Graduation, College, and Employment Outcomes for CTE Students with an Identified Disability

Celeste Carruthers
University of Tennessee, Knoxville, carruthers@utk.edu

Shaun Dougherty
Vanderbilt University, shaun.dougherty@vanderbilt.edu

Sophie McGuinness
Vanderbilt University, sophie.e.mcguinness@Vanderbilt.Edu

Sydney Payne
American Institutes for Research

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Graduation, College, and Employment Outcomes for CTE Students with an Identified Disability

Celeste K. Carruthers, Shaun Dougherty, Sophie McGuinness, Sydney Payne, and Roddy Theobald

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Introduction

Students with an identified disability (SWD) who participate in career and technical education (CTE) in high school tend to have better graduation and employment outcomes than SWD who do not participate in CTE. Recent research has shown that these differences in graduation and employment hold when accounting for observable differences between SWD who do and do not participate in CTE (in both dedicated high schools and comprehensive high schools), and when accounting for differences in the likelihood that a student with an identified disability participates in CTE.

In this report, we examine the relationship between SWD and CTE across different educational policy settings and for students receiving special education services for different disabilities. We use data from three states—Massachusetts, Tennessee, and Washington—to summarize CTE participation, graduation, and postsecondary outcomes for students with different identified disabilities in these states. Officials from these three states provided data on course-taking patterns of students in public high schools, as well as indicators describing CTE participation, disability identification, and data on whether these students graduated from high school, attended college after graduation, and were employed after graduation.

For SWD, we find that CTE concentration is associated with a higher likelihood of high school graduation across all three states and all disability categories and, with some exceptions, a higher likelihood of employment in the year after high school. SWD in Tennessee who concentrate in CTE are more likely to enroll in college than non-CTE SWD, but this is not the case in Massachusetts or Washington. These patterns generally reinforce positive relationships between CTE participation and outcomes for SWD that have been reported in the prior literature—particularly for graduation and employment outcomes. There are important differences, however, across states and disability identifications, which we discuss below. We conclude that CTE policymakers should not consider SWD as a monolith but rather as representing a broad array of disability categories with different trends and needs.

Data and Summary Statistics

The high school administrative data from Massachusetts, Tennessee, and Washington used in this analysis are the same as the data used in a prior
We limit the analysis samples to students enrolled in high school for at least four consecutive years. While this restriction helps to make samples more comparable across states, it removes students who either drop out of high school or enter or leave the public education system during high school—which has implications for graduation rates discussed in the next section.

Our analysis also considers slightly different years of data in each state: the 2007–08 through 2015–16 ninth-grade cohorts in Massachusetts; the 2009–10 through 2013–14 ninth-grade cohorts in Tennessee; and the 2010–11 through 2015–16 ninth-grade cohorts in Washington. We use all available years of data for this analysis because some categories we consider (e.g., specific disability categories) are relatively small within a single high school cohort. Data in all states include measures of CTE concentration, post-high school outcomes, gender, race, ethnicity, and each student’s disability identification (if any). We focus on disability identifications as of Grade 9 throughout the analysis.

Massachusetts and Washington also include an indicator for student economic disadvantage (defined as receiving free or reduced priced meals due to family income or other qualifying factors in ninth grade).

We examine how CTE concentration for SWD relates to three outcomes. First, we assess whether students graduated with any high school diploma within five years of their first year of ninth grade. Second, we use linked postsecondary data to measure college attendance at two- and four-year colleges. Third, we examine employment after graduation. In Massachusetts and Tennessee, college and employment measures come from administrative data connecting the state’s higher education and Unemployment Insurance (UI) data systems. In Washington, by contrast, we rely on a novel Post-School Outcomes survey of SWD with a high response rate (over 80%) that asks students or a caregiver about the educational and employment outcomes of SWD during the year after their expected year of graduation.

It is important to emphasize that participating states have different graduation requirements and that differences in data sources across the three states also complicate cross-state comparisons. We therefore avoid cross-state comparisons of overall levels of these three outcomes. That said, to create somewhat consistent measures across states, we limit the Massachusetts and Tennessee postsecondary and employment outcomes to the year after graduation and use the different data systems to create indicators of whether SWD in each state (a) attended a two- or four-year college the year after graduation or (b) were employed at least half-time the year after graduation.
Additional literature provides more context about overall differences in student demographics and CTE participation rates across the three participating states.\(^8\)

Figure 1 shows summary statistics for students with and without an identified disability in Massachusetts, Tennessee, and Washington. SWD in all three states are disproportionately male, economically disadvantaged, and Black. Specifically, over 60% of SWD in all three states are male (relative to less than half of non-SWD), about 60% of SWD in Massachusetts and Washington are economically disadvantaged (relative to about 40% of non-SWD), and a higher percentage of SWD in all three states are Black than non-SWD.

**Finding 1: CTE Concentration by Disability Type**

CTE concentration rates for SWD vary across states and disability type. Concentration rates for students with specific learning disabilities, communication disorders, or health disorders are relatively high in all three states.
We focus on whether students concentrated in CTE during high school as the primary measure of CTE participation. In Massachusetts, this measure is defined as being a participant in a CTE program for two or more academic years, while in Tennessee and Washington, it is defined as completing at least three credits in a program of study. In practice, students usually take more than one year to accumulate three credits in a program, so there is broad but incomplete overlap between these two measures. Previous research provides additional context about CTE concentration requirements in each state.\(^9\)

Figure 2 shows CTE concentration rates across SWD in each state (first, overall and then by disability category). The differences in overall concentration rates across the three states may partially be a function of how CTE concentration is defined in the three states, and there is also substantial variation within the disability categories used in Figure 2 and subsequent figures in terms of student needs and educational settings. That said, CTE concentration rates depicted in Figure 2 illustrate important similarities and differences across the three states. A key similarity is that in all three states, a higher percentage of students with specific learning disabilities (SLD) concentrate in CTE in high school than for
any other disability category. Concentration rates for students receiving special education services for an identified communication or health disorder are also relatively high in all three states. On the other hand, students with autism appear to be less likely to concentrate in CTE than other SWD in all three states—though the difference is smaller in Washington than in the other two states. Students with identified low-incidence disabilities, such as intellectual disabilities or multiple disabilities, are also less likely to concentrate in CTE (particularly in Tennessee).

**Finding 2: High School Graduation by Disability Type**

Across all three states and different identified disabilities, SWD who concentrate in CTE are more likely to graduate from high school than non-concentrators. These differences by CTE concentration status and disability type vary across the states but tend to be largest in Massachusetts.

Figure 3 shows five-year high school graduation rates by state for SWD who did or did not concentrate in CTE in high school (first, for all SWD and then by disability category). We include regular diplomas as well as occupational or special education diplomas in our definition of high school graduation. As with Finding 1, however, we avoid comparisons of overall graduation rates between states as they have different graduation requirements and policies. But focusing on trends within states and consistent with prior research discussed earlier, graduation rates are considerably higher—by 10 to 15 percentage points in each state—for SWD who concentrate in CTE during high school than for SWD who do not.

What has not been shown in prior research using state administrative data is how these differences in graduation rates vary across disability categories and states. While the overall patterns are similar for students with an identified SLD, which is unsurprising as this is the largest category of special education services, the differences are quite large in Massachusetts and Tennessee for students with identified intellectual and multiple disabilities. More specifically, SWD with identified intellectual and multiple disabilities who concentrate in CTE are over twice as likely to graduate in Massachusetts than SWD in these same categories who do not concentrate in CTE. Other differences are more modest, but it is notable that CTE concentrators are more likely to graduate
within five years than non-concentrators within every disability category across all three states.

**Finding 3: College Attendance by Disability Type**

SWD in Massachusetts who concentrate in CTE and graduate from high school are less likely to attend college. By contrast, SWD in Tennessee are more likely to enroll in college if they concentrate in CTE than if they do not. In Washington, the relationship between CTE and college enrollment varies across disability categories. The gap in college attendance among SWD tends to be smaller between CTE concentrators and non-concentrators in Tennessee and Washington, though in Tennessee, students with autism who concentrate in CTE are much more likely to attend college than non-concentrators.

The higher graduation rates documented in Figure 3 for SWD who concentrate in CTE clearly have important implications for later outcomes of SWD given
that a high school diploma is required for most college programs and for many jobs. In Figure 4, we limit the analysis sample to SWD who graduated from high school and summarize college attendance rates to explore the relationships between CTE participation and postsecondary outcomes conditional on graduating from high school.

Figure 4 shows that trends in college attendance rates are quite different within each of the three states. SWD who concentrate in CTE and graduate from high school are considerably less likely to attend college in Massachusetts, slightly less likely to attend college in Washington, and slightly more likely to attend college in Tennessee than SWD who do not concentrate in CTE and graduate from high school. One notable disability category in these figures is students receiving special education services for autism: These students who graduate and concentrate in CTE are about 20 percentage points more likely to attend college in Tennessee and equally likely to attend college in Washington than students with autism who graduated from high school and did not concentrate in CTE.
**Finding 4: Employment by Disability Type**

SWD who concentrate in CTE and graduate from high school are more likely to be employed at least half-time in the year after graduation compared to non-concentrators. This pattern is consistent across all identified disability types in Massachusetts and Tennessee and across most identified disability types in Washington.

Figure 5 displays employment rates with at least half-time earnings for SWD in the year after graduation (by CTE concentration and disability category). Focusing again on within-state comparisons, we see evidence consistent with prior literature\(^\text{10}\) that SWD who graduate from high school and concentrate in CTE are more likely to be employed at least half-time (by 5 to 10 percentage points in each state) than SWD who graduate from high school and do not concentrate in CTE. These patterns are not fully consistent across disability categories within the different states (e.g., employment rates are higher for non-
CTE concentrators in the communication disability category in Washington), but the trends generally reinforce the previously studied connection between CTE participation and employment outcomes for SWD.

**Policy Implications**

The results in this report are purely descriptive and may reflect unobserved differences between SWD who do and do not ultimately concentrate in CTE courses, for a variety of reasons, in high school. As such, we do not make any causal claims from this analysis about the impact of CTE participation on outcomes for SWD. That said, overall trends documented in this analysis are consistent with trends from existing research, and variation in these trends across states and disability categories suggests potential policy implications.

First, varying results across the three states suggest that policymakers should have a vested interest in developing data systems and analyses to investigate these trends *in their own educational context*. Second, for the three states in this study, another implication is related to participation in and access to CTE for SWD. Specifically, the identified disability categories that tend to have the lowest CTE concentration rates in these states (e.g., autism or identified low-incidence disability categories like intellectual or multiple disabilities) are the same categories that tend to have the largest gaps in education and workforce outcomes between SWD who do and do not concentrate in CTE. This suggests that students with identified low-incidence disabilities might benefit from interventions to improve access to and advising to pursue CTE. More generally, this analysis suggests that policymakers (and researchers) should not consider SWD as a single student subgroup for the purposes of policy and research but rather as representing a broad array of identified disability categories with different trends and needs.
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Endnotes


3. Note that in Massachusetts, CTE programming is classified in two ways relating to their extent of state approval and related funding. We include both Chapter 74-approved programs that receive more funding and satisfy requirements beyond what is required for non-Chapter 74 programs which must meet definitions established to satisfy the federal Perkins’ requirements.

5. While free- or reduced-price lunch status captures eligibility for federally-subsidized meals, it is no longer the standard of measuring economic disadvantage in all states. However, because this is associated with a federal definition and is therefore comparable across states, we adopt this measure for consistency.

6. See seattleu.edu/ccts/post-school-outcomes/

7. We do not make these categories mutually exclusive (i.e., SWD can be both enrolled in college and employed at least half-time). To assess the relationship between CTE concentration and these outcomes conditional on graduation, we limit the postsecondary analyses to SWD who graduated from high school within five years as defined above.


About the Authors

Celeste K. Carruthers

Celeste K. Carruthers is an associate professor in the Haslam College of Business at the University of Tennessee with a joint appointment in the department of economics and the Boyd Center for Business and Economic Research. Her research centers on education policy with crossovers into public economics, labor economics, and economic history. Carruthers is editor-in-chief of *Economics of Education Review*. Before arriving at UT in 2009, Carruthers earned a Ph.D. in economics from the University of Florida, an M.A. in economics from the University of New Hampshire, and a B.A. in economics and accounting from Appalachian State University.

Shaun Dougherty

Shaun Dougherty is an associate professor of public policy and education in the department of leadership, policy, and organizations at Vanderbilt University. His research emphasizes the use of quantitative research methods to evaluate the impact of educational policies and programs. He is a national expert on career and technical education, with additional expertise in accountability policy. In addition, he is a faculty fellow with the Tennessee Education Research Alliance and a faculty advisor to the Strategic Data Project through the Center for Education Policy Research at Harvard University.

Sophie McGuinness

Sophie McGuinness is a Ph.D. student in Vanderbilt University’s Peabody College. Her research interests include career and technical education, community colleges, and workforce development policy. She holds bachelor’s degrees in economics and applied statistics from the University of California, Davis and an Ed.M. in education policy and management from Harvard University.
Sydney Payne

Sydney Payne is a research assistant for the American Institutes for Research (AIR) National Center for Analysis of Longitudinal Data in Education Research (CALDER). She holds a bachelor’s degree in statistics and a master’s degree in teaching from the University of Washington. Sydney recently earned her Washington state teaching certificate and is an aspiring middle-level mathematics educator.

Roddy Theobald

Roddy Theobald is a principal researcher in the National Center for Analysis of Longitudinal Data in Education Research (CALDER) at American Institutes for Research. He is also a faculty fellow with the Georgia Policy Labs. He received his Ph.D. in statistics from the University of Washington in 2015. He previously worked as a research assistant at the Center for Education Data and Research at the University of Washington. His ongoing projects investigate teacher education and licensing in Massachusetts and Washington, career and technical education and post-secondary outcomes for students with identified disabilities in Washington, teacher quality gaps in North Carolina and Washington, and collective bargaining in California, Michigan, and Washington.
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