Study on the Funding and Governance of Career Technical Education in Vermont

Prepared for

State of Vermont, Legislative Joint Fiscal Office

By

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Executive Summary

Background, Study Approach and Key Findings

Augenblick, Palaich and Associates, Inc. (APA), with its partner National Center on Education and the Economy (NCEE) was contracted by the State of Vermont, Legislative Joint Fiscal Office in October 2022 to conduct a study on the funding and governance structures of career technical education (CTE) in Vermont, authorized by Act 127 of 2022, Section 17[1].

Background and Review. Vermont's CTE system has multiple regional governance structures and a rather complex funding model. For several decades, challenges associated with the funding and governance of CTE in Vermont have been a topic of discussion and study among stakeholders in the state. This study was built upon that foundation of knowledge and included literature/document reviews, national and international CTE policy scans, stakeholder engagement, and data analysis.

The 50-state review of governance and funding policies found a variety of state approaches and that no single approach to either is most common. Governance structures are typically district-based, regional-based, or a mixed approach. Funding approaches include weighted funding or foundation formula, categorical funding, unit-based or resource-based funding, reimbursement, other, or no direct state CTE funding. *States approach CTE governance and funding differently, and Vermont is unique in its approach*.

Stakeholder Engagement. During stakeholder engagement, the study team spoke directly to 140 people through interviews, focus groups and listening sessions, and had around 750 respondents to an online survey, including 260 students. Stakeholders generally felt positive about the responsiveness of their local CTE center to student and industry needs, but also identified barriers and disincentives to CTE participation that can lead to inequity, including:

- Alignment issues between CTE centers and sending schools including calendars, daily schedules, and graduation requirements.
- Alignment issues in CTE between K-12 and higher education.
- Difficulty attracting and retaining qualified CTE teachers.
- Economies of scale challenges in a state with many small settings.
- Funding concerns across the CTE sector, including the tuition-based funding model.

Data Analysis. High level data analysis examined the relationships between governance structures, performance, funding, and student participation in CTE in Vermont.

- No clear relationships exist between governance structures, student performance, funding, and student participation.
- Local decisions at the individual center level, and in the communities that support the centers, seem to be a more significant contributor to the opportunities offered for students.
- Proximity to the CTE center corresponds with the level of CTE participation by students.

[1] https://legislature.vermont.gov/Documents/2022/Docs/ACTS/ACT127/ACT127%20As%20Enacted.pdf

Recommendations

In order for Vermont to reduce barriers to enrollment and improve the quality, duration, impact, and access to CTE, as stated in the RFP, as well as to meet the state's evolving workforce needs, simple changes in the system's governance or funding will not be sufficient.

The study recommendations assume that Vermont sees CTE as a key part of its statewide workforce development system to meet evolving workforce needs to keep the state competitive.

Many of the recommendations are related to two overarching themes identified in the study team's work that impact not only CTE, but other areas of Vermont's K-12 system: alignment and economies of scale.

In each recommendation area, recommendations that are more easily made within the current governance and funding structures are at the beginning of the section and recommendations that likely require greater change to current structures are at the end of each section.

Rec. Area	Recommendation
Funding	1. Provide additional funding and incentives or grants to create more accessibility for students whose sending high school is not on a shared campus with a CTE center.
Funding	2. Create a facilities funding system for CTE programs to address current facilities deficiencies, update program equipment, address enrollment needs, and plan for the future. The system should focus on updating facilities and growing capacity for the programs most needed for workforce development in the state.
Funding	3. Design a funding system that treats all CTE equitably while incentivizing additional CTE capacity in high-growth sectors, utilizing a weighted student funding formula that differentiates funding by CTE program type with funding flowing directly to CTE centers from the Education fund, eliminating tuition-based funding. Additionally, eliminate the six-semester FTE average for funding purposes.
Policy	4. Require regions to align certain systems including calendars and academic requirements, to improve the efficiency of the system for students and staff, providing better outcomes in the system.
Policy	5. Review CTE teacher preparation and licensure requirements and salary policies with an aim of attracting high-skilled industry professionals to teaching.
State Capacity	6. Invest in additional staffing at AOE to provide support to CTE educators across program areas and increase program quality, monitor the system, and to help ensure equity of CTE opportunity across the state.
State Capacity	7. Require that career exploration be offered to all middle school students across the state to increase awareness of CTE offerings as students enter high school.
State Capacity	8. Encourage greater secondary-postsecondary collaboration and require alignment/acceptance of credentialed Vermont CTE center pathways as precursors for enrollment into Vermont CTE postsecondary programs, eliminating the need for core course repetition and ensuring faster and lower cost credentialing for students.
Larger Systems Change	9. Examine current distribution of programs across the centers in the state and consider offering more programming outside of CTE centers (e.g., at sending schools or college) to expand opportunities for students.
Larger Systems Change	10. Consider creating either a coordinated regional governance structure or a single district for CTE. If the state's intentions are equity for all students and developing a statewide workforce, then the state needs a more coordinated and coherent statewide strategy for CTE.

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Introduction

Augenblick, Palaich and Associates, Inc. (APA) was contracted by the State of Vermont, Legislative Joint Fiscal Office in October 2022 to conduct a study on the funding and governance structures of career technical education (CTE) in Vermont. Authorized by Act 127 of 2022, Section 17[2], the scope of work for the study required APA and its partner, National Center on Education and the Economy (NCEE) to:

1. Complete a systematic examination of the existing funding structures of CTE in Vermont and how these structures impede or promote the State's educational and workforce development goals;
2. Examine CTE governance structures in relationship to those funding structures;
3. Examine the funding and alignment of early college and dual enrollment as they relate to CTE;
4. Examine the barriers to enrollment in CTE, early college, and dual enrollment and provide recommendations for addressing these barriers; and
5. Identify and prioritize potential new models of CTE funding and governance structures to reduce barriers to enrollment and to improve the quality, duration, impact, and access to CTE statewide.

Background

Vermont's CTE system has multiple regional governance structures and a rather complex funding model. For several decades, challenges associated with the funding and governance of CTE in Vermont have been a topic of discussion and study among stakeholders in the state, resulting in many reports, proposals and legislative action. In recent years, such actions include:

- Act 51 of the 2015 legislative session, required several state agencies to provide a report[3] "on how Vermont's CTEs can be better utilized to provide training aligned with high-wage, high-skills, high-demand employment opportunities in Vermont…" The report's recommendations included ensuring the deliberate acquisition of 21st century skills, targeting of CTE offerings to six identified priority sectors, and promoting attainment of nationally recognized certifications and postsecondary opportunities.
- Act 189, enacted in May 2018, was intended to explore a redesign of Vermont's workforce development and training system, including authorization of up to four pilot sites/projects to help develop and study proposals to change the CTE funding and/or models. The Career Technical Education Funding Pilot Projects and Middle School Collaboration report was submitted to the legislature June 14, 2021[4]. One of the report's recommendations was to consider simplifying the current CTE structure into a smaller number or regional centers or to create one statewide CTE district with regional hubs.

[2] https://legislature.vermont.gov/Documents/2022/Docs/ACTS/ACT127/ACT127%20As%20Enacted.pdf
[3] https://education.vermont.gov/sites/aoe/files/documents/edu-legislative-report-act51-career-technical-education.pdf
[4] https://legislature.vermont.gov/Documents/2022/WorkGroups/House%20Education/Reports%20and%20Resources/W~Agency%20of%20Education~Career%20Technical%20Education%20Funding%20Pilot%20Projects%20and%20Middle%20School%20Collaboration%20Report~6-14-2021.pdf

- Act 80 of 2019 included a provision aimed at studying how Vermont Technical College (VTC) could offer degree programs at regional CTE centers. This led to a report[5] issued in January 2020, outlining a pilot program to provide credit to high school-aged students attending CTE centers that would be sequentially aligned toward an associate degree at VTC. This report identified challenges to be overcome, including limited funding; potential competition for tuition dollars between schools, CTE centers and VTC; and ensuring VTC accreditation requirements continue to be met. A January 2023 memo[6] documents progress in creating the pilot program.

A list of recent reports and studies related to CTE in Vermont reviewed by the study team can be found in Appendix A. Despite years of deliberation and study, little policy change on the governance or funding of CTE in Vermont has occurred, leading to the creation of this study.

Study Methods

The study team used a combination of quantitative and qualitative methods to address the study questions. This included literature/document reviews, state policy scans, stakeholder engagement, and data analysis. Table 1 below, provides an overview of each method and the study area that was informed by each.

Table 1. Study Topic Areas and Related Study Activities

	Study Activity		
Study Topic Area	**Literature/ Document Reviews and Policy Scans**	**Stakeholder Engagement**	**Data Analysis**
Existing funding structures for CTE in Vermont	X	X	X
Existing governance structures for CTE in Vermont	X	X	X
Funding and alignment of early college and dual enrollment as they relate to CTE		X	X
Barriers to enrollment in CTE, early college, and dual enrollment		X	X
Potential new models of CTE funding and governance structures	X	X	X
Financial analysis of Vermont's current system of funding CTE services as well as annual budgets at the State's 17 CTE centers			X

Literature and document reviews, which included reviewing recent study reports on CTE in Vermont, provided the study team with a baseline understanding of the current structure and status of the state's CTE system. A **national policy scan** documented other state approaches to CTE governance, which the

[5] https://legislature.vermont.gov/Documents/2022/WorkGroups/House%20Commerce/Reports%20and%20Resources/W~Vermont%20State%20College%20System~Study%20on%20Delivery%20of%20Vermont%20Technical%20College%20Degree%20Programs~3-18-2021.pdf

[6] https://education.vermont.gov/sites/aoe/files/documents/edu-state-board-item-g-03-15-2023.pdf#:~:text=In%20accordance%20with%20Act%2080%20of%202019%20and,This%20report%20was%20due%20on%20January%2015%2C%202023.

team supplemented with an exploration of some the most successful CTE systems internationally. A national policy scan examined CTE funding systems in other states, including how students are counted for funding purposes; the mechanics of funding practices (for example, weighted funding, categorical grants, etc.); and the amount of funding available and funding sources.

Stakeholder engagement was an important component of the study, as understanding the perspectives of the system itself and the districts and students it serves, is vitally important when considering any changes to the system. The study team used a multi-tier approach for stakeholder engagement including initial level setting meetings with people in various roles in the CTE system, meetings with CTE center directors, meetings with Vermont Agency of Education (AOE) staff and state legislators, in-person listening sessions open to all system stakeholders (broadly defined to include administrators, teachers, families and students, business and industry leaders, and community members). Through these meetings, the study team engaged approximately 140 individuals in conversation about CTE in Vermont. In addition, an online survey allowed any stakeholder in the state to provide feedback to the study team; approximately 750 people participated in the survey, 270 responses came from students.

The study team used data from the AOE to conduct its **quantitative data analysis.** Data was requested in three categories: 1) revenues and expenditures; 2) student enrollment and counts by career clusters; and 3) regional CTE center performance. The quantitative data analysis provided an objective description of CTE funding, spending, and performance across the CTE regions (For example: Where does the money come from? How much is spent? Are some CTE regions achieving greater student outcomes than others?).

Report Format

The report begins with Current State CTE Context, Governance and Funding Approach, describing the current landscape with an overview of Vermont's current state context that impacts CTE, including how CTE is governed and how it is funded. The following section, Study Activities and Findings, details the study's research activities and associated findings, including results from the national policy and literature reviews, stakeholder engagement activities and quantitative data analysis. Next, Recommendations outlines the study team's recommendations. Finally, the Appendices includes additional materials referenced by the study team throughout the report.

Current State CTE Context, Governance and Funding Approach

State Context That Impacts CTE

CTE sits at the intersection of K12, postsecondary, and workforce, and it is important to consider not only how CTE itself is structured, delivered, and funded, but also how CTE interacts and aligns with the broader education and training system of other relevant state agencies and key stakeholders involved in setting and attaining economic and workforce development goals for the state. CTE at the high school level is intended to provide a pathway into not only the labor market but also to related postsecondary programs and training to help prepare students for success in a modern, global, and competitive economy.

Vermont has a very complex and multi-layered school governance system, where a history of local control permeates many aspects of decision making. There are currently about 150 Local Education Agencies (LEAs) in Vermont despite its small size. This is true even after Vermont school districts began new voluntary merger negotiations and restructuring through a process known as unification following the passage of Act 46 in 2015[7]. The state has a total of 83,000 K-12 students of which 25,000 are high schoolers, the smallest number of high school students in any state, and many districts and schools serve a very small number of students[8]. Further, the student population continues to decrease; the number of students ages 6-17 is expected to decline 5 percent between 2020-2030[9].

In 2013, through Act 77, Vermont introduced a Flexible Pathways model with a goal of encouraging and supporting districts in developing and expanding high-quality educational experiences for high school students. Flexible Pathways include CTE, dual enrollment, early college, work-based learning, and virtual/blended learning. This means that CTE is one option among many and CTE centers are competing for a shrinking number of students. There are also implications for high schools when students choose to enroll at a CTE center. The sending schools must make a tuition payment to the CTE center for every student participating in CTE. This expenditure reduces the amount of funding available for general school operations and some schools may struggle to support the staff required to teach the full complement of classes they might want to offer as a result.

The demographic decline is also impacting Vermont's workforce. The labor force is down by about 20,000 workers from its pre-pandemic high, mostly due to retirements. The Vermont Futures Project reports that by 2040, the state will need an additional 10,000 workers per year.[10] Adding to the challenge, the jobs of the future will require more technical and specialized skills. According to the McClure Foundation, Vermont's most promising jobs typically require education or training beyond high school.[11] Therefore, in addition to the demographic decline, Vermont needs to produce a workforce with the right skills and education to move into the high-skill, high-wage jobs of the future. This will be a

[7] https://education.vermont.gov/vermont-schools/school-governance/merger-activity

[8] https://nces.ed.gov/programs/digest/d22/tables/dt22_203.30.asp?current=yes
https://nces.ed.gov/programs/digest/d22/tables/dt22_203.20.asp?current=yes

[9] http://www.truenorthreports.com/joint-fiscal-office-forecasts-fewer-students-more-retirees-by-2030

[10] https://vtfuturesproject.org/workforce-talent/

[11] https://mcclurevt.org/most-promising-jobs/

challenge. Currently, just 60 percent of Vermont high school graduates enroll in a 2-yr or 4-yr program within six months of graduation.[12] This is below the national average of 66 percent.[13] Even though Vermont attracts many college students from other states, they tend to leave upon graduation: 57 percent of Vermont's college graduates leave the state, the highest "brain drain" among states nationally.[14]

The state has established goals for workforce development and the Agency of Commerce and Community Development has several training programs targeted at key industries and underserved populations. However, the state has not come together to create a comprehensive economic and workforce development strategy with clearly identified priority industry areas to provide guidance for CTE development. The last statewide report from the Agency of Commerce and Community Development was completed in 2016.[15]

CTE is overseen by AOE with the State Board and AOE Secretary sharing rule-making authority. CTE staff at AOE provide technical assistance and support for CTE program improvement, new program design, state and federal grant compliance and high school transformation initiatives related to CTE. The CTE team works with high schools and regional CTE centers to develop and support programs based on state standards. AOE staff positions have been reduced to 3 current positions (director, federal program coordinator, and career pathways coordinator). While the state has funded small innovation grants and pilot programs, it has not scaled successful models statewide.

CTE program offerings are based on input from the local Regional Advisory Board (RAB) and evidence of industry demand in the region.

Vermont CTE Governance

CTE is delivered at regional centers serving multiple sending high schools and often from multiple school districts. The state is divided into 15 regions and there are 17 technical centers. Eleven CTE centers are co-located with a "host" high school in the designated region. In these settings, the center director reports to the host district superintendent. The CTE center budget is also part of the host school district's budget and voted on only by residents of the host school district. The superintendents and principals of sending districts and schools can have a voice as part of their regional center's Regional Advisory Board, but no direct authority related to governing and how money is spent. As mentioned later in the report, this can lead to a number of challenges only solved by strong relationships within the regional communities.

Four regional CTE centers operate as independent Regional Technical Center School Districts, serving high schools in their regions. In these settings, each center has its own school board, the center director is also the superintendent, and all residents of the regional district vote on the CTE center budget. In one region CTE is provided by two private schools (Lyndon Institute and St. Johnsbury Academy), each of

[12] https://advancevermont.org/data-dashboard/#/enroll-seniors
[13] https://research.com/education/percentage-of-high-school-graduates-that-go-to-college
[14] https://www.washingtonpost.com/business/2022/09/09/films-assigned-college/
[15] https://outside.vermont.gov/agency/ACCD/ACCD_Web_Docs/ED/MajorInitiatves/CEDS/2020FullReport.pdf

which has its own Board of Trustees that makes decisions about CTE offerings and the CTE budget, with no input from the public. Additionally, two comprehensive high schools in the more isolated Northeast Kingdom area have state approval to offer CTE programming.

Details on the three models of governance used in Vermont and the 17 regional centers can be found in Appendix B.

Regardless of the specific model, regional CTE centers across the state each serve between 2-11 sending public high schools. They may also serve students from private and alternative schools, and out-of-state students. To ensure that Centers meet the needs of sending schools, the state requires host high school boards to form a Regional Advisory Board (RAB) to play an advisory role. Vermont's CTE funding is a tuition-based model, which is discussed in detail later in this section. High schools and CTE Centers "share" students such that each sending school pays tuition to the regional CTE Center for the students from its school that enroll there.

CTE Center Staffing

CTE Centers hire directors and CTE teachers with expertise in the industry area they teach. Vermont licensure rules require CTE teachers with a bachelor's degree and a minimum of four years of work experience to complete a teacher education program and pass the Praxis Core exams in reading, writing, and math. (There is an alternate route for those with less than a B.A. that gives prospective CTE teachers an apprenticeship license that allows them to complete a teacher education program while they are teaching.) Like other educators in the district, their pay is based on negotiated salary rates in the district and can vary widely even though the job roles are the same. Some Centers also hire academic teachers to support students and assist CTE teachers with the integration of academic and technical instruction.

Vermont reports teacher shortages in high-demand CTE subjects, particularly IT and other STEM fields where CTE teachers have attractive employment opportunities in the private sector. One challenge for CTE teachers is that teaching salaries generally do not take into account relevant workforce certifications or prior years of work [16] in the industry. For instance, starting pay for a CTE teacher is around $40,000, while an entry level software engineer could make about $60,000. This can make hiring and retaining CTE teachers more challenging [17]. While some states offer CTE teachers bonuses or higher salaries to attract them to the teaching field, Vermont does not have any special subsidies in place.

CTE Programming

Unlike most states which offer CTE to students in three-to-four-year sequences, Vermont regulations restrict CTE programming to the last two years of high school (grades 11-12). According to AOE staff, the State Board of Education via Series 2370 CTE regulations[18] chose to focus resources on these older students who would be ready for more rigorous industry-focused instruction and experiences requiring sophisticated equipment housed at the regional CTE Centers. This means that CTE students have to fit

[16] https://www.wcax.com/2022/09/20/cte-brings-back-building-trades-program-help-fill-gap-labor-force/
[17] https://www.indeed.com/career/entry-level-software-engineer/salaries/VT
18 https://education.vermont.gov/sites/aoe/files/documents/edu-state-board-rules-series-2370.pdf

their full set of CTE courses into their 11th and 12th grade schedules. CTE Centers visit sending schools in their regions to recruit students. Each Center has different admissions standards and processes, including creating applications and reviewing transcripts, and attendance and discipline records.

There are two Perkins funded options for 9th and 10th graders to engage in introductory CTE programs:

- ***Pre-Tech Foundations*** programs are designed to familiarize 9th and 10th-grade students with occupations in a career cluster area and instruct students in foundational core academic and occupational skills. Programs must run an average of 200 minutes per week. In most, these are only offered to students in the host high school (an exception is Patricia A. Hannaford Career Center which makes them available to students from sending high school).
- ***Pre-Tech Exploratory*** programs are designed to provide 9th and 10th-grade students with an introduction to all CTE programs at the regional CTE Center. These programs include applied instruction in core academic subjects and are designed to assist students in career exploration, including exploration of career areas nontraditional to their gender, and decision making. Programs must run an average of 120 minutes per day.

It is left up to the local centers and high schools to decide if they want to offer these programs, mostly depending on space and teacher capacity. While these programs could be an effective way to recruit CTE students, only about half of the CTE Centers offer Pre-Tech foundation programs and 10 of the 17 Centers offer Pre-Tech Exploratory programs. As such, only about 12 percent of 9th and 10th graders across the state participate in a Pre-Tech Exploratory or Foundations program[19]. Perkins Act V, the latest amended federal legislation from 2018, requires that states provide career exploration and career development activities beginning before high school in the middle grades.

CTE program options are intended to vary by region depending on regional economic needs and the availability of industry partners, with most Centers offering around 10-12 programs of study (the state has approved approximately 80 CTE programs in total). There is currently not a mechanism in place to ensure that the state as a whole is developing a workforce with diverse skills to meet the future needs of employers across key industries and support a robust economy. AOE has the authority to disapprove new programs if they are duplicative or not in high-wage, high-demand industry areas, but the agency does not have authority to drive programming in particular areas.

Programs are offered either part-time or full-time and how that is organized can vary by Center. According to Vermont regulations, a part-time program provides 600 minutes/week of CTE instruction, and a full-time program provides 1,200 minutes/week. Some Centers offer part-time with a morning and an afternoon shift, with others offer part-time with one grade in the morning and one in the afternoon. Some programs are one year, others are two. Some of the Centers (more often those offering full-time programs) also provide the full complement of required academic and CTE instruction on-site so students do not have to commute back and forth between the Center and their home school.

[19] Pre-Tech participation rate provided to the study team by the Agency of Education.

Despite an overall declining student population, CTE participation as a percent of the student population has grown incrementally over the past decade and was 32 percent in 2022. Participation is different from concentration, which Vermont defines as students taking at least two CTE courses. About 20 percent of Vermont students are concentrators. As shown in Table 2 below, these numbers are below the national average which is 77 percent participation and 37 percent concentrators.[20] Vermont also lags behind in the percent of concentrators who graduate with a postsecondary credential, which is 30 percent in Vermont and about 37 percent in states that track that data. [21]

Table 2. Vermont and U.S. CTE Participation, Concentrator and Credential Rates

	Vermont	U.S.
NCTE Participation Rate	32%	77%
CTE Concentrator Rate	20%	37%
Percentage of CTE Concentrators Who Graduate with Postsecondary Credential	30%	37%[22]

Dual Enrollment/Fast Forward

To understand CTE alignment with dual enrollment policies in Vermont, it is important to understand the overall landscape of technical postsecondary options. Vermont has two institutions that provide postsecondary technical education and are currently eligible to receive federal Perkins funding[23] to support CTE at the college level: the Community College of Vermont (CCV) and the Vermont Technical College (VTC). CCV offers two-year programs in areas such as business, healthcare, Information Technology (IT) and manufacturing while VTC offers both two- and four-year programs in areas such as agriculture, plant and animal sciences; nursing and health professions; and engineering and computing. VTC is the smaller institution which has struggled with enrollment in recent years and is currently in the process of being merged with two other colleges to form a new Vermont State University in July 2023. Once part of the university, it will not be eligible to directly receive Perkins grant funds. AOE or the CTE centers could choose to contract with the new Vermont State University to offer dual enrollment at the same Fast Forward per course cost reimbursement rate

Vermont, like many other states, has created options for high school students to earn college credits before they graduate. There are two separate programs: Dual Enrollment and Fast Forward. Dual Enrollment allows any 11th or 12th grade student (CTE or non-CTE) to take two college courses at 15 Vermont colleges. There is a separate dual enrollment program just for CTE students known as Fast Forward.

Fast Forward allows 11th and 12th grade CTE students to get credit for up to two college courses per semester through either CCV or VTC. This is in addition to any dual enrollment classes they might access.

[20] https://www2.ed.gov/datastory/cte/index.html
[21] https://cte.ed.gov/pcrn/profile/national/performance/2021/population/summary/met/secondary/all
[22] Based on available state data
[23] The federal government, the primary funder of CTE through the Perkins Act, provides states with categorical funding to deliver CTE at both the secondary and postsecondary levels. See Appendix C for more information.

Not all CTE Centers and not all programs within CTE Centers offer these Fast Forward course options. It is up to the Centers to form a partnership with CCV or VTC. Funding is provided through the Perkins federal grant and allocated by AOE to CCV and VTC.

Fast Forward classes are provided at the CTE Centers and taught during the regular school day by CTE program instructors who are approved to teach as adjunct faculty by CCV or VTC; students receive both high school and postsecondary credit for Fast Forward courses. Students who want to participate have to apply and meet admissions criteria, which can include having qualified WorkKeys or Accuplacer scores which are work and college readiness tests from two national test companies, ACT and College Board, respectively.

CCV is the primary provider of Fast Forward classes. As part of its quality assurance process, CCV approves teachers at CTE centers to offer college classes; requires that these teachers attend a class on the pedagogy for teaching; approves the course syllabus; and conducts an initial and periodic classroom observations. As compensation, AOE pays CCV approximately $1,000 per course taught at each CTE Center using Perkins reserve funds. CTE Centers receive $100/student enrolled in Fast Forward courses.

CCV Fast Forward student enrollments have generally been rising (apart from the pandemic years) and was at an all-time high of 750 students in school year 2021-22. This represents 15 percent of Vermont's CTE students and 25 percent of Vermont's CTE concentrators. (Comparable data from VTC are not available.)

In total, 37 percent of CTE concentrator graduates (2022) earned college credits while still in high school.24

In general, in our scan we found that student access to CTE was highly uneven across the state and depended on a number of variables including a student's home high school, their regional CTE center, program offerings coordinated by that center, and whether those programs worked in partnership with CCV or VTC to offer Fast Forward courses. The variation is less correlated to a region's CTE governance and delivery structure and much more dependent on decisions made by the high schools, CTE centers, and postsecondary partners which impact a student's ability to access CTE and the duration and quality of the CTE learning experience.

Vermont's CTE Funding Approach

Vermont's overall school finance system "uses a statewide funding formula coupled with local spending decisions and state education property tax administration at the local level.[25]" All school budgets are funded through Vermont's Education Fund. Each year, school budgets are approved by local voters and the district's education spending per pupil determines the education tax rate paid by the member town(s) of each school district. Thus, the tax rate for each town is in part dependent on the district's

[24] AOE staff Ruth Durkee provided these data for 2022 by phone. This report shows 36% in 2021: https://labor.vermont.gov/commissioner-notes/french-harrington-training-and-cte-are-vital-future-vermonts-workforce

[25] https://legislature.vermont.gov/assets/Legislative-Reports/GENERAL-366459-v2-2023_Report_on_Education_Financing.pdf

spending per pupil, including its CTE spending. These local property taxes, along with other tax sources, fund the Education Fund.

When centers are located in a host district, the CTE center budget is contained within the host district's budget, and local voters in that host district approve the budget. In the regional technical center district model, once the regional technical center district adopts its budget, it becomes an obligation of all member districts. Districts that send students to private institutions simply pay the institution's tuition rate.

The state makes a contribution from the Education Fund to help offset the cost of CTE for all in-state students statewide through the Supplemental Assistance Grant, explained in more detail later in this section. This contribution comes "off the top" of the Education Fund, meaning that allocation comes before allocation of funds to districts, and the cost of that contribution is borne by all districts statewide.

Additional state contributions to centers from the Education Fund include salary assistance and transportation assistance[26]. FY 2024 CTE transportation is provided at a rate of $3.23 per mile. Salary assistance includes a portion of salary and benefits for CTE Center Director, Guidance Director, Co-op teacher, Assistant Director for Adult Education, and in some cases (enrollment and population dependent), Assistant Director of CTE Center.

Vermont's funding system for CTE is based on a formula that includes student participation in CTE as measured in full time equivalents (FTEs). A large portion of CTE center funding comes in the form of tuition payments from sending districts; the FTE calculation is intended to determine each sending district's portion of the cost of the CTE center. Vermont uses a six-semester (or 3-year) FTE rolling average to determine costs for sending districts, which helps stabilize center budgets during times of short-term lower enrollment. The state does have a provision for supplemental assistance for centers experiencing enrollment growth.

How CTE Center Budgets and Tuition Rates are Determined

Each CTE center sets its budget, the exact process is dictated by the center's governance model, and once the budget is approved, establishes the CTE tuition for the upcoming school year through the following process. First, the center determines its actual cost, excluding federal grants, state salary assistance and equipment, and facility usage income. This is the center's net cost, and the amount to be raised through tuition.

To determine the CTE tuition rate, that net cost is divided by the total student FTEs – the anticipated number of out-of-state FTEs plus the (in-state) six-semester FTE average. This is the tuition rate to be charged to out-of-state students. To determine the in-state tuition rate, the full tuition rate is reduced by the Supplemental Assistance Grant, a tuition reduction grant, calculated by multiplying the six-

[26] Testimony of AOE Finance Manager Brad James to House Education Committee 2/2/23, https://legislature.vermont.gov/committee/meeting-detail/2024/10/525

semester average FTE by 35% of the state's base education amount[27]. For FY2024, this supplemental grant assistance is $4,375 per FTE[28].

Tuition Payments to Centers

The actual payment of tuition for in-state students comes in two phases. First, the AOE makes a payment to each CTE center "on behalf" of sending high schools. The "on behalf" payment is equal to 87 percent of the state's base education funding amount, multiplied by the six-semester FTE average of each sending high district[29]. Although paid out of the Education Fund by AOE to the center, these "on behalf" payments come directly from the state instead of being sent to each district. The second phase is a tuition payment from the sending district to the CTE center. For each sending district, the in-state tuition amount is multiplied by the district's six-semester average. The "on behalf" payment is subtracted, and the remaining balance is the tuition amount due to the center from the sending district.

[27] https://legislature.vermont.gov/statutes/section/16/133/04011
[28] Testimony of AOE Finance Manager Brad James to House Education Committee 2/2/23, https://legislature.vermont.gov/committee/meeting-detail/2024/10/525
[29] https://legislature.vermont.gov/statutes/section/16/037/01561

Study Activities and Findings

The study team describes study activities and findings in this chapter of the report.

CTE Governance Literature/Policy Review

The study team first completed a review of available literature and policies relate to CTE governance, both nationally and internationally. Through this review, the study team also developed a programmatic summary of what CTE can look like in these different contexts, which is provided in Appendix C, CTE in the U.S. and Other Countries, for further background.

State Approaches to Governance and Delivery

CTE is overseen and organized by states, as they oversee education. As highlighted in Table 3 below, in 21 states, CTE delivery is organized at the district level. In the districts in these states, CTE may be delivered at traditional/ comprehensive high schools, technical/vocational high schools, career academies, early college high schools and community/technical colleges as well as via apprenticeship programs.

In three states, CTE is delivered regionally (or primarily regionally). In these states, CTE is offered at regional technical centers with facilities designed to accommodate specialized training equipment so students can engage in hands-on learning. At these regional centers, students from multiple districts take CTE classes (either full-time or part-time in combination with classes provided by their home high school).

Most states (26) use a mixed model, combining district based and regional CTE delivery. In some states there is a statewide regional structure in addition to voluntary CTE programming in districts. In other states a set (or sets) of districts have joined networks to offer CTE across their districts (often in areas of the state with scattered population or many small districts unable to fund robust programs) alongside bigger districts in the state that offer their own CTE programming. Another approach for states is a statewide regional governance structure for schools that takes on the role of overseeing CTE in all or some cases. Regional CTE centers are sometimes governed by the state, by regional school boards, sometimes independently, and sometimes jointly by a set of districts.

Vermont is one of three states (along with Maine and New Hampshire) that organize CTE delivery using a regional system. In all three states, the CTE center is typically located on the campus of one ‘host’ high school and serves a designated number of high schools from area school districts. Students are required to apply in order to attend regional centers and application requirements, such as transcripts and attendance and discipline records, and admissions standards vary by center. Table 3 below shows a summary of CTE governance models by state, additional detail can be found in Appendix D, CTE State Governance Model Table.

Table 3. Governance Model by State

CTE Governance Model	
District-based	CO, DE, FL, GA, HI, KS, LA, MD, MN, MS, MT, NE, NV, NM, NC, OH, OR, TN, WV, WI, WY
Regional-based	ME, NH, VT
Mixed	AL, AK, AZ, AR, CA, CT, ID, IL, IN, IA, KY, MA, MI, MO, NJ, NY, ND, OK, PA, RI, SC, SD, TX, UT, VA, WA

State Role in Guiding the CTE System

States also vary in how much leadership the state takes in directing CTE and how much authority is allowed at the local level. Some states limit their roles, either because of a desire to allow local control of CTE or because of limited capacity at the state level. Vermont has a very localized system and currently does not have state capacity to provide much CTE oversight or support. In addition to leaving much of the decision-making to the local CTE centers and school communities, Vermont is unable to provide professional development and technical assistance that could strengthen CTE programming and coordination.

In recent years, many states have taken more of a role in organizing and supporting CTE at the state level, seeing it as a key part of its workforce and economic strategy. States that have embraced this leadership role have defined state program standards and curriculum, defined training pathways for student to postsecondary, negotiated state level articulation agreements with postsecondary institutions, required work-based learning for CTE students, provided sequenced early career guidance and counseling, and provided professional development for CTE teachers and technical assistance for CTE directors, among other priorities. A key benefit to a more centralized approach is coordination of CTE with broader educational attainment and economic development priorities, positioning CTE as a pathway into college and careers.

One example of a state that has moved to a more unified statewide CTE system is **Delaware**. As a result of a series of reforms over the last ten years designed to give more students access to high-quality CTE programs, Delaware developed a set of priority CTE programs of study, known as Delaware Pathways, that are offered in almost all high schools. CTE students earn college credits, complete work-based learning, and can enroll in aligned community college programs to earn an associate degree after they graduate high school. Delaware Pathways has grown exponentially since its inception. In 2019-2020, approximately half of high school students (20,000 learners) were enrolled in a Delaware Pathway program, compared to just 13 percent participating over the 2015-16 school year.[30] [This does not include other non-Pathway CTE options, which brings overall CTE enrollment up to 28,000 students.[31]]

[30] https://careertech.org/resource/delaware-pathways
[31] https://cte.ed.gov/profiles/delaware

Delaware's goal is to have 32,000 students enrolled in Pathway programs, which would be 80 percent of high schoolers.

In Massachusetts students can participate in CTE in comprehensive high schools and at stand-alone technical vocational centers offering rigorous, full-day, four-year programs of study encompassing both academic and technical education. Massachusetts sets rigorous standards for program approval, including curriculum, teaching, equipment, oversight and review. Unlike CTE programs in some other states, which tend to be broader in scope and often resemble career explorations, CTE programs in Massachusetts are more in-depth and intensive with three-year sequences of courses.[32] The state regularly reviews and revises the frameworks and devises new ones to stay current with labor market needs. Massachusetts does have system capacity challenges, with only 18 percent of students enrolled in CTE and wait lists at many centers; it is now exploring options to expand access to students by offering courses outside of regular school hours.

A fuller description of the Delaware and Massachusetts CTE systems can be found in Appendix C.

CTE Governance and Delivery Internationally

CTE —called vocational education and training or VET internationally — is organized very differently in top performing countries than in the US. Students commonly enroll in two- to three-year programs at about age 16 that are the equivalent of two years of a US high school CTE program plus a year of community college. These programs lead to a portable career credential signaling mastery of technical knowledge and content and qualifying them for entry level work. VET is closely integrated with economic and workforce development goals, with employers and industry helping to design and oversee programs that reflect current industry expectations and lead to qualifications valued by employers. This requires a high level of coordination among the system partners and a focus on continuous updating to reflect the changing needs of employers and of the government's economic development goals. While VET is a distinct pathway for students, most high performing systems allow VET students to apply to both academically focused higher education programs as well as advanced technical programs if they chose to pursue additional education. These countries typically have a much more robust sector of polytechnics that offer well-regarded advanced technical training and degrees than do states in the US.

VET models vary by country. Some, such as Singapore, provide technical instruction at the school site in state-of-the-art simulated classrooms designed with employer support. Students have internships in companies throughout their time in a program. Others, such as Switzerland, are employment-based with students spending much of their time in paid on-the-job training, supplemented by related coursework in the schools. NCEE has identified common features and key characteristics of these very different but successful VET systems based on our studies of VET systems around the world. These include:

- Students have a solid academic foundation upon entry;
- Career guidance and early career exploration opportunities are provided early;
- Programs are designed to prepare students for in-demand jobs;

[32] https://www.k12dive.com/news/why-massachusetts-cte-approach-works-and-what-other-states-could-learn/503864/

- Programs integrate academic and technical learning and offer a combination of hands-on and theoretical learning;
- Teachers have industry experience and are given regular opportunities to stay current with changing industry and workplace standards;
- Students learn in authentic work settings;
- Students are expected to meet industry standards, as determined by an industry expert, and earn credentials with value in the labor market; and
- CTE is not a dead end; students have opportunities for postsecondary study, including university.

These systems attract a broad cross-section of students and there is high demand for these programs. This is true in both Switzerland and Singapore where more than half of all students enroll in CTE programs.

Profiles of the Singapore and Switzerland systems — two of the strongest globally — can be found in Appendix C. These two countries are about the same size as a U.S. state.

State CTE Funding Policy Review

The study team conducted a review of each state's mechanism to fund career and technical education. This review focused on the allocation of state funds to support CTE, excluding the distribution of federal Perkins funds. Just as the CTE governance systems differ across the states, how a state funds CTE differ, and differences are often closely aligned with its overall K-12 education funding approach.

As previously noted in the review of the current system, Vermont's funding system for CTE is tuition-based, where sending districts make tuition payments to CTE centers, based on the six-semester rolling average FTE of students attending CTE centers. A state contribution to CTE is seen through a tuition reduction grant for in-state CTE students, calculated by multiplying the six-semester average FTE by 35% of the state's base education amount. The state also contributes funding to support a portion of the centers' salary costs for administration. The following summary is intended to show the wide variety of approaches states take to fund CTE.

Funding Approaches

Among those 45 states that provide state funding for CTE through their school funding formula, the most common approaches include weighted funding within the state's education funding formula, categorical funding, unit-based funding, and reimbursement. Weighted funding means a weight – or multiplier – is applied to the state's base education cost to determine the funded amount for CTE, recognizing that CTE is generally more expensive than a traditional education program. Categorical funded is when funding for CTE is provided outside of the regular K-12 education funding formula. Unit-based funding is an input-based method that considers the level of staff and other needed resources required for CTE, to determine the funded amount. Reimbursement refers to when states reimburse LEAs or other providers based on actual costs or expenditures for CTE.

Several states have other types of systems, such as West Virginia, that funds districts with a block grant, or North Carolina's hybrid funding which provides a minimum level of funding to each district, which is supplemented with additional enrollment-based funding. Several states do not appear to provide funding for CTE within their state formulas, although they may provide competitive grants. Other states provide multiple types of funding, for example, the state may provide weighted funding in its school funding formula and has also established additional categorical funding program specific to CTE. Table 4 below provides an overview of funding approaches by state. Vermont has aspects of both weighted and categorical funding with a recognition of additional costs reflected in the Supplemental Assistance Grant at 35% of base education funding per CTE FTE and categorical funding of specific positions for each center.

Table 4. Funding Approach by State

Funding Approach	States
Weighted Funding or Foundation Formula	AK, AZ, CA, IN, KS, FL, GA, KS LA, MA, MI, ND, NM, NY, PA, SC, TX, VT, WA, WY
Categorical Funding	AR, CO, CT, HI, KY, ME, MA, MS, MT, NH, NJ, NV, RI, UT, VA, VT
Unit-based or Resource-Based Funding	AL, DE, ID, IL, TN
Reimbursement	IA, ME, MN, MO, NY, OK, VA
Other	NC (minimum district allocation and enrollment-based), WV (block grant)
No State Funding Specific to CTE in Formula	MD, NE, OR, SD, WI

Examples of funding approaches:

- **Maine** provides both a foundational categorical funding amount and reimbursement. The state reimburses schools for the cost of providing CTE instruction for any expenses that exceed the State's foundation funding allocation. Reimbursements are calculated on 2-year lag of district valuation and enrollment.
- **New Hampshire** provides state funding through its Department of Education budget to pay a portion of transportation and tuition for students attending CTE centers or designated CTE programs at other comprehensive high schools, if the student's high school does not offer a similar CTE program. The legislation states the sending district is responsible for 25% of the approved tuition rate. The annual per student state amount can vary, as the annual appropriation for CTE first covers transportation, then the remaining appropriation is divided by the number of students to determine the state-funded per student amount[33].
- **Alabama's** funding system is a unit-based system. The state makes a CTE adjustment in the calculation of units, in that 7.4% of a district's average daily membership (ADM) in grades 7-8 is weighted 1.4, and 16.5% of ADM in grades 9-12 is weighted 2.0, reflecting the higher costs of CTE in middle and high school.

[33] https://law.justia.com/codes/new-hampshire/2019/title-xv/chapter-188-e/section-188-e-6/

- **Massachusetts** determines district allocations by comparing various educational items and services, including instructional staff, books and equipment, and facility maintenance costs, to identify an adjusted cost per-student rate. Costs for students enrolled in a state-approved vocational and occupational program are inflated. For example, the number of instructional staff allotted for an LEA's high school foundational allocation is calculated by dividing high school enrollments by 17, as compared to dividing CTE enrollments by 10. This means that CTE students will generate 70 percent more positions than an equivalent number of high school students.
- **North Carolina** The state guarantees each school district funding for five full-time-equivalent CTE teachers, provides CTE Program Support Funding at a flat rate of $10,000 per district, and distributes any remaining CTE funds to districts based on their student enrollment in grades 8-12. The state also provides several competitive grant opportunities, including the Career and Technical Education Grade Expansion Program, focused on expanding CTE into 6th and 7th grades.

How Students are Counted for Funding Purposes

Within each of these funding mechanisms, state utilize different methods to count students and thus generate CTE funding. Vermont uses the six-semester rolling full-time equivalent (FTE). Many states utilize an FTE basis, providing a per student funding amount for the total FTE enrolled in CTE programs, including Arkansas, Colorado, Kansas and Mississippi. Most states utilizing an FTE basis use either current or prior year FTE count, the study team did not find other states using a multi-year rolling average like Vermont.

Other states provide funding based on student enrollment. Examples include Delaware, which allocates funding based on a September 30 enrollment count; Alabama, whose funding is based on total student enrollment in grades 7-12; and North Dakota, whose funding is based on the prior year's average daily enrollment.

Who Receives Funding

In Vermont, funding to CTE centers comes both directly from the state and also through tuition payments from districts, the majority of fundings is from the tuition from districts. Nationally, states vary in how the funding for CTE flows, but it generally goes to LEAs, CTE centers, intermediary service providers/organizations, or a combination thereof, as shown in Table 5. The flow of funds is often attributable to how CTE is organized and governed in each state.

Table 5. Receivers of CTE Funding

Who Receives Funding from the State	States
Districts/LEAs	AL, AK, CA, CO, IN, KY, LA, MA, MI, MN, MO, NH, NJ, NM, NV, NY, RI, SC, TN, TX, UT, VT, WA, WV, WA, WI, WY
CTE Centers	AR, CA, CO, CT, DE, IN, IA, ME, NH, SC, SD, VT
Intermediary Agencies	CO, MI, NY

Examples include:

- **Connecticut** provides funding to the Connecticut Technical Education and Career System (CTECS), a state-run system which operates 17 diploma-granting technical high schools, a technical education center and several other programs.
- **Kentucky** provides categorical CTE funding to school districts with vocational centers.
- **Maine** provides formula funding to regional CTE school and centers.
- **Nevada** provides grant-based funding at the county level.
- **New Hampshire** provides tuition reimbursement to sending districts, while the state contribution for CTE students is provided to centers.
- **North Dakota** provides additional funding for career and technical education (CTE) by appropriating funds for a Department of Career and Technical Education at the state level, separate from the Department of Public Instruction. This funding covers partial reimbursements to districts and Area Career and Technology Centers for CTE instructional salaries, contracts, travel, and other approved costs, as well as support funding for new and expanded program offerings.
- **New York** provides CTE funding to Boards of Cooperative Educational Services (BOCES), except for the state's five largest LEAs and LEAs that are not part of a BOCES, who are funded directly from the state.

Competitive Grant Funding

Many states provide competitive grant opportunities to districts and/or centers. States may utilize state funds, Perkins funds, or a combination thereof to fund the competitive grant opportunities. Grant opportunities are typically targeted to specific purposes, outlined in each grant. Examples of state CTE grant opportunities include:

- **Arkansas,** which currently has three state grant opportunities: Non-Traditional grants; CTE Innovation Grants; and State Start-Up Grants, which funds 85% of start-up costs for new programs, based on a state-designated list of supplies, materials, and equipment for each program.
- **California** provided $300 million in 2021-22 to fund competitive Career Technical Education Incentive grants.
- **Oregon's** CTE Revitalization Grant was established in 2011, a competitive grant program intended to strengthen the alignment of Career and Technical Education, workforce development and economic development. The legislature allocated $7.3 million for the 2021-23 grant cycle, which will serve students in 148 middle and high schools.
- **Missouri** reimburses LEAs for costs associated with starting new or improving existing programs through the CTE Enhancement Grant Program. The state requires LEAs to match 25 percent of instructional equipment costs and 50 percent of other costs; 75 percent of the grant funds must be spent on new programs, curriculum development, or instructional equipment for the state's high demand occupations.

Conclusion

While state funding for CTE falls into three main types of funding, there is wide variation in how states allocate state funds for CTE within these categories. Many states use the mechanisms within their existing state funding formula for K-12 education to fund CTE, for example, states with a student-based weighted formula tend to include CTE weights to provide additional funds to support CTE programs, which tend to be more expensive than traditional school programs. States that don't include CTE in their formula often have categorical funds dedicated to CTE, which have a specific formula or mechanism to distribute funding to schools statewide. Vermont has aspects of both weighted and categorical funding with a recognition of additional costs reflected in the Supplemental Assistance grant at 35% of base education funding and then categorical funding of specific positions for each center.

Most commonly, states use a current or prior year count of students enrolled in CTE as the basis for funding. Many states provide competitive grant funding, often targeted to specific priority areas, or to expand CTE program offerings. Vermont's use of the six-semester rolling average FTE for funding purposes is unique.

Stakeholder Engagement

The study team's stakeholder engagement included individual meetings with former and current stakeholders across the system, targeted small group meetings with CTE center directors, in-person listening sessions, and an online, statewide survey.

The study team conducted around 20 virtual meetings with current and former CTE center directors, SU/SD superintendents, teachers, AOE staff members, legislators, business and economic development representatives, school board members, center Regional Advisory Board members, state education association staff, and related state groups/agencies. These meetings provided the study team with an understanding of the system's successes and challenges from a variety of perspectives.

Three small, focus group style virtual meetings were held with regional CTE center directors; individual meetings were scheduled with directors that wanted to share feedback with the study team but were unable to attend one of the three center director meetings. Through these sessions, the study team directly spoke with approximately seventy five percent of center directors.

In early January, the study team held seven in person listening sessions in six locations in Vermont. The study team greatly appreciates the regional CTE centers that hosted the listening sessions. Sessions were open to the public and provided an opportunity for all in attendance to share feedback on the CTE system in Vermont. Table 6 shows the dates, times, and locations of the listening sessions.

Table 6. Listening Session Locations

Date	Location	Time
Tuesday, January 10, 2023	North Country Career Center (Newport)	4:00 – 5:30pm
Tuesday, January 10, 2023	River Valley Technical Center (Springfield)	4:00 – 5:30pm
Wednesday, January 11, 2023	Central Vermont Technical Center (Barre)	4:00pm – 5:00pm; 6:00pm – 7:30pm
Wednesday, January 11, 2023	Stafford Technical Center (Rutland)	4:00 – 5:30pm
Thursday, January 12, 2023	Burlington Technical Center (Burlington)	6:00 – 7:30pm
Thursday, January 12, 2023	Windham Regional Career Center (Brattleboro)	5:30 – 7:00pm

Through these individual meetings, focus groups and in person listening sessions, the study heard from approximately 140 individuals. Knowing that not all interested parties would be available to attend an in-person session, the study team also released an online survey open to anyone in Vermont wishing to provide feedback on the system. It sought to understand how well stakeholders believe the current system is meeting the needs of students and businesses in Vermont, and to identify potential areas of improvement and change.

The survey opened January 6, 2023, and was open for about 2 ½ weeks. The study team received approximately 750 responses, nearly half of respondents were students. To identify any differences in

perception between students and other stakeholders, the study team separately analyzed student and non-student responses. Among non-student respondents, 48 percent were educators, 23 percent were parents, 10 percent were community members, eight percent were business leaders, six percent were members of a center's Regional Advisory Board, and five percent were members of center's Program Advisory Board.

This section discusses key themes heard across the study team's stakeholder engagement activities. When appropriate, the study team identifies when a theme was more heavily expressed in a particular type of stakeholder engagement. Full survey results can be found in Appendix E.

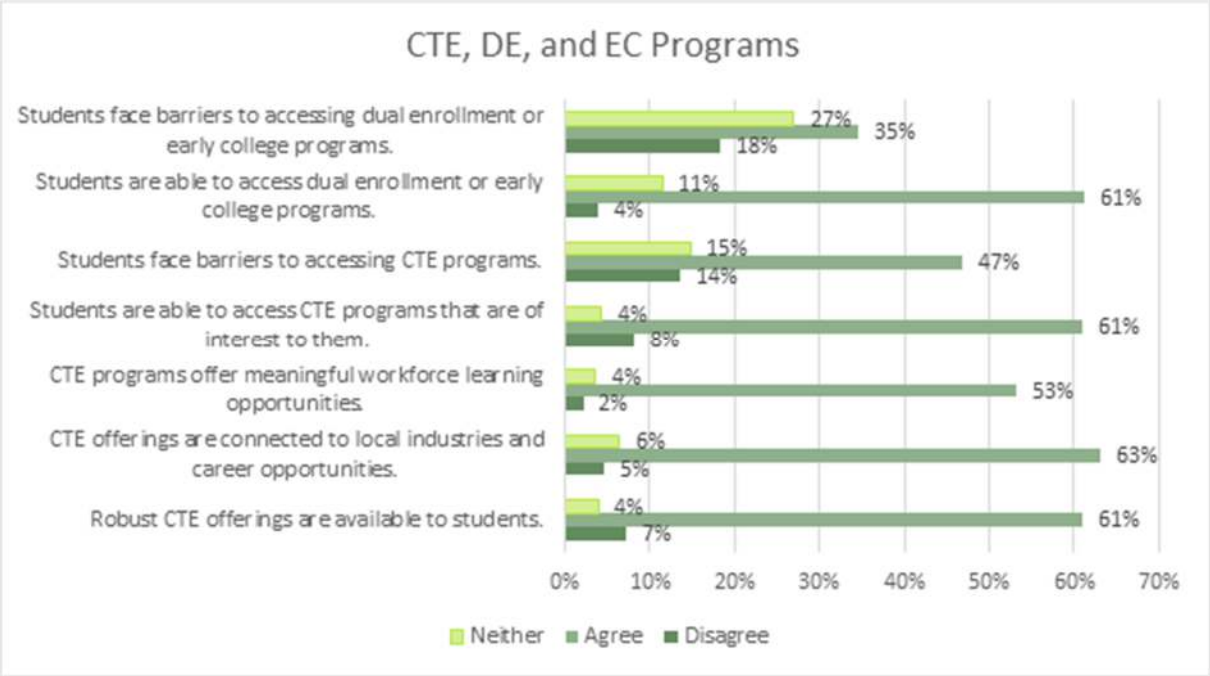
In the rest of this section, the study team first examines some overall impressions of the system's ability to provide CTE and other learning opportunities to students. Next, stakeholder feedback is examined based on common themes heard throughout the engagement process, these include alignment; economies of scale and funding; and equity of educational opportunities.

Overall Impressions of the System

The study team heard in virtual meetings and listening sessions that Vermont provides a variety of educational opportunities to allows students to explore their areas of interest and prepare for life after high school, through CTE, dual enrollment, and early college. Stakeholders very much supported the range of educational opportunities and believe students should have access to them. The study team also heard that stakeholders across the system value CTE and see its benefits for students - in academic achievement and job preparedness – and the crucial role CTE can play in fulfilling Vermont's workforce needs.

As seen in Figure 1 on the next page, when asked about their local program offerings, over 60 percent of non-student survey respondents indicated that robust CTE program offerings are available to students; they are connected to local industries and career opportunities; and students are able to access CTE programs, dual enrollment or early college programs. Over half believe CTE programs offer meaningful workforce learning opportunities. However, almost half of respondents believe students face barriers in accessing CTE programs, compared to just 35% who believe students face barriers in accessing dual enrollment or early college programs.

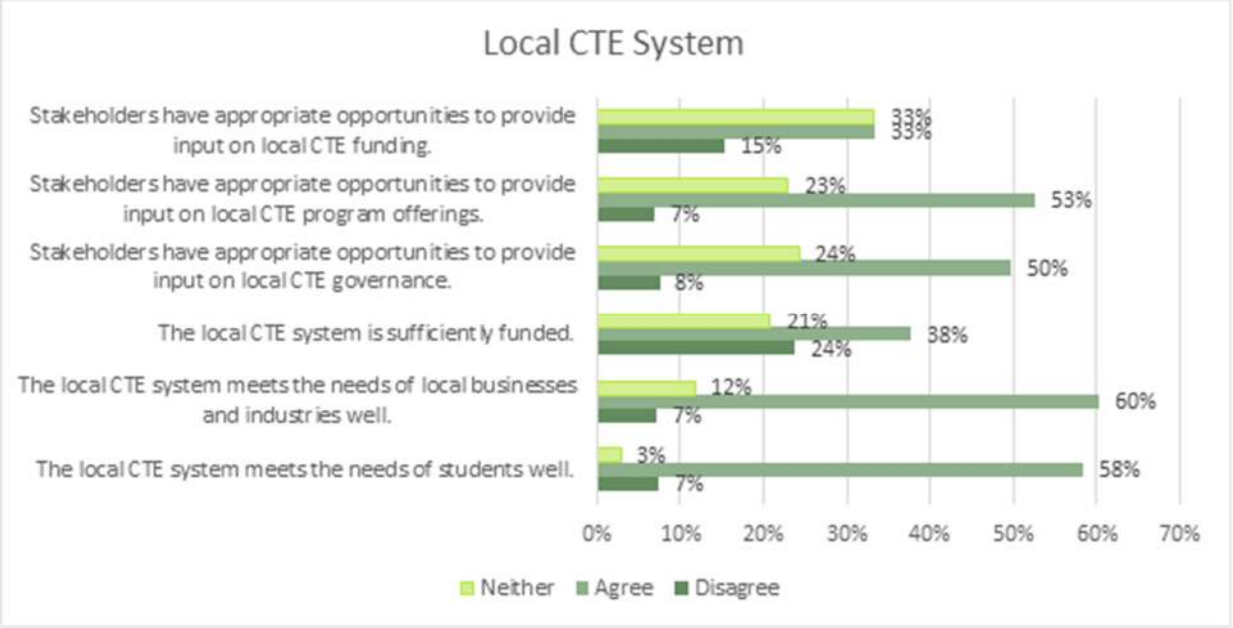
Figure 1. Perceptions of CTE, Dual Enrollment and Early College Opportunities



When asked specifically about their local CTE system, survey respondents generally responded positively. As shown in Figures 2 and 3 below, nearly 60 percent of non-student respondents believe the local CTE system meets the needs of students well, while 60 percent believe it meets the needs of local business and industry well. Approximately half believe stakeholders have appropriate opportunities to participate to provide input on local CTE governance and program offerings. Around a third of respondents agreed that they have appropriate opportunities to provide input on local CTE funding, about fifteen percent disagreed, and a third neither agreed nor disagreed.

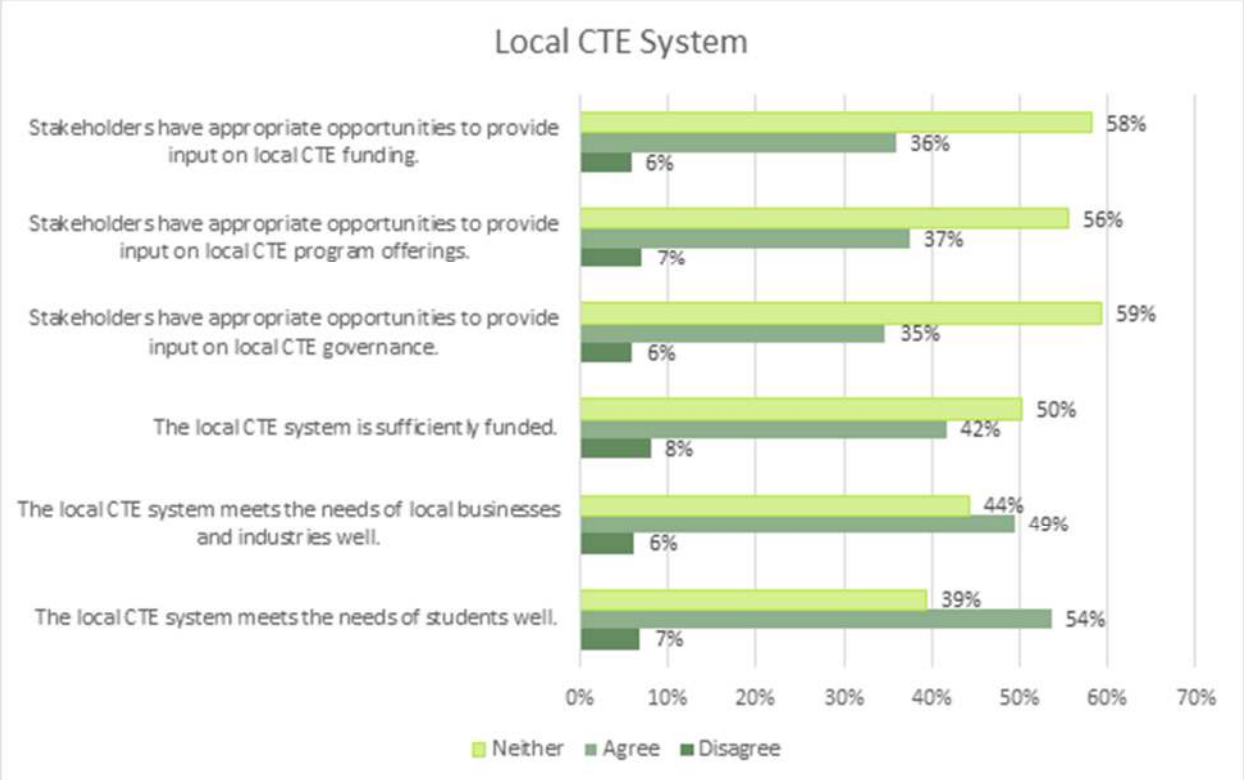
"The Vermont CTE system is connecting hands on learners with job skills, and the chance to earn college credit, all while preparing for the 21st century workforce." – Survey Respondent

Figure 2. Non-Student Responses on Perception of Local CTE System



While students were understandably less sure about stakeholder opportunities to provide input on issues of system governance and funding, fifty-four percent of student respondents believe the system meets the needs of students well, while seven percent disagreed, and 39 percent neither agreed nor disagreed.

Figure 3. Student Responses on Perception of Local CTE System



Alignment

Stakeholders identified several areas where there may be some misalignment within the CTE system that impacts its ability to serve students. These alignment issues include meeting state workforce needs through regional CTE centers, alignment issues between sending districts and CTE Centers, the need for earlier exposure to CTE content, and alignment with Vermont's postsecondary institutions.

Meeting State Workforce Needs through Regional CTE Centers

The regional CTE center model, with Regional Advisory Boards providing overall guidance, and local program advisory boards providing input on specific programs offered at the centers, naturally results in **centers that are focused on regional needs**. Stakeholders believe the CTE centers have the potential to meet students' academic needs and professional interests while graduating students in fields needed to address the state's current and predicted labor shortages. Meeting statewide needs, however, requires state-level identification of workforce needs. Stakeholders reported that currently the identification of workforce needs is primarily done at a regional level, with varying strength of regional economic development or workforce development entities.

"CTE needs to be available to every Vermont high school student who wishes to take courses...this implies a substantial reorientation of high school education in the direction of CTE" – Survey Respondent

Stakeholders consistently identified center and program capacity as an issue. Several centers reported limited capacity and having far more applicants for CTE programs than they are able to accommodate, but centers lack the physical space and the funding to expand program offerings. Student responses on the survey also identified the challenges in not being accepted into their first-choice program, due to limited space.

Alignment Challenges between Sending Districts and CTE Centers

Several areas of misalignment between CTE centers and their sending schools or districts were raised during all phases of stakeholder engagement. As noted earlier, there is wide variation in the number of sending districts across the state, and that the misalignment can become magnified with the higher number of sending schools a center must coordinate with. Alignment challenges include:

- **Varying school calendars.** School calendars are not aligned among all SU/SDs in each region. This means that sending high schools may have different start and end dates, as well as different days off during the school year for professional development days or other district activities. Furthermore, some SU/SDs may have late starts, while others may have full days off or early releases for professional development. This means students attending CTE centers are "off" on different days than students from different sending schools. For teachers, this means a large number of days with partial attendance and needing to help students who missed CTE class due to their sending district's calendar to catch up on what they missed. One center reported students that miss up to 30 days of the instructional day due to this misalignment.

- **Varying bell schedules.** Within the school day itself, daily bell schedules are not aligned to facilitate a common CTE schedule. With students being transported from multiple schools, this means some centers have students arriving in the morning and departing in the afternoon at varying times. It also can be disruptive to sending schools to have students returning from half-day programs in the middle of a class. It was reported that this misalignment can discourage students from taking CTE courses in some cases.
- **Varying interpretations of credit for CTE courses.** The study team heard from stakeholders that there is not required acceptance of CTE courses to fulfill requirements statewide. For example, a specific CTE course may be interpreted by one high school to fulfill a science requirement, while another high school may only provide elective credit. This requires the CTE center staff and sending high school staff to individually reconcile the conflict each time it occurs and can cause students to fall behind in meeting their high school graduation requirements, if courses are not accepted for credit in core content areas.
- **Student schedules can be challenging**. The study team heard that, particularly for students attending CTE centers with half day programs, scheduling can be a challenge. Students need to have enough time in the day to take all the coursework required for graduation beyond their CTE coursework. During listening sessions and in other meetings, stakeholders shared times when high schools only offered certain courses during the time period CTE students would be at the center, with schools suggesting CTE was incompatible with some students' high school schedule. Several parents shared that they had to advocate for schedule changes that enabled their child to attend the CTE center, while acknowledging that other students in that situation do not attend CTE.

> *"Some students are not able to access our CTE programs due to schedule and local high school programming constraints."*
> *- Survey Respondent*

- **A belief that students are counseled away from participating in CTE**. The study team heard – in all forms of stakeholder engagement – a belief that students are sometimes counseled out of CTE. High achieving students are sometimes discouraged from attending CTE programs, and encouraged to take AP or other advanced courses, even when those students express a desire to attend CTE programs. Many stakeholders believe the perception still exists that CTE is designed for students who struggle in the traditional high school experience, when in fact many CTE programs lay the foundation for rigorous postsecondary study.
- **Transportation**. Across all types of stakeholder engagement, the study team heard that transportation is a barrier to student participation in CTE. Under the current model, transportation is the responsibility of the sending district, with state funding support. The study team heard that students may spend an extended period of time, on multiple bus routes, to get to the CTE center. It can also be challenging for students who play sports or participate in extracurricular activities to be transported back to their home school in time for those activities. Stakeholders said this can result in excluding students without the means to provide their own transportation to and from CTE centers from attending. The study team also heard that students may be within a reasonable distance from several CTE centers, however, if they choose to

attend a center that is not their assigned center, no transportation is provided. Since different centers offer different programs, this can mean that, again, only those students with the means to provide their own transportation can attend the program of interest to them,

Alignment with Middle School and the Early High School Years – the Need for Earlier Exposure to CTE

Vermont students are generally not eligible to participate in CTE until 11th and 12th grade, although some opportunities exist in 10th grade. While some districts offer earlier exploratory or foundational CTE courses, stakeholders expressed a desire for earlier exposure to career technical education in earlier grades (middle school), so students have an opportunity to explore different career options and better plan for potential high school CTE opportunities. Stakeholders also suggested these earlier exposures would help students be better prepared to begin CTE coursework once they are enrolled. The study team found this idea of earlier exposure to CTE to be a recurring theme throughout stakeholder interviews, in person listening session, and in survey open-ended responses.

"Allow students to have access to these programs starting in their freshman year of high school and make it so these programs give students the credits needed to graduate on time" – Survey Respondent

"Pre-tech [could] be delivered at sending schools and provide awareness for students in 9-10 (actually even in 7-8 grades" – Survey Respondent

Alignment Challenges with Vermont's Postsecondary Systems

Stakeholders identified a lack of clear alignment of CTE with Vermont's Postsecondary institutions. The study team heard that it can be challenging for centers to work with VTC and CCV, as the systems have not been designed to flow into one another. To meet workforce needs, stakeholders suggested that there should be a clear pathway for students in CTE to continue their education in Vermont's postsecondary system. Several challenges were routinely identified: The postsecondary system can be challenging to work with, and each center must create its own agreement with the institutions. Systems in other states are perceived to be more flexible and/or willing to give students more credit for completing coursework, which results in many centers developing partnerships with postsecondary institutions in New Hampshire and Maine. Additionally, there isn't an in-state postsecondary course of study in all CTE pathways for students to continue their education beyond high school. For example, stakeholders in listening sessions and in survey responses noted the lack of a in-state culinary arts program, "leading to potential culinary workforce employees to leave the state and often not return."

"I think we need more direct pathways for Cooperative Education/Work Based Learning. And more integration with VTC/CCV for students to earn associate degrees and additional credentials during high school." - Survey Respondent

- VTC does not always recognize the courses students completed at the CTE centers and requires students to repeat those courses should they enroll at VTC following high school. Again, this duplication of courses serves as a disincentive for some students, who may attend programs in

New Hampshire, Maine, even in Arkansas, where they can complete the next phase of their professional training without repeating coursework. Stakeholders shared that once students leave the state for these types of programs, they are not likely to return to Vermont, as the schools often have industry partnerships, so students have a natural path to employment upon completion of their out-of-state studies.

- Teachers at CTE centers reported having difficulty being approved to teach dual enrollment courses at the center, even when they teach the same courses, on the same equipment, as adjunct professors for VTC.

Alignment of Teacher Compensation with Teacher Credentials

Stakeholders identified the **difficulty in attracting and retaining high quality, experienced CTE teachers** throughout the state. They felt the misalignment in pay scales with teacher experience and credentials was part of the problem in attracting staff. Currently, negotiated agreements in some Vermont districts recognize industry certifications and experience in salary placement for CTE teachers, while others do not. Stakeholders suggested this leads to greater CTE teacher turnover at the centers where teachers' industry experience is not recognized, which makes it difficult to sustain a high-quality program. A lack of recognition of industry credentials and experience also widens the gap between CTE teachers' salaries and what these professionals could make working in their industry.

In addition to teacher compensation misalignment, the study team heard from stakeholders at listening sessions and in survey open ended responses that Vermont's **licensure requirements can be a barrier to potential CTE instructors**. Teachers acknowledged that while experts in their field, they do need training on the art of teaching, classroom management, and child development, but believe the current system to achieve full certification in Vermont is overly burdensome. The study team heard that teachers spend a significant amount of time completing required coursework on their own time and are required to take and pass PRAXIS exams wholly unrelated to the content they teach. Stakeholders also reported that some centers may cover the costs of becoming certified, while others may not, and teachers must cover the cost themselves. These issues were described as a deterrent to CTE teachers choosing to complete the certification process and stay in the classroom.

Economies of Scale and Funding

Many of the concerns the study team heard are attributable to economies of scale issues.

Funding in Small School Settings

Vermont has many small schools, and small schools by their nature **have economy of scale issues**. It costs more per student to provide similar learning opportunities in a small school, and CTE is generally a more expensive program than a traditional high school setting. As **CTE in Vermont is tuition-based**, stakeholders said that the higher cost to participate in CTE programs is felt by sending districts, as the initial on-behalf payment made by the state comes from district funding, and then the district must remit tuition payments to cover the difference between the on-behalf payment and the actual tuition rate. Stakeholders across every form of engagement believe this direct payment and the resulting "hit" on the district budget leads some districts to try to limit the number of students participating in CTE.

Particularly for small high schools, the combination of sending CTE tuition payments and the lower number of students left at the sending school for participating students can reduce the school's overall funding level so that it is difficult for the school to maintain the same breadth of educational opportunities for students remaining at the sending high school.

Six-Semester Rolling FTE Average

In conversations with CTE center directors and other staff knowledgeable about Vermont's CTE funding system, the **six-semester rolling FTE average as a basis for funding CTE** was identified as a challenge. While intended to help smooth out year-to-year fluctuations in enrollment to stabilize CTE funding, it can result in centers being under-funded when current enrollment is higher than the six-semester rolling average. CTE enrollments were low during the COVID-19 pandemic, those low enrollment figures will impact the funded FTE count for several years because they are included in the current six-semester rolling average for funding purposes.

Equity of Educational Opportunities

Stakeholders across the state expressed concerns about the equity of educational opportunities for students across the state to participate in CTE, some of the concerns include:

- **Some centers operate half-day programs, while others offer full day programs.** The study team heard from some stakeholders that prefer the half-day model and others that prefer the full-day model. Stakeholders did express concern that half-day programs are held to the same expectations as full-day programs, in spite of less time with students. For some students at half-day programs, time in transport back to their home schools can reduce the available class time left in the day to complete other courses.
- **Some centers provide educational support, such as math and reading classes, while others do not.** The study team heard that some centers employ teachers or content specialists in core subjects to provide additional academic support to CTE students while at the center. This additional support can help students who may be behind academically, and to help students in WorkKeys and industry certification exams. Other centers do not provide this additional academic support, and only provide that direct CTE content area instruction.
- **Not all students are served by regional technical centers** – those that are not may be served by a comprehensive high school authorized to provide CTE programs, or by one two private schools authorized to provide CTE programs. Stakeholders acknowledge that some areas of the state are simply difficult to serve in a regional manner, due to geography/distance and small school sizes – CTE programs in particular are extremely costly to run without a minimum number of students per program. Stakeholders expressed concern that the two comprehensive high schools authorized to provide CTE are at a funding and programmatic disadvantage compared to regional centers. While the study team heard that many stakeholders felt positively about CTE provided in the private settings, others expressed concerns about public funding going to private institutions and the lack of transparency in tuition rate-setting at private institutions.
- **There is wide variation in the percentage of students attending CTE centers from sending districts**. Stakeholders across the state expressed concern that certain schools send very few

students to CTE centers, while high schools housed on the same campus as CTE centers send a lot of students to CTE. Stakeholders suggested that a more equitable system would reduce barriers so student participation from sending schools, resulting a more even distribution of CTE students across schools in the state.

- **Some stakeholders expressed concern that special education students are disproportionately sent to CTE centers**. While the study team did not have the data to investigate this assertion, this concern was shared by a number of stakeholders who were concerned that centers may not have the level of special education staffing needed to serve the students well.
- **Transportation is not provided if a student attends a CTE center outside of their school's designated region**, so only those families with the means to provide transportation are able to take advantage of programs offered by other CTE centers. While discussed in more detail earlier in this section, stakeholders consistently brought this specific transportation up as an issue of educational equity.
- **Some negotiated agreements recognize industry certifications and experience in determining placement on the teacher salary schedule for CTE teachers, while others do not**. This was also discussed in more depth earlier, but again, stakeholders identified this as an equity issue for teachers across the state. Stakeholders suggested this leads to greater CTE teacher turnover at the Centers where teachers' industry experience is not recognized, which makes it difficult to sustain a high-quality program.

Data Analysis

This section describes the quantitative data analysis undertaken by the study team to understand the impacts of governance and finance on the opportunities and outcomes for students. Working with the AOE, the study team collected data in a number of areas, when available multiple years of data was collected. Data ranged from 2018 to 2022. The following data was used to conduct the analysis:

- **Enrollment** including total enrollment for sending schools, total enrollment by CTE center, and enrollment by program area in each CTE center;
- **Student performance** including graduation rates, proficiency on WorkKeys assessments, Science assessments and the number of credentials gained by students in each CTE center; and
- **Fiscal data** including each center's revenue and expenditures and the six-semester average FTEs utilized in funding.

Utilizing this data, the study team examined how each CTE center's governance structure or funding impacted the outcomes and opportunities for students and if any clear relationships exist that would support changes to the Vermont's CTE system. It is important to remember that with only 17 sites and three different governance models, it is difficult to make specific conclusions about relationships. Instead, the study team looked for clear patterns that would suggest advantages or disadvantages to specific governance or funding structures.

It is important to note that some of the data analyzed corresponds with the years of the COVID epidemic and thus is likely impacted by the pandemic. When possible, the study team used data from prior and data from the most recent years. In some cases, data was only available from 2020, 2021, and/or 2022 schools years and this will be noted.

Performance

To examine the performance of the CTE centers and possible impacts of governance structures, the study team looked at the average performance by governance type along with looking at the variance in performance across all sites. This allowed the study team to identify any clear patterns on how governance might impact performance. To mitigate the impact of pandemic data, the study team utilized up to five years of data.

CTE centers administer the WorkKeys assessment in areas including Applied Math, Graphic Literacy, and Workplace Documents, along with students being able to earn a Career Readiness certification. A student's highest score is recorded for each test, as students can take the test on multiple occasions. Data was available for two years, 2021 and 2022. Table 7 below shows the proficiency rates for all four tests for both years. The results are shown for all CTE centers combined, including the average proficiency rate, minimum and maximum rates. Additionally, the average result by governance type is shown. The centers were designated as regional hosted (regional), separate technical center districts (districts), and private governance (private) structures. For the purpose of the analysis, centers were identified by the governance type that corresponded to the years of data provided, which may be different than the current governance structure.

As the table shows there is wide variation in the outcomes for students across the CTE centers with low numbers of, or sometimes no, students proficient on the exams in some centers while other centers have high proficiency rates. This was true in both 2021 and 2022. What is not clear is the relationship of performance and the governance structure of the centers. While it does appear that separate district centers had higher average performance across tests in 2021, the pattern does not continue in 2022. *It appears that the WorkKeys outcomes for students are related more to the individual center where they receive services than the governance structure of that center.*

Table 7. Proficiency Rates on WorkKeys Assessments, Overall and by Governance Type

Proficiency Rates on WorkKeys Assessments				
	Applied Math	**Graphic Literacy**	**Workplace Documents**	**Career Readiness**
2021				
Average	47%	61%	37%	35%
Min	12%	0%	19%	0%
Max	83%	100%	71%	100%
Regional	43.7%	55.2%	34.5%	26.6%
District	58.7%	85.9%	43.1%	66.5%
Private	54.5%	59.4%	50.0%	36.7%
2022				
Average	45%	62%	36%	48%
Min	25%	20%	21%	7%
Max	57%	94%	48%	93%
Regional	44.5%	64.9%	35.4%	54.3%
District	50.7%	55.7%	42.6%	33.6%
Private	38.9%	53.1%	20.7%	13.0%

A similar conclusion can be made for most of the other outcome data available for CTE Centers. Table 8 below shows the graduation rates by center from 2014 to 2018. Overall, graduation rates are consistent between regional and district centers while the two private centers show more variation year to year.

Table 8. Graduation Rates for Students Enrolled at CTE Centers, Overall and by Governance Type

High **School Graduation Rates, Students Enrolled at CTE Centers**					
	2014	**2015**	**2016**	**2017**	**2018**
Average	96%	87%	81%	92%	94%
Min	83%	9%	0%	82%	81%
Max	100%	100%	98%	100%	100%
Regional	94.7%	90.9%	90.6%	91.9%	93.3%
District	98.9%	91.0%	94.5%	92.5%	95.2%
Private	100.0%	54.7%	1.9%	93.2%	96.9%

An important outcome for students enrolled in CTE centers are the number of industry credentials earned. To compare across centers, the study team took the total number of credentials earned each year divided by the number of students in the center. This created a metric that can be compared across centers. Table 9 shows the results, a 2.00 figure means that students at the center received on average two certifications in the year. Again, the differences between center governance types are minor, though private centers tended to be noticeably lower in all but one year. More dramatic differences between centers exist on the whole, as some centers have students earning over 3 credentials on average in a given year while other centers have just one-third of the credentials.

Table 9. Industry Credentials Earned per CTE Student, Overall and by Governance Type

Industry Credentials Earned Per CTE Student					
	2018	**2019**	**2020**	**2021**	**2022**
Average	1.92	1.95	1.77	1.87	1.99
Min	1.10	1.01	1.05	1.00	1.26
Max	2.77	3.32	2.62	3.55	3.33
Regional	1.99	1.99	1.82	1.77	2.10
District	2.04	2.05	1.64	1.93	2.06
Private	1.35	1.63	1.67	2.28	1.28

Student Participation

The data allowed the study team to understand the relationship between district size and CTE participation along with how proximity to a site might impact CTE participation. Correlation is a statistical measure that shows the extent to which two variables are related; examining if they change together at a similar rate. The relationship between two variables is expressed numerically as a value between 0.0 and plus or minus 1.0. A 0.0 relationship means that the two variables show no relationship. A 1.0 relationship shows a perfect relationship, as one variable goes up, the other goes up at the same rate, a negative 1.0 relationship means as one variable goes up, the other variable goes down at the same rate. The study team recognizes a moderate relationship between two variables once the correlation reaches .300 and a high relationship at .700.

During stakeholder engagement, participants highlighted that smaller school settings often face barriers when sending students to a CTE center. To see if sending school size was an indicator of participation, the study team ran a correlation between percent of students in CTE and 9-12 enrollment. Table 10 shows that there was a low correlation between sending school size and CTE participation so there does not appear to be a relationship between the size of sending school and CTE participation. The relationship in Vermont is .220 or below in each year, meaning that while on average as sending school size increases, participation percentage increases, the correlation is low.

Table 10. CTE Participate Correlation with School Size

CTE Participation Correlation with School Size				
2018	**2019**	**2020**	**2021**	**2022**
0.164	0.191	0.220	0.148	0.140

Part of the low correlation could be due to the proximity of different sending schools. Generally, regardless of governance structure, CTE Centers are housed on the same campus as a high school, which is also a sending school to the center. To explore the impact of proximity, the study team ran the same correlation analysis but only for those schools not housed on a campus with a CTE center. As Table 11 below shows, there was still a low correlation but, in this case, smaller sending sites actually had higher participation on average, as indicated by the negative relationship.

Table 11. CTE Participate Correlation with School Size for Sending Schools Not on a Shared Campus

CTE Participation Correlation with School Size for Sending Schools Not on a Shared Campus				
2018	**2019**	**2020**	**2021**	**2022**
-0.200	-0.174	-0.110	-0.115	-0.106

Table 12 shows that the best predictor of CTE participation level is being a sending school on the campus with the CTE Center. Centers on a shared campus had a 20-percentage point or greater participation than schools not on a shared campus in each of the five years of data. This finding has important implications when thinking about equity of CTE opportunities for students across the state.

Table 12. CTE Participation Rates from Sending Schools on a **Shared Campus** and **Non-Shared Campus**

CTE Participation Rates from Sending Schools on a Shared Campus and Non-Shared Campus					
	2018	**2019**	**2020**	**2021**	**2022**
Shared Campus	32.4%	36.5%	37.2%	36.6%	38.2%
Non-Shared Campus	12.4%	13.1%	13.1%	13.2%	13.4%

Funding

The study team focused on the revenue received by each CTE center and its relationship to CTE type. Utilizing a data set that included five years of revenue data, 2018-2022, state, local, and other revenue was identified for each CTE center. Revenues for adult education and tuition from non-Vermont LEAs was excluded from the analysis along with a few other items, Appendix F shows the included and excluded revenue. Revenues ranged across the districts and within governance type. Utilizing a per funded FTE amount, total revenues ranged from $19,461 to $43,189 per student in 2022. The share of revenues from state funded ranged from a low of 20 percent to a high of 51 percent. Local revenue share ranged from a low of 44 percent to a high of 71 percent.

Table 13 below shows that on average, across all years the regional centers spent less than the district centers. The figures are unadjusted for inflation and include data from years impacted by the pandemic, which likely impacts the source of funding in those years, especially federal funding. The federal, state, and local amounts are shown and will not add up to the total, any difference is from other funding sources, which are typically small per center. It is important to remember that there were only three district centers during this time and 12 regional centers in this analysis. Private centers are not included.

District centers received more state and local funding in each year and the difference in funding increased over the five years. The difference rose from just around $1,500 per student to over $3,000 per student.

Table 13. Revenue per Student 2018-2022 by Source and Center Type

Revenues per Student 2018-2022					
		Federal	State	Local	Total
2018	**Regional**	$1,276	$8,942	$12,904	$23,450
	District	$945	$10,684	$13,248	$24,878
2019	**Regional**	$1,298	$8,893	$13,224	$23,992
	District	$981	$11,527	$14,360	$26,887
2020	**Regional**	$1,392	$9,336	$13,773	$24,633
	District	$966	$11,671	$14,264	$27,050
2021	**Regional**	$2,323	$9,139	$14,124	$25,920
	District	$3,176	$14,922	$13,764	$32,293
2022	**Regional**	$2,068	$9,886	$14,973	$27,181
	District	$1,184	$13,850	$15,298	$30,629

Table 14 shows the percentage of funding by federal, state, and local sources. Again, the totals will not add up to 100%, with any remainder coming from other sources and some years will be impacted by pandemic funding differences. For all five years, regional centers relied less on state funding and more on local funding. This difference increased to an over 10 percentage point difference by 2022.

Table 14. Revenues by Source and Center Type

Revenues by Source 2018-2022				
		Federal	State	Local
2018	**Regional**	5%	37%	57%
	District	4%	43%	54%
2019	**Regional**	5%	36%	57%
	District	4%	42%	54%
2020	**Regional**	6%	36%	57%
	District	4%	43%	53%
2021	**Regional**	9%	33%	56%
	District	9%	46%	44%
2022	**Regional**	8%	35%	57%
	District	4%	45%	50%

There are clear differences between spending levels and where funding comes from but the small number of centers in each category make any firm findings difficult. Though on average regional centers

have less revenue, two of the highest three revenue centers are regional centers. Similarly, the center with the highest reliance on state funding is a regional center. The variation within group shows that local decisions can dramatically impact the results of this type of funding analysis.

Relationship between Funding and Performance

Understanding the relationship between funding levels and performance is a complex undertaking in education policy research. This section takes a very high-level review of the connections within the Vermont CTE context, relying on correlation analysis and acknowledging the limitations in the analysis.

Table 15 shows the correlations between spending per student and the WorkKeys results for 2021 and 2022. The correlations are generally low and even negative in 2021 but all positive and some at or approaching a moderate correlation of .300 in 2022.

Table 15. Correlation between Spending per Student and WorkKeys

Correlation between Spending per Student and WorkKeys				
	Applied Math	**Graphic Literacy**	**Workplace Documents**	**Career Readiness**
2021	0.054	-0.126	0.092	0.277
2022	0.322	0.197	0.263	0.174

Conclusion

The study team undertook the data analysis to identify any clear patterns related to either governance structure or funding levels on opportunities and outcomes for students. The data does not suggest that different governance structures provide better outcomes for students. Additionally, there does not appear to be a link between funding levels and student outcomes. The data analysis seems to show that decisions made at the individual center level, and in the communities that support the centers, is a larger contributor to opportunities for students. What does appear to be clear is that proximity to the CTE center is a good predictor of the level of CTE participation that can be expected for students.

Recommendations

In order for Vermont to reduce barriers to enrollment and improve the quality, duration, impact, and access to CTE, as stated in the RFP, as well as meet the state's evolving workforce needs, simple changes in the system's governance or funding will not be sufficient. CTE sits at the intersection of K-12, higher education and workforce development and its success depends on considering it within the context of the broader set of issues facing the state. This includes issues around maintaining robust and high-quality high schools in a rural state with declining enrollment; designing a comprehensive and flexible postsecondary education and training system that meets the needs of Vermont's future and current workforce; and connecting economic development goals for the state to its CTE and adult training systems. CTE needs to be positioned as part of a larger statewide strategy with the state coordinating cross-agency resources to effectively and efficiently to develop the next generation of skilled talent.

The recommendations in this section assume Vermont sees CTE as a key part of its statewide workforce development system to meet evolving personnel needs to keep the state competitive. They are developed to support this goal, with some implementable within the current governance and finance system and others larger systems changes.

To support a high-quality CTE system, Vermont needs to make smart and strategic investment of resources to support CTE, including:

- effective statewide oversight and monitoring;
- a regional delivery model that can support and maintain the range of CTE program offerings needed to support Vermont's workforce development goals and provide students with sufficient opportunities; and
- adequate and high-quality staffing and infrastructure to allow students from across the state to access CTE.

Between the stakeholder engagement, data analysis, and policy reviews, several overarching themes were identified that impact Vermont's ability to provide high-quality CTE. Two themes emerge about many aspects of Vermont's K-12 system, not just CTE:

- **alignment** and
- **economies of scale**.

While it is important to address the issues within CTE, using only that lens may obscure broader issues about K-12 that need to be addressed to support CTE students in other parts of their academic career.

Overarching Contextual Themes

Alignment

The study team identified a number of alignment issues that, if addressed, could improve CTE services for students. They fall into three main areas: alignment between regional technical centers and sending

schools; alignment between K-12 and higher education; and alignment between regional technical centers on systems issues such as teacher credentialing and professional development.

The study team frequently heard about the challenges students and CTE centers face when policies and practices are not aligned across all the sending schools and the regional center, even though regional calendars are required by 16 VSA § 1071(e)[34]. The challenges include varying yearly calendars that can lead to students missing a number of days of CTE instruction, variations in daily bell schedules that make it more difficult for students to attend CTE classes, and misalignment in graduation requirements and acceptance of certain CTE courses to meet graduation requirements.

Economies of Scale

Vermont's K-12 education system faces economies of scale issues that impact CTE education. Though Act 46 (2015) has led to consolidation across the state, there are still many small educational settings, and the student population is expected to continue to decline. Many are likely necessarily small settings; while others represent local communities' choice to keep students served locally and to have local control. In either case, a smaller school setting often leads to challenges in providing robust educational opportunities. Smaller high schools often have fewer course offerings and it is clear that when students leave these high schools for CTE and other Flexible Pathway opportunities, options can become even more limited for the remaining students. With fewer students to directly serve, schools may face limited course offerings due to constrained funding impacting class size and teacher assignments. It was communicated to the study team that sending schools often want to support students going to these available opportunities but must face the reality that these choices can have negative impacts on students who remain at the high school.

The rest of this chapter presents a set of recommendations for CTE in the state. Many have specific actions the study team recommends implementing, while others may be taken more as a finding, with less specific changes identified for the system. This is either because the recommendation would be outside of the scope of this project or there is not a clear policy that change that could be recommended. These recommendations focus on CTE, with the knowledge that other aspects of the K-12 system may be impacted or may also need to be addressed to achieve a comprehensive system that meets the state's educational and workforce needs.

It is important to acknowledge that many of the recommendations focus on providing a more equitable CTE experience for students across Vermont, it is true that addressing CTE equity issues might impact equity issues in other areas of the K-12 system, and that other flexible pathway options may have similar equity issues as CTE.

Recommendations

Recommendations are made in three areas: funding, policy, state capacity, along with two recommendations for larger system changes. In each section, recommendations more easily made

[34] https://legislature.vermont.gov/statutes/section/16/025/01071

within the current governance and funding structures are at the beginning of the section and recommendations that likely require greater change to current structure are at the end of the sections. The recommendations respond to the two themes discussed above and are focused on CTE as a key driver of the state's workforce development priorities and goals

Funding Recommendations

Recommendation 1: Provide additional funding and incentives or grants to create more accessibility for students whose sending high school is not on a shared campus with a CTE center. The data show that the best indicator of CTE participation in Vermont is the proximity of the sending school to the CTE center. Sending schools housed on the same campus send over two times as many students to CTE than those not on the same campus, on average. Additional funds would act as a hold harmless funding amount to ensure the quality and scope of programming can be maintained at the sending school and must include increased transportation funding. The state would need to determine the amount of additional funding to support these sending schools.

Increased transportation funding can be used to lower the burden of students in getting to CTE sites. This may include eliminating the need for students to get to their home campus and then on a bus to the CTE center or even providing technology to make the time traveling more productive for students, such as Wi-Fi on buses. Grants could also be provided to allow coordination between local transportation groups and the schools to enhance regional transportation options.

Any solution should also provide support to allow students to attend CTE centers outside of the one that their sending school is assigned to so they can have the widest possible educational opportunity.

Recommendation 2: Create a facilities funding system for CTE programs to address current facilities deficiencies, update program equipment, address enrollment needs, and plan for the future. The system should focus on updating facilities and growing capacity for the programs most needed for workforce development in the state. Though the state currently provides facility grants, CTE centers and other stakeholders reported the high cost of modernizing buildings and program equipment or adding new programs/equipment. Additionally, many CTE centers report waiting lists for enrollment, but they do not have the resources to increase capacity. A board should be created that would prioritize the centers and programs most in need of facilities funding that support the workforce development goals of the state or that have any safety/health concerns for students. State allocated funds would be distributed based on the board-identified priorities.

Recommendation 3: Design a funding system that treats all CTE equitably while incentivizing additional CTE capacity in high-growth sectors. The study team recommends **creating a weighted student funding formula that differentiates funding by CTE program type** to both recognize the higher costs of certain programs and to incentivize CTE centers to add capacity in high-growth sectors. **Funding should flow directly to CTE centers and be equal by program type across the state. This would mean funding would come off the top of the Education Fund and tuition would be eliminated.** The state would need to identify high-growth sectors in a systematic way to support the new funding system. Current funding per student varies greatly across the CTE centers, by around $20,000 per student, and

state funding is agnostic to the type and cost of CTE program being delivered. Eliminating tuition payments responds to consistent stakeholder feedback the study team received – that the tuition-based model can create a disincentive for schools to send students to CTE centers.

The study team recognizes that this approach changes the current processes used to determine local CTE budgets. It would likely be easier to implement this approach while making a larger change in governance for CTE, as mentioned in Recommendation 10 below, but this change could be made within the current governance model. Budgeting would likely begin for each center with an estimate of the total revenues expected from the state based on the number and types of students in the centers, with the estimated funding used to determine the appropriate allocation of resources within each centers' various programs. CTE funding would be distinctly different from most of the other Vermont school funding. Funding CTE off the top of the Education Fund also means all districts in the state would share in the costs of CTE, which could impact local education tax rates.

With this change, the study team also suggests **reexamining the six-semester rolling average FTE for CTE funding**. Traditional school funding systems often have declining enrollment adjustments to help schools adjust to declines in student enrollment but generally do not keep any averaging as schools grow. The COVID pandemic has highlighted the implications of a six-semester average on CTE Centers as enrollment returns and the average provides funding for fewer students than are in attendance. Either funding similarly to other areas of the funding system that do not use a six -semester average or providing a "best of" calculation (where centers receive the best of either a current tor more recent enrollment count or the average) may help CTE centers to better serve students.

Policy Recommendations

Recommendation 4: Require regions to align certain systems including calendars and academic requirements, to improve the efficiency of the system for students and staff, providing better outcomes in the system. This includes requiring districts to utilize the regional calendar, no longer allowing districts to receive waivers to following the calendar. The state should also create incentives for districts and regional centers to create bell schedules that will allow CTE students to be better served. This means mapping transportation needs and having bell schedules throughout the system that will minimize disruptions and allow students to miss the fewest educational opportunities at their sending school and the CTE center.

With the alignment of school calendars, a common calendar for CTE professional development could be created. This would allow CTE teachers to have time with teachers teaching similar coursework at other centers, allowing for improvement and consistency in programs across the CTE system. Resources may need to be provided by the state to support centers in sending CTE staff to the common trainings.

Utilizing the course maps of CTE courses to academic requirements already developed by AOE, districts should be required to accept courses as meeting certain graduation requirements. The study team recognizes simply requiring districts to do this does not reflect the steps boards will need to take to implement the recommendation and recommends AOE be provided resources to support local boards in implementation of this requirement.

Recommendation 5: Review CTE teacher preparation and licensure requirements and salary policies with an aim of attracting high-skilled industry professionals to teaching. The educator preparation and licensure required for an industry professional to become a certified CTE teacher can be a barrier to attracting talent. This is a key issue as it is difficult for centers to attract and retain high quality CTE instructors. Any proposals or state programs to provide incentives to attract and retain educators in the state should include CTE teachers.

Several centers already have practices in place that recognize industry experience in the compensation of CTE teachers, these systems could be leveraged to create a system for recognition. The study team heard some centers struggle to recruit and retain talent because salary levels varied so much among regions and are much higher in industry than in CTE centers. Depending on the findings of the review, the state might consider setting a minimum salary, designating CTE instructors as "hard to find" and therefore eligible to receive supplemental pay or hiring bonuses, or requiring districts to recognize industry experience in salary placement of CTE teachers. The state could also consider innovative staffing models to allow for part-time teaching arrangements and flexible compensation.

State Capacity Recommendations

Recommendation 6: Invest in additional staffing at AOE to provide support to CTE educators across program areas and increase program quality, monitor the system, and to help ensure equity of CTE opportunity across the state. With Vermont's numerous small settings, including many of its CTE centers, providing centralized technical assistance and support is important to the success of students. Stakeholders reported AOE's loss of capacity to support CTE centers and teachers over time. Though current AOE staff are highly regarded in the field, they cannot provide the type of program specific support available in the past that helped ensure teachers were receiving common professional development and that programs were utilizing the latest curriculum and technology. Increasing capacity for AOE in not just CTE staffing, but across the Agency to support flexible pathways, will increase opportunities and education support for all students.

With increased capacity, AOE could broaden its oversight and help ensure equitable opportunities for students across the state. This could include helping centers provide more consistent access to work-based learning and college courses (increasing the percentage of concentrators leaving with college credit from the current 37 percent), continuing to work with sending schools and centers to ensure students behind academically are receiving the support they need to increase outcomes on the WorkKeys assessments, and provide coordination between the centers and the state's postsecondary education institutions.

Recommendation 7: Require that career exploration be offered to all middle school students across the state to increase awareness of CTE offerings as students enter high school. Currently, there is no consistent curriculum or guidance to provide middle school students with career exploration opportunities and inform them of CTE offerings available through their high schools and CTE centers. Vermont may want to expand these introductory opportunities so more students can participate (perhaps virtually) and clarify the responsibilities of middle and high school counselors to specify that counseling should include career planning and exploration as well as information about CTE pathways,

dual enrollment and Fast Forward, work-based learning and industry certifications. The state should ensure educators have the time and resources necessary to do this work and may want to consider a consistent career planning tool for all of K-12.

Recommendation 8: Encourage greater secondary-postsecondary collaboration and require alignment/acceptance of credentialed Vermont CTE center pathways as precursors for enrollment into Vermont CTE postsecondary programs, eliminating the need for core course repetition and ensuring faster and lower cost credentialing for students. Throughout stakeholder engagement it was highlighted that Vermont's current alignment between K-12 CTE and postsecondary CTE could be improved. Currently, CTE center partnerships with CCV and VTC are ad hoc and program dependent, and some centers find postsecondary institutions across state lines are better able to meet the needs of their CTE programs than in-state institutions. Stakeholders report that many Vermont students leave for out of state post-graduation opportunities. These opportunities generally present the student with a more direct path to certification and thus employment. Once out of state, the students often are recruited locally and do not return to Vermont.

The state should work with its higher education and regional centers to create a set of courses in each CTE pathway that will be recognized by Vermont higher education institutions as meeting the first-year requirements, ensuring that any student that has successfully completed the pathway will have only one year of study to get to their career credential after high school. This change will likely reduce overall revenue for higher education but will create an incentive for more Vermont students to stay in state to complete credentialing, which might offset this impact. Staying in state, will increase the likelihood students remain in Vermont for their carer.

Larger Systems Change Recommendations

Recommendation 9: Examine current distribution of programs across the centers in the state and consider offering more programming outside of CTE centers (e.g. at sending schools or college) to expand opportunities for students. The state should do a full review of CTE center programs and develop a plan that considers whether to deliver any CTE programs outside of CTE centers. This could include delivery at high schools if programs do not require much space or equipment, on college campuses if they have already made investments in facilities and equipment, and via technology. CTE centers could continue to oversee and coordinate the offerings. This shift could allow for the expansion of programs with more sophisticated equipment needs at the centers.

As a small state with geographically isolated regions, Vermont should consider how to better incorporate educational technology as a learning tool in CTE programming. This can not only improve student access to specialized courses and programs, it also gets students comfortable with tools they will likely use in the increasingly technology-focused work environment across all career areas. In addition, some of the more immersive technologies like augmented reality/virtual reality can help CTE students experience what it is like to work in different fields and in a wide variety of scenarios without leaving the classroom. Using these kinds of technology well will involve long term planning to consider how and where to best enhance current programming, how to choose high quality and useful tools,

programs where new programming can be added and what kind of training and support will be needed to implement it effectively.

Recommendation 10: Consider creating either a coordinated regional governance structure or a single district for CTE. If the state's intentions are equity for all students and developing a statewide workforce, then the state needs a more coordinated and coherent statewide strategy for CTE. To that end, Vermont could consider a regional or single statewide district model for CTE to ensure more consistency and equity in how CTE is delivered, improve coordination with public and private partners and ensure that CTE programs stay up-to-date and aligned with larger statewide economic and workforce goals. Currently, the state's complex CTE governance system has a very localized focus with no statewide framework or coordination. Given the small population and scare resources, Vermont may benefit from more centralized decision-making around staff hiring and development, facilities and equipment updates, programmatic choices, and linkages to the business and postsecondary communities.

This kind of structure would not directly impact how students experience CTE and would still require the state to make many of the changes recommended above. A unified structure would likely make it easier to make some of these changes, however, and may set up Vermont to be better prepared to continue to adapt its CTE system to the changing needs of the economy and of the state. A more streamlined CTE governance system would also allow AOE to more successfully support CTE centers and teachers, along with providing leaders more authority in coordinating the system.

Appendix

The following appendices begin on the next page:

Appendix A: Reports Reviewed by the Study Team

Appendix B: Vermont's CTE Governance System and its Regional Centers

Appendix C: CTE in the U.S. and Other Countries

Appendix D: CTE State Governance Model Table

Appendix E: Survey Results

Appendix F: Revenue Included and Excluded from Data Analysis

Appendix A, Reports Reviewed by the Study Team

The following table includes recent reports relating to career technical education in Vermont reviewed by the study team. This is not a comprehensive list of every document reviewed, as the study team also reviewed legislative testimony on CTE in recent years, materials provided to the study team through stakeholder engagement activities, and numerous related websites.

Report	Date
Career and Technical Education in Vermont, Best Practices, Funding Mechanisms, And Comparative State Analysis (Rockefeller Center at Dartmouth College)	February 26, 2014
Report on Act 51 of 2015, Section C.10: Vermont Career Technical Education	January 25, 2016
The Vermont Association of Career and Technical Education Directors (VACTED) White Paper #1, Vermont CTE: A Path Forward	November 2017
The Vermont Association of Career and Technical Education Directors (VACTED) White Paper #2, Vermont CTE: A Path Forward 2.0	November 2018
Act 189 of 2018 Implementation Report	January 15, 2019
Proposal for Equalizing Technical Center Funding (Talbot/Brighton Recommendations)	February 2020
Vermont State Plan (2020-2024), Strengthening Career and Technical education for the 21st Century Act ("Perkins V")	March 18, 2020
Study on Delivery of Vermont Technical College Degree Programs at Career Technical Education Centers in Vermont, Report to Vermont Legislature	January 2020
Technical Education Funding in Vermont, Maine, and Massachusetts (Vermont Legislative Research Service)	April 19, 2021
Findings from Vermont Agency of Education Survey of Career Advising Practices among School Counselors	June 2, 2021
Career Technical Education Funding Pilot Projects and Middle School Collaborations Report	June 14, 2021
Perkins Collaborative Resource Network, Vermont State Profile	September 14, 2022
The Vermont Association of Career and Technical Education Directors (VACTED) White Paper #3, Act 127	November 2022

Appendix B, Vermont's CTE Governance System and its Regional Centers

Vermont CTE Center Governance Chart

	Regional CTE Centers*	Regional Technical Center School Districts (RTCSD)	Region Served by Two Designated Private Schools
Description	11 CTE Centers that are co-located within a host HS and are the responsibility of that school's district (or supervisory union)	4 CTE Centers operate as independent districts	The St Johnsbury region has no public school CTE option; students can attend St Johnsbury Academy or Lyndon Institute for CTE courses
Governing Entity	Host school Supervisory Union board plus required Regional Advisory Board	Elected regional board	Board of Trustees of each school plus required Regional Advisory Board
Superintendent	Superintendent for host school Supervisory Union	CTE Center Director	N/A Each school has a headmaster
Decision making Authority for CTE Center	School districts, with input from the Regional Advisory Board (All Centers have RAB. In one case, two Centers share a RAB)	CTE Center board	3 LEAs in the region formed a consortia to receive federal CTE funds and contract with the 2 private schools. Regional Advisory Board determines how state and federal grant funds are used

* Two exceptions to the regional CTE Center delivery model are: 1) Missiquoi Valley Union High School which operates 3 state approved agriculture programs and 2) Canaan Memorial High School which due to its geographic isolation is allowed per State Board Rule 2374.1.P to operate 5 state approved CTE programs. Note: only 2 of the 5 Canaan programs meet state and federal program size minimum requirements (8 CTE concentrators per program)

Budget	Host HS district votes on the district (or SU) budget which includes the CTE Center	All voters in CTE region approve the budget	Headmaster and Board of Trustees set budget with no voter approval; CTE budget not provided to AOE
Approximate Percent of Students Served (2018-19 data)	64%	23%	13%

Regional CTE Centers

CTE Center	Governance Model	Number of Public High Schools Served*	Full-time (FT) or Part-time (PT)	2022 Estimated Enrollment	Pre-Tech Foundations Offered to Grade 9/10 Students in Host HS	Pre-Tech Exploratory Offered to Grade 9/10 Students from All Sending HS	Number of CTE Programs Offered (grades 11/12)**	Academic Content Specialists on Staff
Burlington Technical Center	Regional CTE Center; shares RAB with Essex	8	PT	253 students	No	Yes	10	No
Center for Technology, Essex	Regional CTE Center; shares RAB with Burlington	8	FT c	383 students	No	Yes (5 all day programs, each aligned to a career	16	Yes. Science, Math, English, and Social Studies teachers on staff. In response to low academic achievement

* In addition, private high school students also have the right to attend CTE at no cost and some alternative schools send students to the regional CTE centers.

** Program count can be challenging as some CTE Centers offer separate programs that are year 2 only. AOE is in the process of surveying all programs to map and describe distinct offerings.

CTE Center	Governance Model	Number of Public High Schools Served*	Full-time (FT) or Part-time (PT)	2022 Estimated Enrollment	Pre-Tech Foundations Offered to Grade 9/10 Students in Host HS	Pre-Tech Exploratory Offered to Grade 9/10 Students from All Sending HS	Number of CTE Programs Offered (grades 11/12)**	Academic Content Specialists on Staff
						cluster or clusters)		data, the Center added more math supports this year and plans to add additional literacy supports
Central Vermont Career Center	Moved from Regional CTE Center to Regional Technical Center School District in 2022	6	FT and moving to add academic instruction so students take all classes onsite	200 students; waiting list	No	Yes (2 programs)	13	Yes, STEM Integrationist, focused on integrating math and science skills embedded in WorkKeys in all programs; Literacy Integrationist focused on integrating literacy skills embedded in WorkKeys in all programs
Cold Hollow Career Center	Regional CTE Center	2	PT	131 students	No	Yes	6	No
Green Mountain Technology and Career Center	Regional CTE Center	5	FT with academic instruction provided by home HS	142 students	No	Yes	11	Yes. Center has had Math Integrationist for a few years; new Literacy Integrationist position created in the past year

CTE Center	Governance Model	Number of Public High Schools Served*	Full-time (FT) or Part-time (PT)	2022 Estimated Enrollment	Pre-Tech Foundations Offered to Grade 9/10 Students in Host HS	Pre-Tech Exploratory Offered to Grade 9/10 Students from All Sending HS	Number of CTE Programs Offered (grades 11/12)**	Academic Content Specialists on Staff
Hartford Area Career and Technology Center	Regional CTE Center	2 VT + 3 NH	PT	321 students	No	Yes	12	Yes. Math Integrationist and plans to add a Literacy Integrationist by Fall 2023
Lyndon Institute	Private comprehensive high school	3	PT	288 students	No	Yes	7	No. The Center does have plans to add a half-time Math teacher (unclear if this position has been filled)
North Country Career Center*	Regional CTE Center	2	Mostly PT (2 programs are FT for 1 year; plans to make Auto Program FT for 2 years beginning in Fall 2023)	805 students	Yes	No	14	No
Northwest Career and Technical Center	Regional CTE Center	3	PT	492 students	Yes	Yes	9	No

* Canaan Memorial HS offers satellites programs for North County Career Center

CTE Center	Governance Model	Number of Public High Schools Served*	Full-time (FT) or Part-time (PT)	2022 Estimated Enrollment	Pre-Tech Foundations Offered to Grade 9/10 Students in Host HS	Pre-Tech Exploratory Offered to Grade 9/10 Students from All Sending HS	Number of CTE Programs Offered (grades 11/12)**	Academic Content Specialists on Staff
Patricia A. Hannaford Career Center	Regional Technical Center School District	4	PT	460 students	Yes (and available to students from sending high schools)	No	12	No. The Center had Math and Literacy/English teachers/integrationists but positions eliminated
Randolph Technical Career Center	Regional CTE Center	4	FT with students taking all classes onsite	160 students	No	Yes	12	Yes. Last year Math and English positions filled by long-term substitutes. This year, the two new teachers have provisional teaching licenses
Riverbend Career and Technical Center	Regional CTE Center	2 VT + 2 NH	PT (and experimenting with FT for seniors)	274 students	Yes	No	12	No
River Valley Technical Center	Regional Technical Center School District	3 VT + 1 NH	PT	341 students	Yes	Yes	11	No
Southwest Tech	Regional Technical Center School District	2	PT	560 students	Yes	No	14	No. The Center has tried to hire for these positions but has had

CTE Center	Governance Model	Number of Public High Schools Served*	Full-time (FT) or Part-time (PT)	2022 Estimated Enrollment	Pre-Tech Foundations Offered to Grade 9/10 Students in Host HS	Pre-Tech Exploratory Offered to Grade 9/10 Students from All Sending HS	Number of CTE Programs Offered (grades 11/12)**	Academic Content Specialists on Staff
								difficulty finding qualified applicants
Stafford Technical Center	Regional CTE Center	7	FT with students taking all classes onsite	266 students; sometimes waiting list	Yes	No (seeking to add for 2023-24 school year)	14	Yes. Math, Social Studies, and English teachers on staff
St. Johnsbury Academy	Private comprehensive school	3	PT	554 students	No	No	8	No
Windham Regional Career Center	Regional CTE Center	4	PT	194 students	Yes	No	12	Yes. Math and English/literacy teachers on staff

Appendix C, CTE in the US and Other Countries

In the US, CTE is offered at the secondary level, with most high school vocational programs only consisting of 2-3 courses, as students must also complete a broad range of high school graduation requirements. This is very different from the full-time multi-year programs with significant work-based placements typically offered in high performing countries. Students in the US who want to pursue a particular career field usually must enroll in specialized training at the postsecondary level after high school.

CTE in the U.S.

Federal Perkins Act Requirements

All US states receive federal funds for secondary CTE from the Carl D. Perkins Career and Technical Education Act. The Perkins Act provides states with categorical funding to deliver CTE at both the secondary and postsecondary levels. Each state varies in how much funding is allocated to secondary and postsecondary CTE. States can spend up to five percent of their Perkins funds or $250,000, whichever is greater, on administrative activities and up to ten percent on State leadership activities. There are many permissible uses of leadership funds, including developing statewide programs of study, establishing statewide articulation agreements, establishing statewide industry partnerships, and awarding incentive grants.

By law, states must designate a lead agency to receive the Perkins funds. While in most states the department of education oversees CTE, in a few places it is the community college system (CO, LA, WV, WI), the state university system (MT) the governor's workforce cabinet (IN), the state board of education or board of regents (ID, IL, KS, UT), the state board for CTE (ND), and the workforce training and education coordinating board (WA). This decision often impacts how tightly connected CTE is to the broader workforce development and economic development strategies in the state. The lead agency is required to prepare and submit a state plan outlining how the state will Perkins funds, including flexible set-aside leadership funds, and set performance levels on federally required indicators of CTE student achievement and attainment, such as student graduation rate and academic proficiency rate in English, math and science.

States also must approve programs of study for CTE that require CTE providers to align programs with local labor market needs and allow students to transition seamlessly from high school into a related postsecondary program. Nearly all states have adopted a national voluntary framework of 16 career clusters originally developed by the National Association for State Directors of Career Technical Education Consortium to organize programs into broad occupational categories such as health science; manufacturing; and business, management, and administration. Within each cluster, states develop programs of study with specific standards defining what students need to know and be able to do to at an entry level in that field. For example, within the Health Sciences cluster, states might offer an Allied Health and a Nursing program.

Perkins requires course sequences in each CTE program of study that begin with introductory courses at the secondary level that teach broad foundational skills and progress to more occupationally specific

courses at the post-secondary level, giving students a clear continuum of education and training from secondary to post-secondary. Most industry-recognized credentials require more training that is available in high schools (that typically offer 2-3 courses in a career areas) and the career pathway shows students what options they have to enroll in a postsecondary program so they can the necessary training to gain a credential that is valuable in the workforce. Some states identify or set industry credentials for CTE programs statewide; others allow local areas to identify program credentials. At a minimum, states collect data on a number of federally required indicators of student achievement and attainment as a condition of receiving federal funds.

Finally, Perkins requires districts organize advisory councils that include educators, business and industry, labor organizations, and parents to provide input on the programs of study offered to ensure they are responsive to community needs and aligned with employment priorities in the region and state. According to a US DOE study of CTE finance, 37 states earmark state funds for CTE[35] in addition to federal Perkins funding. They do this as CTE programming is more expensive to deliver than general education, requiring additional instructors, specialized equipment and supplies, and students' transportation to regional centers or worksites.

Related Programs

Work-Based Learning

While not a Perkins requirement, increasingly states are prioritizing work-based learning (WBL) experiences as a way to give CTE students the opportunity to apply their classroom learning in an authentic setting. In a 2020 analysis, Advance CTE found that 23 states and the District of Columbia include (but do not require) WBL as a factor when approving new or existing CTE programs. Delaware is one state that actually requires students participate in WBL as part of their CTE programming. Sixteen states are developing definitions, frameworks, or related standards to support WBL implementation.[36]

College Credit/Dual Enrollment Options

Under Perkins, states are encouraged to approve CTE programs of study that include opportunities for CTE students to earn college credit while in high school. How this is organized varies by state. Some states have general dual enrollment programs, open to non-CTE and CTE students. Others support CTE dual enrollment specifically, like Vermont's Fast Forward program which uses Perkins reserve funds to offer college courses at CTE Centers taught by teachers who are also adjunct faculty at either CCV or VTC. And many states offer multiple programs; an analysis by the Education Commission of the States identified 86 dual enrollment programs across 48 states.[37]

CTE-focused dual enrollment has its roots in Tech Prep, an educational strategy formalized under the Perkins II CTE law of 1990, which represented the first significant effort to merge dual enrollment and CTE courses. Tech Prep was a sequenced program of study starting in high school and continued into a partnering college, usually for two additional years, leading to an associate degree or a technical

[36] https://cte.careertech.org/sites/default/files/files/resources/State_CTE_PerkinsV_2020.pdf
[37] https://www.ecs.org/wp-content/uploads/State-Approaches-to-Funding-Dual-Enrollment-Programs.pdf

credential. Many states have converted their Tech Prep programs into CTE-focused dual enrollment which allows high school students to complete college courses prior to graduation.

There are three key ways that dual enrollment programs vary:

- ***Eligibility*:** More than 40 states require students to meet eligibility criteria to participate.[38] Prior to the pandemic, most states required students to meet whatever the entry requirements set by local postsecondary institutions before taking college-level courses. Since the pandemic, eligibility has been loosened in many states and now the most common requirement is simply that students reach a particular grade level or have a recommendation from a teacher before starting dual enrollment.[39] In Vermont, eligibility depends on the CTE program and the Fast Forward course. Generally, students must have qualifying WorkKeys or Accuplacer scores in order to enroll. While there are no national statistics on how many students take CTE dual enrollment courses, the data that are available suggest student participation varies widely by state – for example, about 7 percent of Texas' dual enrollment courses are CTE focused compared to 62 percent of Indiana's.[40] In Vermont, 37 percent of CTE concentrator graduates (2022) earned college credits while still in high school, although Fast Track courses are not available for all CTE programs or at all CTE Centers.

- ***Cost*:** The biggest cost for dual enrollment is covering the cost of tuition for the student, which can be the responsibility of the state, local school district, or the student and his/her family. Only 13 states cover the full costs of at least one of their dual enrollment programs.[41] Under these arrangements, tuition payments are made from the state directly to the postsecondary institution or the district providing the course. In Vermont, there is no cost for students to enroll in a Fast Forward course. The AOE reimburses CCV or VTC approximately $1,000 for each course taught and CTE Centers are paid $100 per student enrolled.

- ***Instructor qualifications*:** Rules governing CTE dual enrollment instructor qualifications vary by state. In just under half the states, high school teachers are required to possess the same credentials as faculty at the partner college, according to an analysis by the Education Commission of the States; in another 19 states, they must have earned either a master's degree or a certain number of graduate credits in the field in which they are teaching. Since many high school vocational teachers do not have master's degrees, getting permission from a college for a vocational high school teacher without one to teach a course for college credit can be a challenge for CTE-focused dual enrollment programs. In Vermont, CCV or VTC must approve the CTE teacher assigned to teach the Fast Track course.

[38] https://reports.ecs.org/comparisons/dual-concurrent-enrollment-2022-09a
[39] https://www.edweek.org/teaching-learning/dual-enrollment-programs-are-expanding-but-do-they-reach-the-students-who-need-them-most/2022/09
[40] https://edworkingpapers.com/sites/default/files/ai22-692.pdf
[41] https://www.edweek.org/teaching-learning/dual-enrollment-programs-are-expanding-but-do-they-reach-the-students-who-need-them-most/2022/09

Description of the Delaware and Massachusetts CTE Systems

Delaware

In recent years, the state has strengthened the linkage between the CTE system and the state's economic goals, partnering closely with business and higher education to give more students access to high-quality CTE programs, known as Delaware Pathways. Through Pathways, Delaware is creating a state-led unified structure for CTE.

In 2014, then-Governor Jack Markell organized leaders from Delaware's K12, higher education, business, and community organizations to make the case that the state should join JFF's Pathways to Prosperity Network to rethink CTE and create clear grade 7-14 pathways toward in-demand careers. A key part of the strategic plan was the alignment of education and workforce systems and the coordination of financial support (both public and private). In 2016, Governor Markell signed an executive order defining Delaware Pathways as a "collaborative workforce development partnership. "

The executive order named a steering committee that includes the cabinet secretaries of education, labor, economic development, and health and social services; the president of Delaware Tech (state community college system); the chair of the Delaware Workforce Development Board; the president of the State Board of Education; two school superintendents; two business representatives; and three members of community organizations.[42] This cross-agency committee meets regularly and oversees the development and implementation of pathways programs for Delaware students.

To select priority pathways, the state examined labor market data and identified fast-growing fields that required postsecondary training and paid relatively high wages such as health sciences, advanced manufacturing, IT, engineering, K-12 teaching, and environmental science. Business, higher education and K12 worked together to develop new courses of study in these priority areas. Today there are more than two dozen state-developed programs, each of which includes a defined set of high school courses (typically three) plus options for continued study at the postsecondary level. Each pathway includes a work-based learning (WBL) experience and college credit through dual enrollment with Delaware Tech. The Department of Education provides curriculum support as well as training for high school teachers to successfully implement the curriculum.

Districts and schools can adopt the state-defined pathway programs of study or apply for approval for a locally developed CTE program. To incentivize schools to offer the state programs, the state makes competitive grants available to districts using federal Perkins funds.

Delaware currently offers CTE in 41 out of 45 public high schools, including its three technical school districts (six high schools), 16 comprehensive or traditional school districts (26 high schools), seven charter school districts (seven high schools), and two state institutions serving at-risk youth (two high schools). With the help of ARPA money, it is creating new career-technical programming for middle

[42] The Role of Strategic Partnerships in Scaling Delaware Pathways. Robert Rothman. JFF. 2017.

school grades to increase career awareness and exposure so they will enter high school more prepared to make decisions about CTE pathways and postsecondary opportunities.[43]

Delaware Pathways has grown exponentially since its inception. In 2019-2020, approximately half of high school students (20,000 learners) were enrolled in a Delaware Pathway program, compared to just 13 percent participating over the 2015-16 school year.[44] [This does not include other non-Pathway CTE options, which brings overall CTE enrollment up to 28,000 students.[45]] Delaware's goal is to have 32,000 students enrolled in Pathway programs, which would be 80 percent of high schoolers.

Student participation in a work-based learning experience is a required component of all state-approved CTE programs of study and the state is funding a statewide work-based learning intermediary at Del Tech, the community college. It hosts the Office of Work-Based Learning whose role it is to ensure that schools have access to work-based learning opportunities that meet criteria set by the state. Staff recruit and match employers with students, working closely with schools to understand student needs, arrange events like mock interviews and job shadows to build student competency in interviewing for positions, and design work-based learning experiences. While data on current student participation in work-based learning across the state is not readily available, Del Tech reports that 100 employers are involved and the state intends to double that number.[46]

Delaware provides state funding for CTE programs to account for extra costs of CTE staff salaries, supplies, materials, and energy costs to districts operating approved CTE programs, using a formula. In addition, the state provides additional per pupil funding to the three county vocational technical school districts based on student enrollment.[47] Delaware Pathways coordinates efforts across multiple state agencies and has been successful in integrating previously silo-ed funding streams including US Department of Labor funds and grants from the Workforce Innovation and Opportunity Act, America's Promise, and ApprenticeshipUSA expansion efforts. Over the years, it has leveraged and coordinated almost $24 million in funding using a diversified funding model that combines public (federal and state) and private resources from foundations.[48]

Massachusetts

In Massachusetts the CTE system got an overhaul when the Massachusetts Education Reform Act (MERA) passed in 1993. MERA emphasized strengthening academics in CTE, ensuring that CTE students met the same standards as non-CTE students. More students want to enroll in CTE programs than there are spots available: currently about 18 percent of high school students are enrolled in CTE, with another 5,000 or so students on waitlists.

Massachusetts provides CTE education through comprehensive high schools (with embedded career academies) run by local districts, regional vocational technical high schools (RVTS), vocational schools

[43] https://baytobaynews.com/delaware/stories/guest-commentary-how-delaware-is-beginning-to-rethink-middle-school,85149
[44] https://careertech.org/resource/delaware-pathways
[45] https://cte.ed.gov/profiles/delaware
[46] https://direct.mit.edu/edfp/article/13/2/119/10291/The-Effect-of-Career-and-Technical-Education-on
[47] http://funded.edbuild.org/reports/issue/cte/in-depth
[48] https://baytobaynews.com/delaware/stories/commentary-delaware-pathways-builds-a-lasting-foundation,59931

operated by local districts, and county agricultural schools. Most commonly, Massachusetts cities and towns operate their own preK-12 schools and belong to a vocational regional school district. There are 38 regional vocational high schools which are standalone districts focused solely on CTE programs. Cities and towns in Massachusetts also may establish and operate independent vocational-technical schools in their own school districts.

About half of CTE students in the state participate in specialized programs in comprehensive high schools and half attend RVTS where all students participate in CTE and academics are integrated into CTE programs. Students in a region apply to their RVTS but they must be accepted (usually students submit applications in 8th grade, but they can apply in later grades too) and in some areas demand exceeds supply. Transportation is usually provided, even to programs outside of the home school district if no program in the home districts is offered.

At comprehensive high schools, students take CTE coursework alongside their academic and other elective and required classes. They do not take non CTE classes as a cohort. In contrast, at RVTSs, students alternate weekly between full-time academic coursework and full-time classes/work in their technical area and take all classes as a cohort.

The structure for the CTE system in Massachusetts is in Chapter 74 of the Massachusetts General Laws. The commissioner of the Massachusetts Department of Elementary and Secondary Education (DESE), under direction of the Massachusetts Board of Elementary and Secondary Education (BESE), must approve public vocational technical education programs (known as Chapter 74 programs) by district and school. In order to receive additional funding from the state, Chapter 74–approved programs must document partnerships with representatives from organized labor and local industry leaders in the program area to inform curricula, performance evaluation standards, and equipment purchases. This public–private partnership is designed to keep training relevant and to offer programs in a manner that is consistent with local labor market needs. Chapter 74–approved programs also require adherence to program specific student–teacher ratios and space guidelines.[49] Programs are expected to place at least 70 percent of their graduates in military or civilian jobs related to their program of study or enroll in further education and training within 9-12 months of graduation.[50] More than 90 percent of programs offered in RVTS settings carry this designation, whereas roughly 60 percent of programs in comprehensive settings are Chapter 74-approved.

Each of the approximately 50 Chapter 74 CTE programs (in areas such as agricultural mechanics, diesel technology, graphics, medical assisting, and environmental technology) uses a common state framework that specifies what skills and areas of knowledge students are expected to master in each program. Unlike CTE programs in some other states, which tend to be broader in scope and often resemble career explorations, CTE in Massachusetts is considered to be more in-depth and intensive with three-year

[49] https://direct.mit.edu/edfp/article/13/2/119/10291/The-Effect-of-Career-and-Technical-Education-on
[50] https://resources.finalsite.net/images/v1634747804/minutemanorg/jju6h4rhhniclzck2ijk/DESECh74Manual.pdf

sequences of courses.[51] The state regularly reviews and revises the frameworks and devises new ones to stay current with labor market needs.

Chapter 74 specifies that each school district with five or more Chapter 74-approved vocational technical education programs in high schools must employ a licensed vocational technical supervisor/director of vocational technical education to plan and supervise the programs. The high school principal and supervisor/director of vocational technical education have joint responsibility for planning and implementing programs and activities in which vocational technical education and other students jointly participate, including interrelated academic and vocational technical education programming and scheduling of students.[52]

The Department of Elementary and Secondary Education's Office of College, Career and Technical Education does on-site monitoring of Chapter 74 programs to assess quality and provides technical assistance as needed. The state uses Perkins funds to support professional development academies for CTE teachers and aspiring leaders.

One challenge the state has faced is capacity, as there is a significant waitlist of students. The state adopted new regulations in 2021 requiring vocational technical schools to develop admissions policies that "promote equitable access," removing the requirement that grades, attendance, discipline records, and counselor recommendations be used as admissions criteria.[53] In addition, there is a new innovative effort known as "After Dark" to expand student access by offering CTE programs during times outside of the typical school day when vocational technical facilities are underutilized. Priority is given to oversubscribed schools and programs, allowing students to take their core academics at their regular high school and technical studies at the center after school.[54] Students can apply to attend out-of-district programs if their desired program is not offered locally. State law requires the state to reimburse cities and towns for the cost of transporting students.

CTE is a separate category in the state education funding formula based on student enrollment and state aid is higher for districts with CTE programs.[55] In FY2022, Massachusetts provided $14,752.78 in weighted funding for each CTE student. This is slightly more than the FY22 statewide average foundation budget per pupil of $13,142 per pupil.[56]

[51] https://www.k12dive.com/news/why-massachusetts-cte-approach-works-and-what-other-states-could-learn/503864/
[52] https://resources.finalsite.net/images/v1634747804/minutemanorg/jju6h4rhhniclzck2ijk/DESECh74Manual.pdf
[53] https://www.patriotledger.com/story/news/2021/06/23/massachusetts-vocational-schools-get-new-rules-admission/5320169001/
[54] https://www.doe.mass.edu/ccte/cvte/afterdark/
[55] https://schoolstatefinance.org/resource-assets/Comparing-CTs-Career-and-Technical-Education.pdf
[56] https://www.doe.mass.edu/finance/chapter70/fy2022/chapter-2022-whitepaper.docx

CTE Internationally

A key feature of top performing CTE systems internationally is continuous improvement to adapt to a changing economic and global context. Key current trends are:

- More students in all academic programs, not just CTE students, being given access to applied, work-based learning experiences to help students make connections with employers and ease their transition into the job market.
- A greater focus on strengthening the academic foundation of CTE programs so that students are better prepared for rising skill levels in high growth jobs, have opportunities to continue advanced technical studies, are prepared to apply to university or other higher education programs should they choose to shift their focus.
- Rethinking how and where training takes place, with systems using new technologies such as AI and virtual reality to provide new kinds of learning opportunities for students and modularizing programs to personalize them and allow for different ways of gaining skills.
- Investing in lifelong learning and supporting adults who need upskilling or who want to transition from current jobs into careers in emerging industries. For example, Switzerland has introduced a program to refresh the skills of mid-career workers who were former apprentices. Singapore's *SkillsFuture* initiative encourages citizens to keep their skills current by providing every citizen age 25+ with credits that they can use to cover the cost of designated education.

Profiles of the Singapore and Switzerland systems — two of the strongest globally — can be found below. These two countries have populations. Similar in size to those of a US state.

Profiles of Switzerland and Singapore

Switzerland

Switzerland, with a population of 8.8 million people, is known for its "dual" vocational education system that combines a work-based apprenticeship with learning in school. The Swiss system is based on the Germanic apprenticeship model which has its root in the guild system of apprenticeships from the Middle Ages. While Switzerland's system traditionally focused on preparing young people to enter the trades (welding, blacksmithing, etc.), it has dramatically expanded and updated options in high growth areas and now provides approximately 230 programs in areas such as IT, insurance, health and social care, and pre-engineering.

Students attend a common school until grade 9 at which point they choose an academic program to prepare for university or an apprenticeship. Most students (70 percent) select an apprenticeship, which are 3-4 years in duration. With help from local career guidance centers, students choose an occupational area and apply for paid apprenticeship positions with an employer. These positions are under the supervision of an experienced mentor usually for 3 days a week; students attend school for related instruction 2 days a week. The vocational content and assessment requirements are determined by broad national industry sector associations to ensure that students learn a broad set of skills that are applicable across many specializations. For example, the commercial sector includes 21 areas of specialization including banking, retail, and public administration.

Students learn on the job and are expected to do real work. At the completion of the apprenticeship, students sit for final exams and complete an individual practical project at the workplace that is presented to a panel of employers and teachers for a grade. They earn a Federal VET Diploma that is recognized across the country. The Swiss system allows students to move from apprenticeships to higher education, both to programs offering advanced technical skills and to university. Both programs require students to enroll in additional academic coursework (or self-study) and sit for an exam. Those who pass the exam are awarded the Federal Vocational Baccalaureate which entitles them to admission to a University of Applied Sciences (UAS), where they can earn Bachelor's and Master's degrees in such fields as information technology, health care, social work, business, arts, music, and engineering. Students with the Federal Vocational Baccalaureate can also sit for the University Aptitude Test that qualifies them to enroll in the traditional university system.

The Swiss system is overseen and funded by three partners who share responsibility:

- The federal government, generally referred to as the confederation, whose role is to regulate and steer the system. The federal financial contribution is about 10 percent.
- The 26 cantons, which are like US states and are responsible for primary and secondary education, organize the school-based part of the vocational system and ensure quality. The canton financial contribution is about 30 percent.
- Employers and their industry sector organizations are the real drivers of the system. They set the training content of vocational programs based on industry standards, take the lead in determining when new occupational programs need to be developed or when current programs should be phased out, and assure there are adequate numbers of apprenticeships to match the numbers of students seeking contracts. Employers contribute about 60 percent of the total cost.

Employers are committed to the system as they view it as an investment in their future workforce. In fact, many company CEOs started as apprentices themselves. About 30 percent of Swiss companies host apprentices and many more hire apprentices full time after they complete their apprenticeships. Industry partners report that the benefits they receive from hosting apprentices in terms of productive work completed far outweigh the salary costs – in other words, there is a positive return on investment that encourages them to support and engage in the apprenticeship system.

Singapore

Singapore is a small island nation of 5.6 million people with no history of apprenticeship or industry involvement in training students; it only built its vocational training system after it gained independence in 1965. From the beginning, Singapore saw its education and training system as vital in building the nation's economy and has redesigned it over time to align to its evolving economic strategy. Singapore has a very rigorous secondary program that ends at age 16. Students then choose among a set of academically focused upper secondary programs including preparation for university and vocational education. Initial and continuing VET is offered in a set of state-of-the-art ITE campuses which offer postsecondary students technical training in a school-based setting. A second option is enrolling at one of the polytechnics which offer nearly 150 different three-year degree programs in technical fields.

A career guidance curriculum has been mandatory for primary and secondary school students since 2014, and the Ministry of Education has created a web portal that enables students to assess their strengths, identify their interests and explore careers that match them.

The ITE offers a wide range of three-year technical education programs in six broad areas: Applied and Health Sciences, Business Services, Design and Media, Electronics and ICT, Engineering, and Hospitality. Employers are deeply involved in ITE program design, provide state-of-the-art equipment to simulate work settings, and help assess students' mastery of skills when they complete the programs. The curriculum of a typical program comprises about 80 percent core modules that integrate academic and technical skills in the chosen area of study, 15 percent general foundational skills modules, and 5 percent elective modules to allow for personalization. ITE currently requires all students to participate in a three- to six-month internship and there are efforts to expand the work-based learning portion of their VET programs and over time, build more of a culture of apprenticeship.

In addition to teacher training, instructors have professional qualifications and work experience in their industry area and are required to do work externships on a regular basis. Students graduate with technical diplomas and can either enter the workforce directly or enroll in higher level technical training at a degree-granting polytechnic. Polytechnics offer nearly 150 diploma programs, and, like the ITE, have worked to remain closely connected with industry, growing and changing alongside Singapore's economy.

The ITE and polytechnic are very popular options for students after they leave secondary school as students know they will be prepared for good, in-demand jobs. Each year about 40 percent of graduating students enter one of the polytechnics and 25 percent enter the ITE. The Singapore CTE system is tightly coordinated by the government with the Ministry of Manpower working with economic agencies and industry groups to identify critical workforce skill needs. ITE program offerings are regularly updated, and the number of slots available in each are adjusted to reflect expected demand.

In Singapore, up to 40 percent of graduates of vocational education pursue a university degree. In many cases they can transfer enough credits to complete a bachelor's degree in two years.

Appendix D, CTE State Governance Model Table

States	District-Based	Regional-Based	Mixed
Alabama			All districts offer CTE + students can apply for specialized full-time CTE programs at 68 area technical centers (ATCs) serving students from a particular region
Alaska			42 out of 54 districts offer CTE + students can apply for specialized full-time CTE programs at 9 area technical centers (ATCs) serving students from a particular region
Arizona			Offered in 5 districts + 14 specialized CTE districts that serve multiple districts.[57] CTEDs can include central and satellite campuses[58] CTEDs are governed by an elected board consisting of five members elected from five single member districts within the CTED
Arkansas			Districts can provide CTE or send students to 25 Area Career Centers with 27 satellite locations. Some districts do not have access to a CTE Center, however[59] These centers are sponsored by high schools or two-year colleges. There are two exceptions: one center is sponsored by an education service cooperative with instruction delivered by two higher education institutions, and one center is sponsored by a technical institute.

[57] https://www.azed.gov/sites/default/files/2020/08/CTED%20List%20and%20Map%208-6-20.pdf?id=5f2c63d603e2b31790c7dc89

[58] https://www.acteaz.org/resources/cted-information/

[59] https://www.arkleg.state.ar.us/Bureau/Document?type=pdf&source=education%2FK12/AdequacyReports/2018%2F2018-01-23&filename=CareerTechEdCTE14woFordyceBaldKnobBeebe

States	District-Based	Regional-Based	Mixed
California			District based (in comprehensive high schools with CTE programs and high schools solely devoted to CTE) + 74 Regional Occupational Centers and Programs (ROCPs). The ROCPs can serve a single district, multiple districts, or a county
Colorado	District based		
Connecticut			Districts can offer additional CTE programs + state funds 17 technical high schools and one tech ed center. The system has its own superintendent and serves both HS students and adults. Three tech high schools have career academies
Delaware	District-based and offered at 41 out of 45 public high schools, including its 3 technical school districts, 16 comprehensive or traditional school districts, 7 charter school districts and 2 state institutions serving at-risk youth		
Florida	District-based		
Georgia	District-based		
Hawaii	District-based		
Idaho			Some districts provide CTE for their own students (some offer courses via CTE Digital) + 17 Career Technical Schools (CTS) provide CTE to students from groups of districts. CTS are governed separately from the school districts and are authorized by the state[60]
Illinois			Most districts offer CTE (592 out of 704 HS offered CTE in FY2020)[61]

[60] https://cte.idaho.gov/programs-2/secondary-education/career-technical-schools-in-idaho/

[61] https://www.ilga.gov/reports/ReportsSubmitted/2409RSGAEmail4198RSGAAttach2020%20Career%20and%20Technical%20Education%20Report%20ISBE.pdf

States	District-Based	Regional-Based	Mixed
			24 Area Career Centers also each serve multiple districts
Indiana			Districts offer CTE for their own students + there are 49 CTE Districts (defined by statute) which bring together 2 or more local districts to jointly offer CTE. CTE Districts have a board that includes membership from each participating district and approves course offerings. There are 23 Area Technical Centers
Iowa			State requires (per Iowa Code Chapter 12) every district to offer/teach at least 3 CTE courses within at least 4 of the state's 6 identified industry clusters.[62] 105 districts (out of 328) do this through 18 regional centers.
Kansas	District-based		
Kentucky			CTE is delivered through: 1) 51 state-operated area technology centers (ATCs) that have local input through steering committees, 2) locally operated career and technical centers (CTCs), and, 3) local area vocational centers (LAVECs) that are district-governed[63]
Louisiana	District-based		
Maine		27 regional CTE centers/high schools for 177 school districts (all students can access)	

[62] https://educateiowa.gov/sites/default/files/documents/The%20Annual%20Condition%20of%20Secondary%20Career%20and%20Technical%20Education%20-%20Website.pdf

[63] https://apps.legislature.ky.gov/CommitteeDocuments/329/12108/CTE%20Task%20Force%20-%20KDE%20Presentation%20-%20July%202019.pptx

States	District-Based	Regional-Based	Mixed
Maryland	District-based[64]		
Massachusetts			By law, each student in Massachusetts has access to either a regional or district vocational program. Districts offer CTE programs + there are 36 regional vocational schools that are open to any student in the state (no specified sending districts)
Michigan			55 Area career centers operated by ISDs (and supported by county wide millage) + local district CTE academies or programs + consortia of districts operating a joint center
Minnesota	District-based		
Mississippi	District-based		
Missouri			CTE is offered in 444 out of 567 school districts + there are 57 districts that host Area Career Centers (serve multiple districts)
Montana	District-based		
Nebraska	District-based		
Nevada	District-based		
New Hampshire		30 regional CTE Centers, hosted by a high school, across the state; each school district has an agreement with a CTE center to receive their students. Of these, 5 are shared with VT Regional centers are governed by the superintendent of the district that hosts the center	

[64] https://mldscenter.maryland.gov/egov/Publications/ResearchReports/FinalCTEReportOctober2019.pdf

States	District-Based	Regional-Based	Mixed
New Jersey			Districts can offer CTE + 21 vocational technical schools serve each county)[65]
New Mexico	District-based delivery; mix of comprehensive high schools, voc/tech high schools and via early college programs with community college State requires a regional approach to CTE (coordinating funding and programming decisions) with 10 CTE regions (for 129 school districts)		
New York			District-based (example NYC has 135 out of 400 high schools that offer CTE) + regional tech centers operated by 37 Boards of Cooperative Education Services (BOCES)
North Carolina	District-based		
North Dakota			Districts provide CTE in comprehensive high schools + 12 Area Technical Centers that are governed by an ATC board composed of at least one member from every participating district or area served
Ohio	All 612 school districts in Ohio are connected to one of 93 CTE planning districts. Three models are used: 1) CTE is provided as part of the HS offerings; 2) Planning district creates a compact for CTE programming to be open to all students within the Compact; 3) Students attend Career Center within the district[66]		
Oklahoma			391 out of 509 districts offer CTE + there are 29 technology center districts offering

[65] https://careertechnj.org/high-school-opportunities/

[66] https://www.ohioacte.org/whatiscte

States	District-Based	Regional-Based	Mixed
			specialized career programs that serve most (but not all) areas of the state.
Oregon	District-based		
Pennsylvania			80+ CTC regional centers operated by 29 intermediary units + other districts deliver through their own schools
Rhode Island			CTE available in all HS + 10 CTE Centers (and any student can access any program)[67]
South Carolina			27 of 79 districts operate their own career centers. Other districts are served by12 multi-district career centers
South Dakota			15 out of 148 districts offer CTE programs + the remaining 133 districts have formed 18 regional consortia to provide CTE[68]
Tennessee	District-based		
Texas			Texas independent school districts (ISDs) are required by law to provide 3 out the 16 career clusters to students + there is a system of Area Technical Centers that serve high school students[69]
Utah			Districts provide CTE programs + there are 8 technical colleges that provide both secondary and postsecondary CTE across the state. Each technical college serves a designated set of K12 districts, although the numbers of HS students they serve are small. The Technical Colleges are overseen by Board of Higher Ed which has responsibility for all postsecondary
Vermont		CTE is provided statewide through 15 service regions. Each service	

[67] https://www.ripec.org/pdfs/2015-CTE.pdf

[68] https://s3.amazonaws.com/PCRN/docs/stateplan/SD_2020_State_Plan.pdf

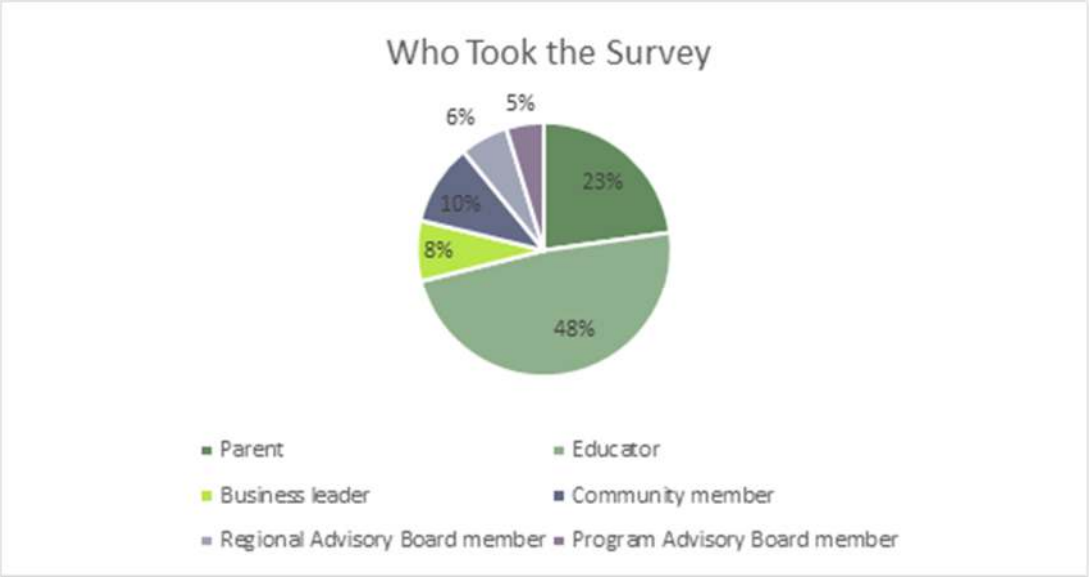
[69] https://files.eric.ed.gov/fulltext/ED613503.pdf

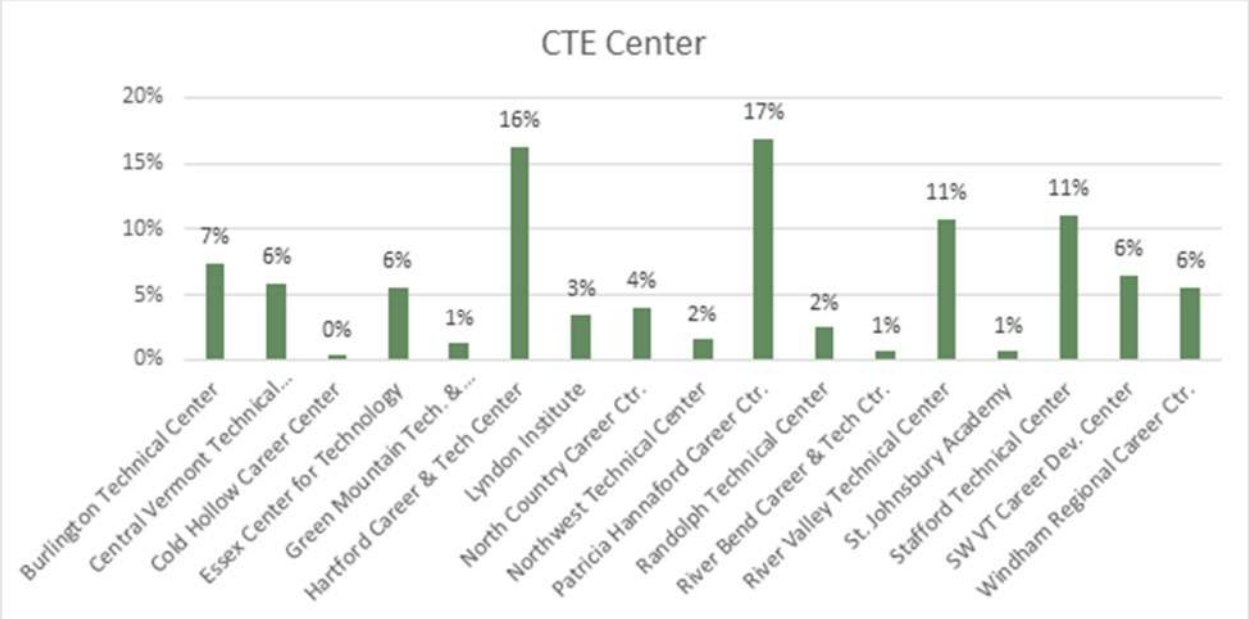
States	District-Based	Regional-Based	Mixed
		region is served by a technical center(s) and/or comprehensive high school(s). School districts and independent high schools are assigned to a technical education service region	
Virginia			Some districts offer CTE
Washington			District-based + statewide system of 14 CTE skill centers offering programs that are too expensive or specialized for local districts to offer[70]
West Virginia	Offered in school district vocational centers or voc/tech high schools		
Wisconsin	District-based		
Wyoming	District-based		

[70] https://www.k12.wa.us/student-success/career-technical-education-cte/cte-skill-centers

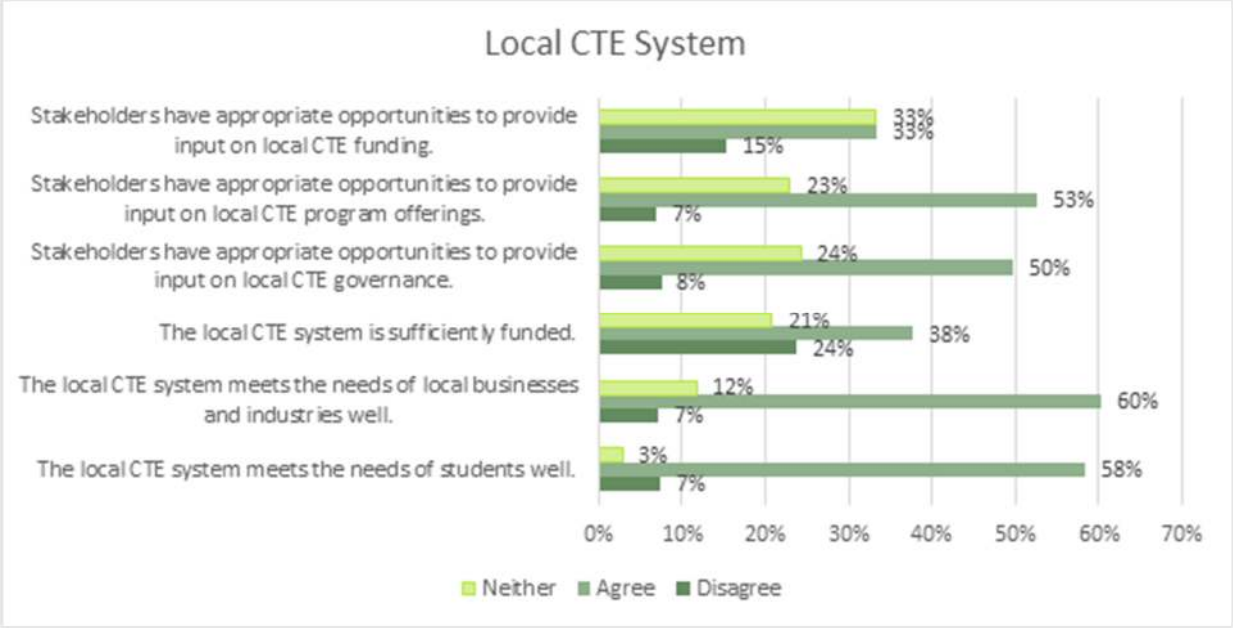
Appendix E, Survey Results

VERMONT CTE RESULTS WITHOUT STUDENT RESPONSES

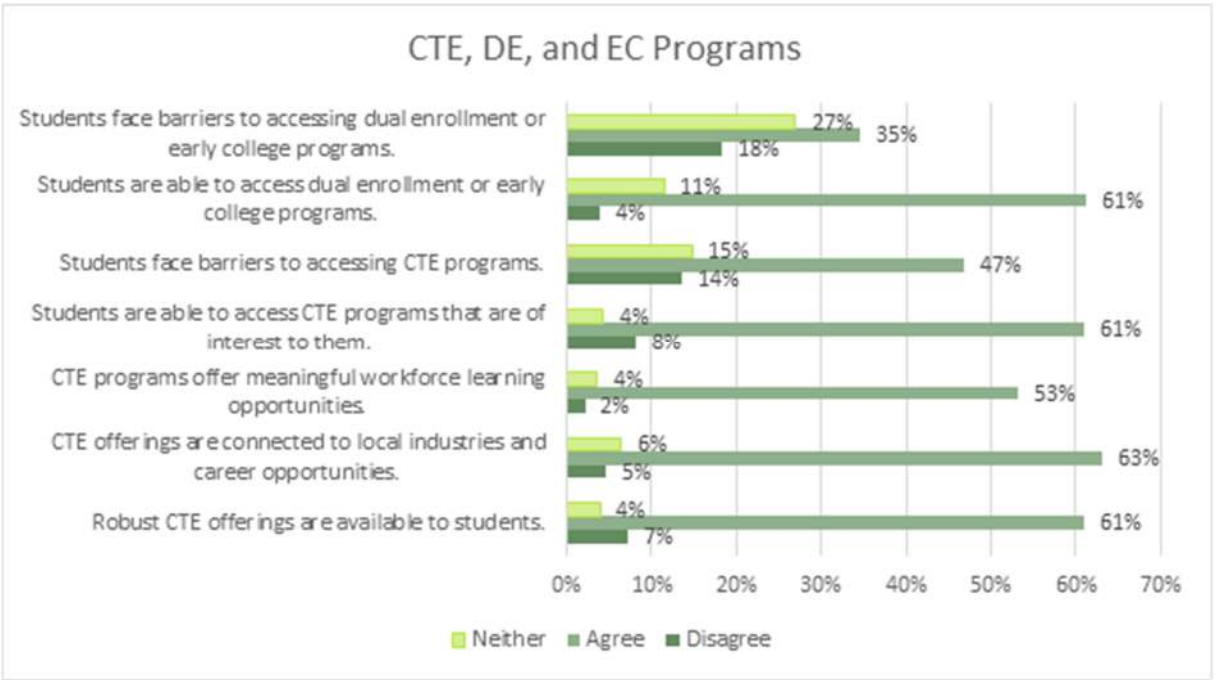




Q2 - Please indicate the degree to which you agree or disagree with the following statements about your local CTE system:

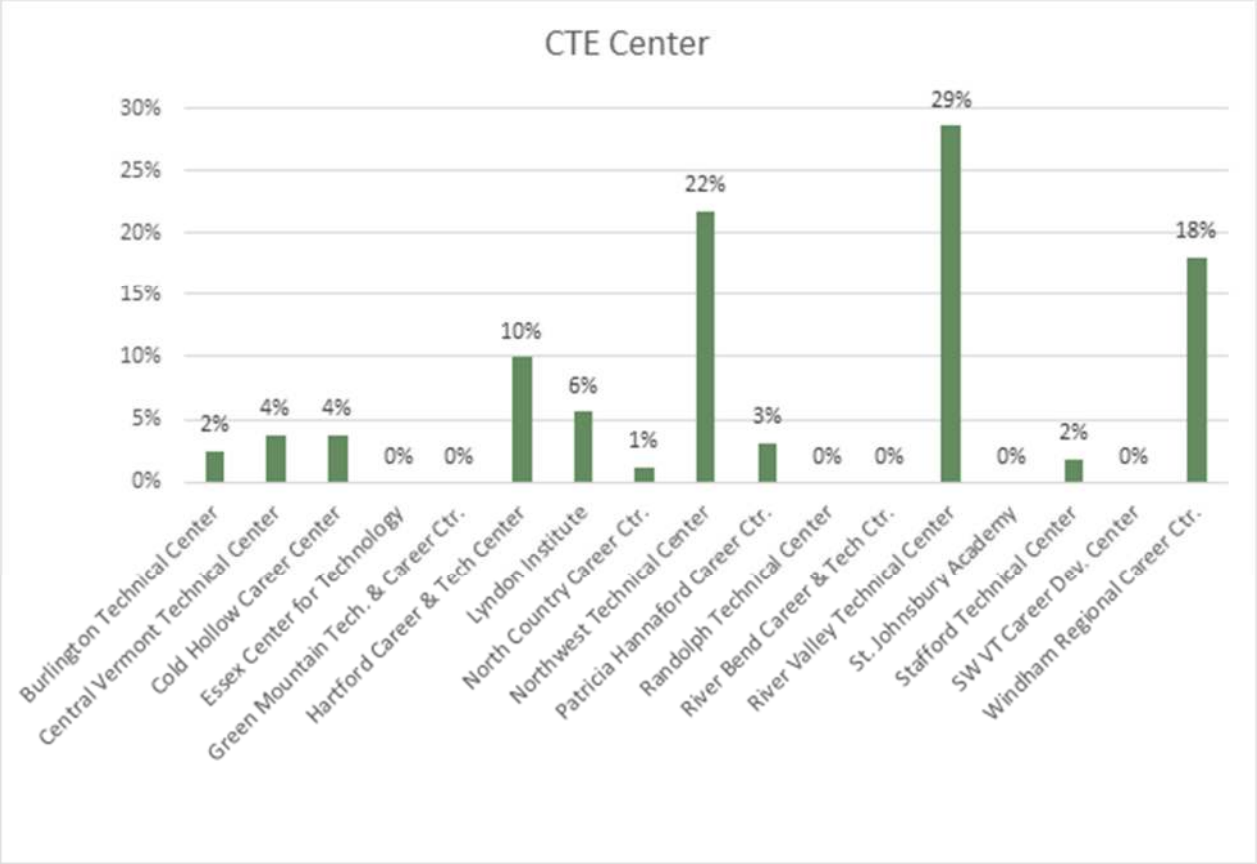


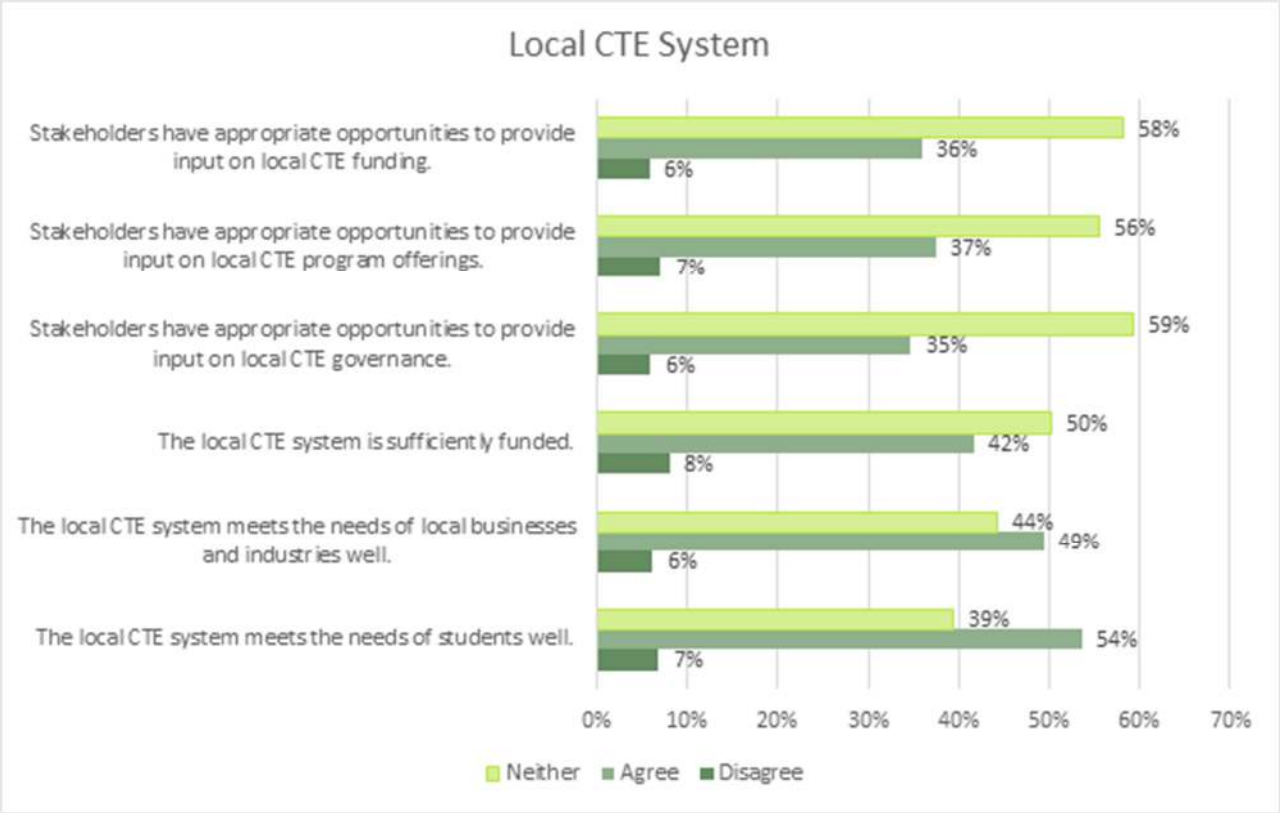
Q3 - Please indicate the degree to which you agree or disagree with the following statements about access to CTE, dual enrollment and early college programs in your area:

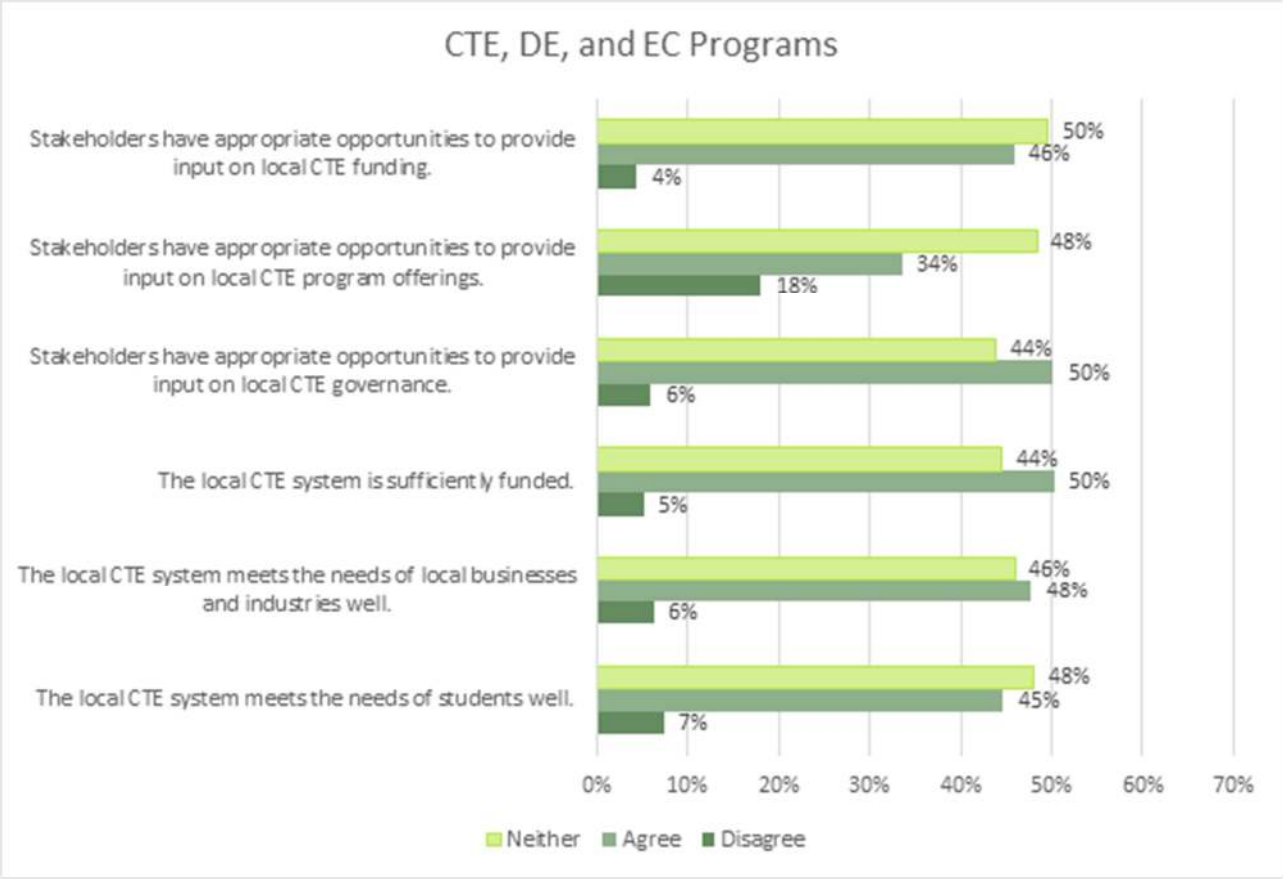


VERMONT CTE SURVEY RESULTS -STUDENT RESPONSES

(about 270 responses, though only 161 answered which CTE center they were from)




Local CTE System
Stakeholders have appropriate opportunities to provide input on local CTE funding.
58%
36%
6%
Stakeholders have appropriate opportunities to provide input on local CTE program offerings.
56%
37%
7%
Stakeholders have appropriate opportunities to provide input on local CTE governance.
59%
35%
6%
The local CTE system is sufficiently funded.
50%
42%
8%
The local CTE system meets the needs of local businesses and industries well.
44%
49%
6%
The local CTE system meets the needs of students well.
39%
54%
7%
0%
10%
20%
30%
40%
50%
60%
70%
Neither
Agree
Disagree


CTE, DE, and EC Programs
Stakeholders have appropriate opportunities to provide input on local CTE funding.
50%
46%
4%
Stakeholders have appropriate opportunities to provide input on local CTE program offerings.
48%
34%
18%
Stakeholders have appropriate opportunities to provide input on local CTE governance.
44%
50%
6%
The local CTE system is sufficiently funded.
44%
50%
5%
The local CTE system meets the needs of local businesses and industries well.
46%
48%
6%
The local CTE system meets the needs of students well.
48%
45%
7%
0%
10%
20%
30%
40%
50%
60%
70%
Neither
Agree
Disagree

Appendix F, Revenue Included and Excluded from Data Analysis

STATE REVENUE INCLUDED

Revenue Code	Revenue Code Description	Program Code	Program Description	Fund Code	Fund Description	Level Code	Level Description
3113	State Supprt-VC	11	Regular Education	1000	General	10	Elementary (K-6)
3114	Tech Center on Behalf Payments	22	Not eligible MOE Program	1001	General	30	Secondary (7-12)
3115	Reimb-Unenrlld Res att VC	29	Other Special Programs	2000	Special Revenue	40	Postsecondary
3190	Other Unrestricted Grants-Local Use	31	Vocational Regular	2011	Youth Leadership	50	Location-wide
3303	Tech Ed-Adult Formula	60	Adult/Continuing Education	2012	Technical Education Pilot		
3305	Tuition Reduction	98	Enterprise Programs	2013	Technical Ed. - Equipment		
3306	Youth Leadership			2014	Flexible Pathways		
3308	Tech Ed-Transportation			2022	Other Restricted State Grants		
3309	Tech Ed-Coop Ed Salary			2024	Secondary School Reform		
3310	Technical Ed-Guidance			2026	ACT 51 Equipment/Curriculum grants		
3312	Tech Ed- Director Salary			5001	Other Permanent		
3316	Technical Education Pilot			6000	Enterprise		
3330	Technical Edu-Equipment						
3350	Secondary Sch Reform						
3370	High School Completion						
3380	Flexible Pathways						
3722	ACT 51 Equipment/Curriculum grants						
3790	Other Restricted State Grants						

STATE REVENUE NOT INCLUDED

Revenue Code	Revenue Code Description	Program Code	Program Description	Fund Code	Fund Description	Level Code	Level Description
3313	TechEd Adult Coord Salary	60	Adult/Continuing Education	2008	Adult Basic Ed		
3240	Adult Basic Ed						

LOCACL REVENUE INCLUDED

Revenue Code	Revenue Code Description	Program Code	Program Description	Fund Code	Fund Description	Level Code	Level Description
1000	Local Revenues--Local Use	11	Regular Education	1000	General	30	Secondary (7-12)
1301	Tuition-Students	21	K-12 Special Education Eligible for Reimbursement	1001	General	40	Postsecondary
1302	Tuition-Pub VT LEAs	21	MOE (Maintenance of Effort)	2000	Special Revenue	50	Location-wide
1304	Tuition-other sources	29	Other Special Programs	2132	GEER		
1412	Transport-Pub VT LEAs	31	Vocational Regular	3001	Capital Projects		
1510	Invest Interest Earned	81	Other Community Services	5000	Permanent		
1590	Invest Earnings-Other	92	Non-Athletic Co-Curricular Activities	5001	Other Permanent		
1600	Student Activities	98	Enterprise Programs	6000	Enterprise		
1903	Local Revenues--Local Use	99	Other Cocurricular and Extracurricular Programs	6001	Other Enterprise		
1903	Food Serv-Othr Local			8000	Trust		
1910	Community Activities			8001	Other Trust		
1911	Parental Fees			9001	Other Agency		
1921	Other Revenues-Rentals			9001	Other Custodial		
1922	Contributions/Donations						
1941	Serv to Pub VT LEAs						
1943	Special Ed Excess Costs						
1950	Serv to Othr Local Gov						
1960	Gain/Loss on Fixed Assets						
1980	Refund of PY Expenditure						
1985	Other Program Income						
1989	Surplus PY Revenue						
1990	Misc Other Local Revenue						
1990	Local Revenues--Local Use						

LOCACL REVENUE NOT INCLUDED

Revenue Code	Revenue Code Description	Program Code	Program Description	Fund Code	Fund Description	Level Code	Level Description
1942	Services to non-VT LEAs	60	Adult/Continuing Education	2008	Adult Basic Ed		
1303	Tuition-Non VT LEAs						