CAREER AND TECHNICAL EDUCATION IN THE ERA OF COLLEGE AND CAREER READINESS

Influences on Youth Postsecondary Aspirations in “Oaksburg,” USA

RESEARCH BRIEF
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Introduction

Career and Technical Education (CTE), a model of vocational education designed to integrate academic and career-related learning, has become central to efforts to promote “college and career readiness” by policymakers and practitioners. However, the increasing popularity and decentralized spread of CTE nationally has led to variation in how educators understand its goals, with unknown implications for program design and student outcomes.

Some scholars have expressed concern that CTE’s success at preparing students for sub-baccalaureate education and work may come at the expense of rigorous preparation for four-year college, inadvertently reproducing tracking between academic and CTE coursework.

This study examines CTE and other career education initiatives in a manufacturing community of Pennsylvania pseudonymously named “Oaksburg.” Data collection was carried out between the summer of 2018 and the fall of 2019. Analyses were completed in the spring of 2021.

OVERVIEW AND PURPOSE

As imagined by policymakers, CTE provides pathways for students to pursue a range of in-demand postsecondary certificates, associate degrees, and other sub-baccalaureate credentials in addition to bachelor’s degrees (BAs). At the same time, CTE has been hailed as an alternative to “college for all” (CFA) approaches to educational equity, which have been criticized as upholding an overly narrow vision of postsecondary success premised on BA attainment (Rosenbaum, 2001; Rosenbaum et al., 2017).

Researchers have found positive impacts of high school CTE on students’ work-related outcomes, including employment and earnings, in the years after they graduate (Brunner et al., 2019; Dougherty, 2016, 2018; Dougherty et al., 2018; Rabren et al., 2014; Theobald et al., 2019). At the same time, CTE has shown mixed impacts on students’ preparation for higher education, with some programs reducing enrollment in four-year colleges (Brunner et al., 2019; Cowan et al., 2019; Dougherty, 2018; Giani, 2019; Witzen, 2019).

While causal impact studies provide a growing understanding of how CTE shapes students’ postsecondary outcomes, they leave interpretation of these outcomes open for debate. Some researchers may assume that reduced four-year college enrollment indicates that CTE students are receiving inadequate academic supports in schools with low expectations for CTE students (e.g., Haycock, 2011; Sutton, 2017). However, others argue that CTE by design exposes students to a wide array of postsecondary learning opportunities, and in some cases pursuing four-year college alternatives will better support students’ long-term career goals (Newman & Winston, 2016; Rosenbaum et al., 2017; Symonds et al., 2011).
Missing from these debates is research on how educators understand the goals of CTE programs, as well as research on the education and career aspirations of CTE students themselves, particularly those who do not plan to attend a four-year college.

This study helped fill these gaps through a case study of “Oaksburg,” Pennsylvania. In addition to implementing the PA Career Education and Work (CEW) standards, many districts across this manufacturing region of the state have developed in-house CTE programs in their comprehensive high schools. These programs frequently involve local occupational advisory committees that advise schools on industry needs and program curriculum. Programs also often provide opportunities for students to earn industry-recognized occupational credentials and/or transferable credits for community colleges or apprenticeship programs. Some of the comprehensive high school programs have received approval from the PA Dept of Education as CTE Programs of Study.

Reflecting the needs of local industry, many of the most developed CTE programs are in manufacturing, although schools have plans to expand to other in-demand areas, including healthcare. Drawing on sensemaking and vocational development frameworks, this study examined how ideals of equity were manifested by educational stakeholders as they made sense of and implemented CTE, and it analyzed implications for student experiences and aspirations.

**METHODS & ANALYSIS**

The study’s methods involved interviews with 52 educational stakeholders across Oaksburg, including comprehensive high school administrators and school counselors, local employers, members of workforce boards and workforce development groups, apprenticeship instructors, and others involved in education and workforce development. Observations (114 hours) took place at meetings between educational stakeholders as well as at student-oriented college and career readiness events.

A student survey on aspirations and vocational development was administered to 1,046 students. Based on survey responses and administrative course-taking data, students were categorized as “trades concentrators,” “college concentrators,” or “non-concentrators.”

**RESEARCH QUESTIONS**

1. How did educational stakeholders, including school administrators and counselors, industry partners, and representatives in workforce development, make sense of CTE’s goals? To what degree were their interpretations consistent or inconsistent with federal and state CTE policy?
2. How did educational stakeholders communicate these interpretations to students and parents? In turn, how did they advise students and families on postsecondary planning?
3. What types of students participated in Oaksburg’s most developed CTE pathways, and what shaped their aspirations for postsecondary education? Did CTE students with sub-baccalaureate aspirations assess BAs as unattainable, or did they believe their goals were better supported with alternative forms of postsecondary learning? How realistic and informed were these assessments, and how did they compare to the assessments of non-CTE students?
Trades concentrators were CTE students in either manufacturing or construction sequences, the most developed CTE programs at the time that the study was administered. College concentrators were non-trades concentrators who spent a great deal of time preparing for four-year college. Non-concentrators were students with little engagement in postsecondary preparation. (See Pullout Box, “Student Concentrator Categories” for further details.)

Youth interviews and focus groups with over 150 high school students and young adults asked about their goals for the future and major influences on those goals.

Analysis involved thematic coding of interviews, focus groups, and observations. Missing survey data was imputed, then regression analyses and Marginal Mean Weighting with Stratification (Hong, 2010) techniques were used to analyze survey results.

**STUDENT CONCENTRATOR CATEGORIES**

Students were categorized into groups for the purposes of comparison. Categories were based on student survey responses and administrative course-taking records. These were not categorizations used by the students’ schools.

- **Trades Concentrators**
  
  In accordance with national and state-level definitions at the time of the study, “trades concentrators” were defined as students who had taken three or more CTE courses in either the manufacturing or construction sequence or underclassmen who had taken two or more courses in manufacturing or construction, with plans to take at least one additional course in the sequence.

- **College Concentrators**
  
  College concentrators included non-trades concentrator students who took steps to prepare for college after high school. This measure was based on student survey responses to questions about college planning; college help-seeking; the number of honors courses planned to be completed by the end of high school; the number of dual-enrollment, AP, or CHS courses planned to be completed by the end of high school; plans to or experience of receiving SAT or ACT tutoring; and educational aspirations. The responses for these items were standardized and combined to construct a unidimensional college concentrator scale (α = .80). College concentrators were defined as students with scores in the top third of the college concentrator scale who were not trades concentrators.

- **Non-concentrators**
  
  Non-concentrators were defined as students who were neither trades concentrators nor college concentrators.

These categorizations do not reflect CTE concentrator status for students in non-trades programs. This is because manufacturing and construction programs were the most developed at the time of the study. Future work could examine differences across various types of CTE students.
Key Findings

EDUCATION STAKEHOLDERS
Education stakeholders unanimously believed in and promoted the importance of CTE and career education more broadly for helping students make informed college and career decisions in the post-“college for all” era.

- Educators, employers, workforce development leaders, and other community members felt that prior commitments to four-year “college for all” had been damaging to students, given PA’s high public four-year college tuition rates and high attrition rates (see Pullout Box, “Four-Year College Debt in Pennsylvania”).
- The local “skills gap,” particularly in advanced manufacturing, is thought to provide rewarding career opportunities for young people with sub-baccalaureate education (on-the-job experience, industry certifications, associate degrees, etc.).
- In turn, stakeholders felt obligated to promote and expose students to a diverse array of postsecondary pathways.
- Stakeholders appreciated the time-intensive nature of completing a CTE Program of Study, and they recognized that the time spent in CTE may come at the expense of other types of coursework.
- School leaders framed CTE improvement as a matter of educational equity, which they considered as opportunity to receive an education relevant to one’s career goals, regardless of whether that career required four-year college.

Education stakeholders worked to elevate the status of CTE and middle-skill careers (careers requiring more education than a high school diploma but less than a bachelor’s degree).

- Stakeholders were passionate about upholding the dignity of all work that contributes to society.
- They frequently pointed out variation in earnings across degree levels, such that some sub-baccalaureate degree-holders earn more than some workers with bachelor’s degrees.
- They also emphasized the important social contributions of middle skill work, such as that of the electrician who keeps our lights on or the mechanic who keeps our cars running safely.

School leaders framed CTE improvement as a matter of educational equity, which they considered as opportunity to receive an education relevant to one’s career goals, regardless of whether that career required four-year college.
At times, education stakeholders pulled upon potentially misleading examples of what middle-skill workers can expect to earn.

- For example, stakeholders commonly shared examples of welders or other tradesmen who earn six figures. While such careers certainly exist, students may not realize that they are exceptional. For example, according to the Bureau of Labor Statistics the median annual income for a welder in 2020 was just under $45,000.
- At other times, stakeholders compared high-earning sub-baccalaureate degrees (e.g. certificate in Information Technology) with low-earning bachelor’s degrees (e.g. BA in social work) without first explaining the generally positive correlation between education and income.
- Exaggerations of how much college debt students take on in pursuit of a four-year degree were frequent. The median four-year college debt in PA was $37,000 in 2018 (Gonzalez et al., 2019) – a high debt load for any student to take on. However, education stakeholders often communicated that students could expect to leave college with a much larger sum of $100k or more in debt.

FOUR-YEAR COLLEGE DEBT IN PENNSYLVANIA

Pennsylvania students have some of the highest student debt burdens in the nation, according to a report by Gonzalez and colleagues (2018).

- In 2018, 65% of students graduating from PA’s non-profit four-year colleges had student debt.
- On average, their student debt was $37,061. This was the second highest average student debt load nationally.
- Students graduating from for-profit colleges have even higher debts, on average.

Student debt hits Pennsylvania’s low-income students the hardest. According to a report by Cochrane and Ahlman (2017), they tend to have more student debt than other low-income students nationally.

- At public four-year colleges nationwide in 2014-15, families earning less than $48,000 on average paid between about $10,000 in yearly tuition with financial aid. In Pennsylvania, families in the same earning category paid between $15,000 and $16,300 per year.
- For Pennsylvania families who earned less than $30,000, this tuition amounted to an average of 289% of their discretionary yearly income, meaning very low-income students often have little choice but to take out substantial student loans.

Not all students who enroll in college (and take on student loans) graduate.

- Almost half of students nationally who enroll in a four-year college drop out. These rates are higher among students from low-income families (National Center for Education Statistics, 2019).
- Without degrees, these students must pay back student loans in jobs where they are likely to earn no more than workers with no college experience.
STUDENT SURVEY RESPONSES

Descriptive Summary

- Most students were categorized as non-concentrators, about a third were college concentrators, and about 1 in 6 were trades concentrators. (See Figure 1.)

- **Trades concentrators** were overwhelmingly male. They had a higher proportion of white students than the student body as a whole. They reported that their parents had lower levels of education than typical students at the school, but they were less likely than other students to participate in the Free/Reduced-price Lunch program.

- **College concentrators** were majority-female and had the highest proportion of white students. They reported the highest levels of parent education (almost half had at least one parent with a bachelor’s or advanced degree), and they were the least likely to participate in Free/Reduced-price Lunch. They also had higher GPAs than non-concentrators or trades concentrators.

- **Non-concentrators**, as a group, were split evenly between male and female students, and they had a higher proportion of Latino/a students than the other groups. They reported lower levels of parent education than typical students and had the highest participation in the Free/Reduced-price Lunch program.

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**Figure 1: Descriptive Summary of Student Survey Participants**

<table>
<thead>
<tr>
<th>Descriptive Survey Data</th>
<th>All Respondents (%)</th>
<th>Respondents By Concentrator Status (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non-concentrators</td>
<td>Trades concentrators</td>
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<tr>
<td>Percent of all respondents</td>
<td>100.0</td>
<td>52.3</td>
</tr>
<tr>
<td>Grade level</td>
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<tr>
<td>9</td>
<td>25.5</td>
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</tr>
<tr>
<td>10</td>
<td>29.1</td>
<td>28.5</td>
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<tr>
<td>11</td>
<td>26.4</td>
<td>25.4</td>
</tr>
<tr>
<td>12</td>
<td>19.1</td>
<td>19.0</td>
</tr>
<tr>
<td>Gender</td>
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<td></td>
</tr>
<tr>
<td>Female</td>
<td>49.7</td>
<td>50.3</td>
</tr>
<tr>
<td>Male</td>
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<td>49.7</td>
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<tr>
<td>Race/Ethnicity</td>
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<tr>
<td>White</td>
<td>75.9</td>
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<td>Latino</td>
<td>17.4</td>
<td>20.8</td>
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<tr>
<td>Black/African American</td>
<td>4.6</td>
<td>5.0</td>
</tr>
<tr>
<td>Asian American</td>
<td>2.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Highest parent education</td>
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<td></td>
</tr>
<tr>
<td>Less than high school</td>
<td>7.8</td>
<td>10.9</td>
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<tr>
<td>High school</td>
<td>27.1</td>
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<td>Some college, no degree</td>
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<td>17.2</td>
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<td>Associate degree</td>
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<tr>
<td>Bachelor’s degree</td>
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<td>Advanced</td>
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<td>Free/Reduced-price Lunch</td>
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<td>GPA</td>
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<td>38.1</td>
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</table>
Results from Regression Models & Marginal Mean Weighting with Stratification

Trade concentrators had lower postsecondary educational aspirations than demographically similar non-concentrators and college concentrators.

- They were less likely to aspire to a bachelor’s or advanced degree and more likely to aspire to an industry credential or associate degree.
- Being a trades concentrator did not appear to cause lower educational aspirations – instead, students who started high school with lower aspirations were more likely to become trades concentrators.

Trade concentrators had strong vocational development.

- They had stronger commitment to a specific career pathway than demographically similar peers.
- They reported high knowledge levels about the career pathway of their choosing.
- They had strong alignment between their education and career aspirations (they were likely to aspire to the level of education that their career goals required – no more, no less).
- These outcomes predict higher self-efficacy and locus of control (Brown, 1999; Coertse & Schepers, 2004; Savickas, 1993) and positive long-term outcomes across a broad number of domains, including academic achievement, career satisfaction and performance, health behaviors, and civic involvement (Anderson et al., 2016; Galvin et al., 2018; Honicke & Broadbent, 2016).

However, trade concentrators overestimated the median earnings of workers with sub-baccalaureate degrees.

- Compared to demographically similar peers, trades concentrators were more likely to believe workers with less than a bachelor’s degree earned more than they actually do. (See Pullout Box, “What is the Return on Investment to College Degrees?”)

- They had especially exaggerated estimations of how much workers with industry certifications earn, on average. They overestimated annual earnings by about $20k.

College concentrators had high educational aspirations and strong vocational development compared to demographically similar peers, but they were more likely to overestimate how much education their desired careers would require.

Non-concentrators had low educational aspirations and they had the lowest levels of vocational development compared to demographically similar peers. They reported little knowledge about or commitment to any specific college or career pathways.

YOUTH INTERVIEWS & FOCUS GROUPS

Recent graduates who had participated in their comprehensive high schools’ revamped CTE programs were grateful for the opportunities the programs provided.

- They reported that participation increased their confidence in their postsecondary plans.
- They felt that their personal strengths and skills were valued by their schools and teachers.

Older graduates who attended high school during the “college for all” era, before many schools began emphasizing career exploration and learning, felt that they missed out on opportunities.

- The older graduates explained that during high school, they had felt undervalued and
disconnected because they were not enthusiastic about attending college.

- Some of these graduates had enrolled in college because they felt that they were “supposed to,” but they ended up dropping out because they felt directionless once enrolled.
- These graduates strongly supported schools’ current push to make students aware of diverse career pathways, including those that don’t require a bachelor’s degree.

High school students in general, and recent graduates who did not enroll in a four-year college, often had inaccurate ideas about college debt.

- A number of the youth believed that a four-year college would leave them with student loans in excess of $100k. This reflects the fact that Pennsylvania college students, especially those from low-income families, have some of the highest debt loads in the nation. However, less than 5% of student loan borrowers hold six-figure debt, and they are almost exclusively from postgraduate programs (Looney & Yannelis, 2018).
- Stress about student loan debt was a major factor in students’ postsecondary decision-making.

Youth were interested in job rewards beyond income.

- Students enjoyed learning about how various careers contribute to society, which an emphasis of many teachers and other education stakeholders in discussions about careers.
- Many recent graduates communicated that qualities of work such as autonomy, lack of repetition, opportunities to learn and grow, work-life balance, and contributions to society were important aspects of their career satisfaction.

WHAT IS THE RETURN ON INVESTMENT TO COLLEGE DEGREES?

Anthony Carnevale and his colleagues (2019) at the Georgetown Center on Education and the Workforce asked this question and found interesting results.

Debt
Students who pursue bachelor’s degrees (BAs) take on much more debt than students who pursue postsecondary certificates and associate degrees.

Short term
Because BA holders have higher student loans, certificates and associate degrees have a higher average payoff in the short-term (10 years). The value of a certificate or associate degree in this time span is an estimated $49,000 - $70,000 more than a bachelor’s degree.

Long term
In the long term (40 years), bachelor’s degrees have a higher average payoff. Their value in this time span is an estimated $141,000 - $287,000 more than certificates or associate degrees.

Takeaway
For students who graduate, four-year college tends to pay off in the long term.
Implications

High school students and young adults highly value opportunities for career exploration and training.
- Those who concentrated in CTE in high school demonstrated strong vocational development.
- Many students feel that their particular strengths are valued and developed through career education experiences.

Education stakeholders (high school administrators, school counselors, teachers, local employers, apprenticeship instructors, and members of workforce boards and workforce development groups) should be careful to communicate a full picture of the typical returns on investment for various certificates and degrees (industry certifications, associate degrees, bachelor’s and advanced degrees).
- Many students enter high school with very little knowledge about the world of work or college.
- In turn, well-meaning efforts to highlight high-earning sub-baccalaureate careers has the potential to mislead students, if they have not already learned about the general positive relationship between education and earnings.
- It is important to communicate about average student debt loads across postsecondary schools, at various degree levels, and for families with varying income levels.

Education stakeholders could plan additional lessons, events, or experiences to explicitly communicate about career rewards other than income.
- Day-to-day qualities of the work environment are important for overall career satisfaction.
- However, many young people do not consider these aspects of careers until they have attained work experience.

Education stakeholders should continue expanding efforts to engage all students in meaningful postsecondary preparation activities.
- In recent years, comprehensive high schools across the region have made seismic shifts in their curricula, scheduling, and programs to promote career learning.
- These efforts appear to be paying off, with strong vocational development observed among students who engage the most in postsecondary preparation.
- Looking forward, many more students could be reached. Those with the lowest engagement in postsecondary preparation may be more likely to be low-income or racial/ethnic minority students. Continued efforts to promote career learning is likely to create more equitable outcomes across diverse student groups.
HOW ARE THESE FINDINGS BEING USED?

Findings from this study have been shared with research and practitioner audiences. In addition to being published as a dissertation, findings were shared in an invited presentation to the Institute for Education Sciences (IES) CTE Research Network, a national group of CTE researchers and practitioners funded by the US Department of Education. Findings were also presented at three academic conferences, and an academic journal article based on this work is under review. Continued efforts are being made to share findings with practitioners and apply lessons to CTE research and implementation.
Citations


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Photos by Jeswin Thomas on Unsplash