate was lowest among students who concentrated in transportation, distribution, and logistics (57 percent) and manufacturing (66 percent).
- **Students who concentrated in transportation, distribution, and logistics had the highest two-year postsecondary award attainment rate but the third lowest five-year attainment rate.** The percentage of CTE concentrators who earned any kind of postsecondary award within two years of their expected high school graduation year was highest among those who concentrated in transportation, distribution, and logistics (12 percent); agriculture, food, and natural resources (10 percent); manufacturing (8 percent); and architecture and construction (8 percent). These rates were above the two-state average (4 percent). The two-year postsecondary award attainment rate was lowest (1 percent each) among students who concentrated in education and training; law, public safety, corrections, and security; and government and public administration. The CTE concentrators most likely to have earned any kind of postsecondary award within five years of their expected high school graduation year were those who had concentrated in government and public administration

(57 percent), finance (52 percent), and marketing (50 percent). The five-year postsecondary award attainment rate was lowest among students who concentrated in hospitality and tourism (22 percent); manufacturing (25 percent); and transportation, distribution, and logistics (25 percent). CTE concentrators in 8 of the 16 career clusters had a higher five-year postsecondary award attainment rate than the two-state average (37 percent).

- **The types of postsecondary awards CTE concentrators attained within five years of their expected high school graduation year varied by the career cluster they concentrated in.** The percentage of CTE concentrators who earned a bachelor's degree or higher within five years of their expected high school graduation year was highest among those who concentrated in government and administration (55 percent) and marketing (46 percent). The percentage of CTE concentrators who earned up to an associate's degree as their highest postsecondary award within five years of their expected high school graduation year was lowest among those who concentrated in the same two career clusters (2 percent for government and public administration and 4 percent for marketing). The percentage of CTE concentrators who earned up to an associate's degree as their highest postsecondary award within five years was highest among those who concentrated in transportation, distribution, and logistics (17 percent). This career cluster also had the lowest percentage of students who earned a bachelor's degree or higher within five years (8 percent). In 8 of the 16 career clusters, the percentage of CTE concentrators who earned at least a bachelor's degree was higher than the two-state average (28 percent). In 4 of the 16 career clusters, the percentage of CTE concentrators who attained up to an associate's degree as their highest postsecondary award was higher than the two-state average (9 percent).

Implications

The study's finding of a large, positive impact of being a CTE concentrator on on-time high school graduation and on short-term postsecondary enrollment and completion provides evidence that state and local education agency leaders can consider when deciding whether to fund, strengthen, or expand CTE programming. Although CTE programming, previously called vocational education, has been historically viewed as less academically rigorous and less likely than traditional high school coursework to lead to positive postsecondary student outcomes,⁵ the results of this study challenge those notions. Given that students who become CTE concentrators have better short-term postsecondary education success and are on a par with non-CTE concentrators in the longer term, future research might examine how these trends translate to workforce outcomes such as subsequent employment rates and wages.

Students and their families can use the results of this study when deciding whether and how to participate in CTE programs. For example, students and their families might refer to the postsecondary enrollment rates and attainment rates associated with the 16 career clusters to understand typical patterns in postsecondary enrollment and completion.

5. Malkus, N. (2019). *The evolution of career and technical education: 1982–2013*. American Enterprise Institute. <https://www.aei.org/research-products/report/the-evolution-of-career-and-technical-education-1982-2013/>.

This brief was prepared for the Institute of Education Sciences (IES) under Contract ED-IES-17-C-0005 by the Regional Educational Laboratory Central administered by Marzano Research. The content of the publication does not necessarily reflect the views or policies of IES or the U.S. Department of Education, nor does mention of trade names, commercial products, or organizations imply endorsement by the U.S. Government. The full report is available on the Regional Educational Laboratory website at <http://ies.ed.gov/ncee/edlabs>.

Brodersen, R. M., Gagnon, D., Liu, J., & Tedeschi, S. (2021). *The impact of career and technical education on postsecondary outcomes in Nebraska and South Dakota* (REL 2021–087). U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Central.