

Does Expanding Access to High Quality Technical Education Induce Participation and Improve Outcomes?

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New Study Shows Expanding High-Quality CTE in Regular High Schools Boosts Student Participation and Early Career Outcomes

Across the country, Career and Technical Education (CTE) is getting greater focus as a core part of the comprehensive high school experience. In fact, [83 percent of U.S. districts](#) that offer CTE programs offer them in regular high schools, where students take career-focused courses alongside traditional graduation requirements.

While previous research has shown that high-quality CTE can boost graduation and early-career employment, most of the causal evidence comes from selective or specialized CTE schools. These settings are different in that all students who attend them have an expressed interest in CTE. In many cases, they also have additional dedicated space, equipment, and staffing than other high schools. And, one of the reasons they have had more research on them recently is that they often have more selective student enrollment (based on excess demand), which creates another dimension of difference. The EdResearch for Action brief “[Evidence-Based Approaches to Designing Effective Career and Technical Education Programs](#)” identifies the core elements that make CTE “high quality,” including structured programs of study, strong employer and postsecondary partnerships, and equitable access to high-value pathways, but few studies have examined whether those principles can be effectively implemented in comprehensive school settings. This leaves us with a gap in the evidence: *Does expanding access to high-quality CTE within traditional high schools meaningfully improve college and career outcomes?*

This new study offers the first causal evidence to help answer that question. In recent years, Massachusetts has supported the expansion of Chapter 74 programs (state-approved CTE pathways that must meet rigorous requirements) into more comprehensive high schools. This shift aimed to give more students access to high-quality technical education without requiring them to leave their local schools. By studying the rollout of these programs, the researchers find that expanding access to quality

CTE within comprehensive high schools can meaningfully increase participation and improve both early employment and earnings in early careers, especially for historically underserved groups.

STUDY AND METHODS

Using data from more than 740,000 students across 330 high schools and 15 graduating cohorts of students, the researchers took advantage of the fact that Chapter 74 programs rolled out gradually across different schools and years. This allowed them to compare outcomes for students before and after a new CTE program was introduced in a school to students in schools that hadn't yet expanded CTE offerings. This difference-in-differences and event study approach helps isolate the effect of expanding CTE access from other statewide trends. The study tracks a range of outcomes, including CTE participation, college enrollment, and early career earnings, and also looks at whether the impacts differ by student group (such as by gender, race/ethnicity, or disability status) or by type of program offered.

KEY FINDINGS

- 1 Expanding access to high-quality CTE programs increased participation by 11.5% for previously non-participating students. The effect was larger (~17%) for students who were introduced to CTE pathways in their first year of high school.**
- 2 On average, program exposure did not affect 4-year high school graduation rates, 2-year college enrollment, or completion of any postsecondary degree. It did slightly decrease 4-year college enrollment.**
 - The exception: female students exposed to Education programs and URM students exposed to IT programs experienced an increase in 4-year college enrollment of approximately 2 percentage points, as well as an increase in any college completion of about 2 percentage points.
- 3 Students with expanded CTE access were employed for more quarters after high school. This effect was especially pronounced for students with disabilities and for Black or Hispanic students.**
 - This suggests that CTE programs help students make an earlier or smoother entry into the workforce.
- 4 Students with expanded CTE access earned about 9% more than similar peers who were employed one year after high school graduation. However, by age 23, that earnings gap narrows or disappears, meaning non-exposed peers “catch up” in annual earnings.**
 - Students with disabilities (SWD) and male students saw the largest early earnings gains. Initial earnings increased by about 14% percent for male students and by 17.5% for

students with disabilities. Female students, by contrast, did not see comparable wage increases.

- This finding has two implications:
 - Even if annual earnings later converge, early wage gains for students with expanded CTE access still translate into higher cumulative lifetime earnings, since those first few years of additional income are already realized. In other words, “fading” effects reduce the gap in yearly pay but don’t erase the meaningful head start in total earnings.
 - Early earnings gains also raise the opportunity cost of college, making college or training programs less financially attractive right after high school. As a result, some students may enter the workforce sooner, which can boost short-term income but limit longer-term wage growth tied to additional credentials.

5 Because students often sort into career pathways along gender, racial, and disability lines, with male and White students overrepresented in higher-paying technical fields, the programs a school offers largely determine which students benefit.

- Male students were far more likely to enroll in technical and skilled-trade programs (e.g., construction, transportation, IT), while female students gravitated toward education and health services. URM students most often participated in health services, and SWD students in transportation.

IMPLICATIONS FOR POLICY AND PRACTICE

- 1 Expand high-quality CTE opportunities in traditional high schools.** CTE programs, most of which are housed in traditional high schools, can deliver positive college and career benefits, and policymakers should invest in supports that enable these schools to launch and sustain quality programs.
- 2 CTE expansion should be paired with intentional advising and inclusive program design and partnership to ensure equitable access to opportunities.** Because students often sort into pathways along gender and racial lines, with male and White students overrepresented in higher-paying technical fields, districts should actively monitor enrollment patterns, provide early and unbiased career guidance, and design recruitment strategies that broaden participation across student groups. This effort must also extend to employer partners, who play a critical role in shaping student experiences and perceptions of career pathways. Building a diverse pipeline of professionals requires partners who are explicitly committed to inclusion and who showcase proof of concept through diverse representation and equitable hiring practices. Together, these efforts can help ensure that CTE expansion broadens opportunity rather than unintentionally reinforcing existing labor market inequalities.
- 3 Invest in data systems to track outcomes over time.** Longitudinal tracking of CTE participants’ college and employment outcomes, like that used in this study, is essential to understand what works. States should build integrated data systems that

link K–12, postsecondary, and workforce outcomes to continuously improve program design and equity. In addition, states should encourage the collection of detailed information on work-based learning and internship experiences, including whether they are paid or unpaid and the total time or duration of participation, to better assess how these opportunities contribute to students’ long-term success.

FULL WORKING PAPER

This report is based on the EdWorkingPaper “*Does Expanding Access to High Quality Technical Education Induce Participation and Improve Outcomes?*,” published in October 2025. The full research paper can be found here: <https://edworkingpapers.com/ai25-1312>

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