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# **An Overview of Colorado K-12 Career and Technical Education**

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# Executive Summary

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Over the past several decades Career and Technical Education (CTE) has emerged as a robust avenue for promoting educational options for student populations ranging from those who would have been traditionally served by vocational education programs to college-bound students in high demand fields. Though a comprehensive definition of CTE might oftentimes prove elusive, it is generally beneficial to understand it as education designed to directly connect a student's learning experience at the secondary level with whatever career or educational aspirations they may choose to pursue after graduation. In other words, while CTE programs are designed to offer a level of career preparation rigorous and applicable enough that students may be able to pursue employment immediately after high school, in many cases pathways will continue on to colleges and universities. Therefore, the key distinction between traditional vocational education and contemporary CTE programming is that the former was generally understood as career preparation designed specifically for students not intending to pursue postsecondary degrees, whereas the

latter will oftentimes lead directly into further learning or training. This paper aims to provide an overview of Career and Technical Education in Colorado, highlighting different options and funding sources available to schools and districts.

Different facets of CTE in Colorado are overseen by a number of government entities (for instance, CTE instructor credentialing is handled by the Colorado Department of Education), but the Colorado Community College System (CCCS) is charged with the leading role in directing career learning in Colorado at both the secondary and postsecondary levels. The CCCS oversees program approval, which in turn is a crucial step in the process of securing state funding through the **Career and Technical Act (CTA)**, as well as federal funds made available by the **Perkins Act**, both of which are available as reimbursements. In addition to discussing these major sources of funding, this paper also highlights several crucial Colorado initiatives intended to promote career learning. The first of these is the **P-TECH** program, created by House Bill 15-1270, which

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promotes the creation of partnerships between high schools, colleges, and local business communities in order to allow students to pursue associate degrees while enrolled in 5th and 6th years of high school. Additionally, the paper highlights the **Career Development Success Program** established by House Bill 16-1289 that allows schools to receive funds for each student who successfully completes a qualified industry credential program. **Concurrent Enrollment**, which plays a crucial role in Colorado’s CTE landscape, is also discussed.

CTE programs in Colorado can for the most part be grouped into the following models, which are discussed in some length with specific examples:

- **Designated Career and Technical Schools**
- **Career and Technical Education Integrated into Comprehensive High Schools**, this encompasses distinct approaches:
  - **Extensive CTE program integrated into a single school**

- **CTE concentrations intentionally dispersed among district schools**

- **Programs conducted via Concurrent Enrollment**
- **Early Colleges**
- **P-TECH Programs**

The paper puts forth two policy recommendations. The first of these is intended to promote equitable access to CTE program approval and to related funding for district-authorized charter schools. Currently, in order to receive CTA or Perkins Act funding, charter schools must rely on their school districts to forward their program approval applications to the CCCS, but districts are not obliged to take any steps. The second policy suggestion aims to address the issue of CTE instructor retention, which schools frequently deal with. This challenge might in many cases be difficult to overcome, but alterations to district salary schedules may go a long way toward alleviating it.

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## Introduction

Vocational training has long been a significant—though oftentimes overlooked—component of secondary and postsecondary education in the United States. Vocational education has been rebranded as Career and Technical Education (CTE), though the transformation has entailed more than a mere change in name. The range of course offerings under the CTE umbrella is broad, and many if not most secondary schools in Colorado will operate a career preparation pathway of one type or another. This paper aims to first outline a brief sketch of the history of vocational training in the United States and in Colorado and to then provide a

broad overview of Career and Technical Education in Colorado while highlighting relevant legislation and programs. Because schools and districts have considerable autonomy when it comes to organizing their CTE programming, there is much variation across the state. For this reason the paper also features several models of career instruction.

Although training students for specific jobs and careers doubtless has a longer history, the separation of vocational training from general high school curricula can be traced back to the beginning of the 20th century when the Smith–Hughes National Vocational Education Act of 1917 called

on individual state boards of education to implement plans to govern various dimensions of vocational training from instructor training to the specific content and methods to be used in schooling. The next several decades saw several successive expansions of federal support for vocational instruction. Additionally, following the Second World War the scope of vocational training began to expand beyond agriculture, trade, and industry, with the 1958 National Defense Education Act noteworthy extending federal funding to vocational training while simultaneously emphasizing fields of study that would today fall under the STEM (science, technology, engineering, math) umbrella.<sup>1</sup>

The next defining step in the evolution of vocational education came with the adoption of the Vocational Education Act of 1963. It further broadened federal funding while also loosening federal control over state vocational programs. Partly resulting from the deindustrialization of the American economy, the 1963 Act underwent several amendments in the 1980s to where vocational education began to encompass a broader range of careers as well as more varied academic trajectories. Career and Technical Education as currently understood originates from this shift.<sup>2</sup>

While all schooling is to some extent designed to prepare students for their lives after graduation, the aim of CTE is to emphasize a *direct* connection between the content a student is exposed to and the skills and knowledge that will be demanded of them later, whether it be in a workplace or in the context of postsecondary education. Therefore, one of the key differences between past and present vocational training is that

the former was generally understood as career preparation designed specifically for students not intending to go on to college, while in the case of the latter the training at the secondary level may in fact lead directly into programs of further learning or training. With that said, however, contemporary Career and Technical Education does also provide a possible avenue for students who either cannot, or for whatever reason will not go on to postsecondary schools, be they two- or four-year colleges.

In the 2006 reauthorization of the Vocational Education Act, federal lawmakers made two significant changes. They replaced the phrasing of “Vocational Education” with “Career and Technical Education” and removed from the law the stipulation that schools and programs geared toward career preparation be necessarily mutually exclusive with education aimed at preparing students for postsecondary education. In other words, while career training initially came into being as a parallel educational track, at the

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beginning of the 21st century there came a concerted effort to integrate college- and career-oriented schooling. Consequently, one of the defining features of CTE is that

it is intended to complement rather than replace or supersede traditional academic instruction.

In 2018 President Donald Trump signed into law the Strengthening Career and Technical Education for the 21st Century Act (commonly known as Perkins V), which provides an annual \$1.2 billion federal investment in Career and Technical Education programs. Much as has been the case with federal vocational training legislation virtually from the moment of its emergence, Perkins V calls on states to craft their own career training plans. It is up to the states and their respective departments of education and higher education to define many key dimensions of Career and Technical Education programs.

In Colorado, much of the task of administering Perkins funding and CTE instruction more broadly is assigned to the Colorado Community College System (CCCS). Among the most important aspects of CTE instruction defined at the state level are the size, scope, and quality of instructional programs. The Colorado state plan sets the minimum completion requirement at two year-long courses (i.e. two Carnegie Units of instruction), though it allows for longer sequences and stresses that the optimal

program length is three years of Carnegie Units. A student becomes a “CTE concentrator” when, within the reporting year, he or she is served by an official CTE provider and has completed at least two courses in an approved single CTE program. A single course, meanwhile, may count toward the completion of multiple different CTE career pathways. All CTE courses in Colorado must meet a certain set of specific requirements. To this end, CTE courses at the secondary level must integrate academic, technical, and employability training. Furthermore, courses must progress in a defined sequence of classes that build upon one another and must train the student for at least entry-level employment in a defined discipline. In Colorado, CTE career concentrations are grouped into six distinct industry sectors:

- Agricultural, Natural Resources and Energy;
- STEM, Arts, Design, and Information Technology;
- Skilled Trades and Technical Sciences;
- Health Science, Criminal Justice and Public Safety;
- Hospitality, Human Services, and Education; and
- Business, Marketing, and Public Administration.<sup>3</sup>

Additionally, CTE programs are required to include some component of work-based learning that provides students with hands-on experiences that relate to the student’s CTE program of study. Although career and technical instruction takes place primarily at the high school and community college levels, there are some programs that operate in middle school settings. At all levels of instruction, these programs are obliged to provide opportunities for career exploration which may include career counseling, career planning, career fairs, industry speakers, tours of worksites, etc.

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Because of the unique nature of Career and Technical Education and because the field is a relatively new one, CTE touches on issues overseen and regulated by a number of different state level departments. For instance, because local CTE programs may rely heavily on concurrent enrollment, the Colorado Department of Education, Department of Higher Education, and the Colorado Community College System play a considerable oversight and regulatory role. Additionally, the Colorado



Workforce Development Council, Colorado Department of Labor and Employment, as well as the Office of Economic Development and International Trade will play a significant role in shaping CTE-related policy at the state level due to the type of jobs and careers for which CTE aims to prepare Colorado's students and, more importantly, because CTE as a subfield of education—quite unlike conventional schooling—may be explicitly used to address specific workforce and economic needs of the state, region, or the country. Colorado's Strategic Plan for Career and Technical Education is published on the Colorado CTE website.<sup>4</sup>

Career and Technical Education in Colorado is a very specific concept referring to instruction governed by the Career and Technical Act (CTA), previously known as the Colorado Vocational Act (originally passed in 1970).<sup>5</sup> The Act tasks the State Board for Community Colleges and Occupational Education with the approval of Career and Technical Education programs and provides a set of requirements that programs are to meet in order to be authorized as such. According to rules for the implementation of the Career and

Technical Act, a program is eligible for approval if it meets the following set of qualifications:

- It must provide students with entry level occupational skills *or* it must provide for a “seamless transition from secondary to postsecondary education or training.”
- Its duration must be sufficient to provide entry-level occupational skills.
- It must work with a local program advisory committee which is to assist the district in “planning, conducting, and evaluating” the operation of CTE programs.
- The facilities used for CTE instruction must be sufficiently and appropriately equipped for the specific pathways in which they will provide instruction.
- Programs must be coordinated to respond to existing employment potential.
- Opportunities for industry-specific leadership training must be provided. These are referred to as CTSOs (career and technical student organizations) and can include any in a range of associations such as DECA, Future Business Leaders of America

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(FBLA), Future Farmers of America (FFA).<sup>6</sup>

Importantly, the rules also provide the following definition:

CTE means organized educational activities that offer a sequence of courses that provides individuals with coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in current or emerging professions; provides technical skill proficiency, an industry-recognized credential, a certificate, or an associate's degree; and may include prerequisite courses; and include competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills,

In 2017-18, the latest year for which comprehensive information is available, the Colorado General Assembly provided nearly \$26.7 million to CTE programs as reimbursements. The report which provides the preceding figure, produced by the Colorado Community College System, states that there are “nearly 1,500 secondary CTE programs” across the state serving 106,720 individual high school students in both traditional and charter schools. Additionally, 86 districts offered middle school programs, which enrolled 31,574 students. Including administrative costs, CTE expenditures in Colorado totaled over \$123.5 million in 2017-18, meaning that the state funding made available through the CTA covered roughly a fifth of the costs.<sup>8</sup>

The report notes that the percentage of expenditures funded by the State has dropped continually since the Colorado Vocational Act was first implemented in the early 1970s: in 1971-72 the General Assembly provided over 58% of the cost of what is now CTE instruction.<sup>9</sup> Statewide, the top recipients of CTA funding in fiscal year 2020 were:

- Jefferson County (\$3,453,220)
- Denver Public Schools (\$3,061,833)
- Cherry Creek (\$1,843,277)
- Mesa County 51 (\$1,785,801)
- Aurora Public Schools (\$1,528,169)
- Boulder Valley (\$1,187,682)
- Poudre (\$1,124,875)
- Adams 12 (\$986,662)
- St. Vrain Valley (\$884,153)
- Academy 20 (\$875,863)
- Douglas County (\$875,382)<sup>10</sup>

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technical skills, and occupational-specific skills, and knowledge of all aspects of an industry, including entrepreneurship, of an individual.<sup>7</sup>

How career and technical instruction is carried out varies from district to district, but the differing approaches can be divided into a handful of models. These models are not strict formulas, but rather devices that may allow observers to better understand the different approaches

to career and technical education in Colorado. We divided CTE programs into the following five models:

- **Designated Career and Technical Schools**, or district-operated facilities dedicated specifically to CTE instruction. These operate under a set of specific state guidelines and must adhere to strict requirements. We focus on Jefferson County's Warren Tech but also provide a few highlights from a tour of the new Cherry Creek Innovation Campus.
- **Career and Technical Education Integrated into Comprehensive High Schools**, this encompasses distinct approaches:
  - **Extensive CTE program integrated into a single school**, in this case we use the example of Westminster Public Schools.
  - **CTE concentrations intentionally dispersed among district schools**, here we use the example of Douglas County School District and District 49.
- **Concurrent Enrollment**, which allows students to earn college credit

while enrolled in high school.

- **Early Colleges**, these may be built to a greater or lesser extent around approved CTE programs, but generally serve the overarching CTE mission of deliberately integrating a student's educational experience in K-12 schooling with their post-graduation plans and aspirations. This section provides the example of the Colorado Springs Early College.
- **P-TECH Programs**, which operate under a relatively new law that allows students to seamlessly transition into community college and effectively attend these as 13th and 14th graders. Two schools offering P-TECH pathways, Power Technical in Colorado Springs (District 49) and STEM School Highlands Ranch are discussed here.

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# Designated Career and Technical Schools

The rules for the administration of the Colorado's Career and Technical Act defines the concept of Dedicated Career Technical Schools (DCTS) which are understood as educational facilities whose primary mission is to provide intensive instruction in Career and Technical Education.<sup>11</sup> These schools must meet an additional set of criteria relating to the number of CTE programs offered on site and the percentage of students enrolled in CTE programs, among others. Students enrolled in these schools will spend a portion of their day at their home schools while also taking a relatively intensive course load of CTE instruction at their DCTS. There are currently seven approved DCTS locations.<sup>12</sup> In addition, the Cherry Creek Innovation Campus is expected to be approved.

## Jeffco Public Schools

Warren Tech, offered by Jefferson County Public Schools (Jeffco), figures prominently

among DCTS programs.<sup>13</sup> As of the 2019-20 academic year Warren Tech is one school operating across two campuses. The first of these is the centrally located Lakewood building, which dates to 1973, and the second, a north campus, is located near the campus of Arvada West High School. A third campus near Dakota Ridge High School in the south end of the district is scheduled to open in the fall of 2021. Currently, Warren Tech has one principal who oversees both budgets and staffs. Because Warren Tech operates as a single system, the campuses do not duplicate programs. In other words, courses in Audio Production, Business Administration, Criminal Justice, Forensic Science, Medical Assisting and Healthcare, and Sports Medicine are offered only at Warren Tech North, while the Central campus handles an extensive range of pathways in more than 20 additional programs.<sup>14</sup>

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A third campus near Dakota Ridge High School is scheduled to open in the fall of 2021. Warren Tech's expansion to the southern part of the county is driven in part by cooperation with the local business community, as the campus will feature aviation and aerospace science programs, as well as live event production and hospitality programs in order to respond to projections of local industry needs. Principal Heather Keeton notes that in working to address broader trends in economic and technical development, some balancing is oftentimes required.

Warren Tech's specific career areas all have advisory committees composed of faculty, administrative staff, and business and industry representatives—consulting such committees is a requirement placed on programs by the Career and Technical Act. This committee is intended to provide the existing programs with feedback about industry trends such as relevant certifications students should earn, the practical applicability of their equipment, instruction methods, and so forth, and as such may recommend, for instance, that students in the automotive program should receive training on a particular automobile that contains features representative of current manufacturing trends.

Responding to industry trends and needs stands to pose challenges that are not only practical and financial (i.e. acquiring new equipment) but might also present a “marketing” challenge for administrators and instructors. Like any Jeffco option school, Warren Tech markets their more than 30 programs to appeal to juniors and seniors in high school, which means creating program names that are informative for the career pathway and also use student friendly language. Informational materials supplement program names, diving into CTE curriculum, content, and career-relevant details, helping to make clear to students the associated industry field.

It is crucial to stress that Warren Tech campuses are not the only CTE programs in the district. In fact, all Jeffco high schools and most middle schools operate some career and technical programs. According to Assistant Principal Martha Patton, from the district's perspective, the goal is to begin exposing students to career pathways and opportunities in middle school, and then to allow them to continue building on this experience during their first two years of high school before enrolling at Warren Tech their junior or senior year. The culinary pathway is one example of a program that begins in middle school and culminates at Warren Tech. In middle school, a Jeffco student is able to enroll in courses that provide a broad introduction to the range of subjects under the umbrella of family and consumer science. As a high school freshman and sophomore, the student may take courses in nutrition before either finishing their instruction at their home high school with ProStart 1 and 2 courses. Or, they may enroll at Warren Tech and take a higher level of culinary arts instruction which includes ProStart 3 and may feature instruction in farm-to-table techniques, made possible by an on-site farm, greenhouse, and container farm.

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Another example of a program that runs for the duration of a student's secondary instruction is engineering. Students at the STEM-focused Bell Middle School in Golden can take engineering technology courses at Golden High School, which offers a pathway in Basic Engineering, before possibly continuing on to Warren Tech



where they can then enroll in a number of more advanced STEM and engineering programs. Warren Tech supports the district's mission of college and career readiness by informing students about CTE program pathways that are available from middle school through college. Currently, this involves a number of organized visits and tours that aim to bring all of the district's eighth graders through the school over the course of the academic year.

Warren Tech is an extension of all of its students' home high schools insofar as programs on its campuses count as both elective and core academic credits toward a student's graduation requirements. The school is additionally open to local charter school students, as well as students from the neighboring Platte Canyon, Gilpin County, and Clear Creek High Schools. Both campuses offer courses in morning and afternoon sessions with all course offerings taking fifteen hours per week. The programming is organized in two blocks to facilitate scheduling and transportation options for students coming from many different high school schedules and geographical distances.

All student applications are evaluated using the same admissions criteria, with some programs requiring prerequisites in math or science to support industry practices and college-level curriculum. Although classes count primarily as electives, there is considerable academic integration and many Warren Tech courses allow students to earn English, science, and math credits. Principal Keeton stresses that in her eyes CTE instruction is beneficial for the district as a whole, as many teachers at Warren Tech students' home high schools have attested to the academic benefits of students seeing the practical applicability of sometimes abstract content.

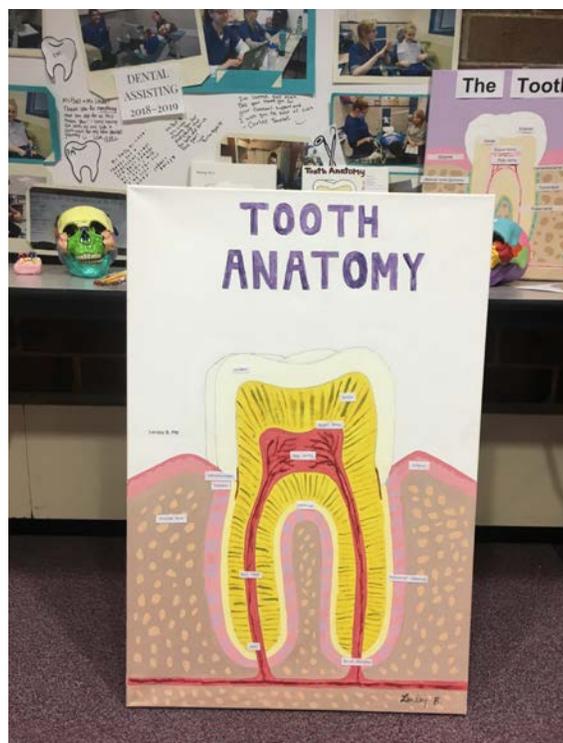
Currently, counselors evaluate applications to Warren Tech programs, but principal Keeton mentions that a long-term goal might be for the school to one day have a dedicated admissions staff to process the large volume of applications. Warren Tech counselors also coordinate the school's informational presentations across the district to show how CTE programs and career pathways support the Individual Career and Academic Plans (ICAP) required for all Colorado students.

In line with broader trends, Warren Tech does occasionally face teacher retention issues, especially in fields like healthcare where the pay gap between industry and instructional positions is oftentimes very wide. Warren Tech instructors are all CTE credentialed and are all on the Jeffco Public Schools salary schedule. The school and the district have worked to translate the salary schedule to be more applicable to CTE instructors and as such industry experience is honored as a substitute for teaching years. However, the specific valuation of the experience is not cut and dry and varies depending on industry

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sectors and on individual circumstances, but no instructor with industry experience will start at the equivalent of a first-year teacher. An issue that remains is a CTE instructor's "horizontal" movement across the salary schedule where increased levels of compensation depend on additional degrees and schooling through traditional college and graduate-level classes. Although instructors in the CTE space renew their industry certifications in order to continue teaching, this professional development is generally not honored because certifications are not degrees per se, and industry-oriented professional development does not entail the accumulation of college credits.

Jeffco Public Schools does not allocate funding to Warren Tech on a per-student basis, rather, the school is treated as a line item in the district's budget. Because enrollment caps in CTE classes are generally more restrictive than in standard academic courses (be it due to industry safety restrictions or the number of regulated permits available to use managed recreational spaces for a class like Warren Tech's outdoor leadership program), the school's administrators consider themselves fortunate to operate in a district that encourages dual enrollment in neighborhood high schools and Warren Tech without forcing competition for a portion of their shared students' per pupil funding.

The school also benefits significantly from industry partnerships. For instance, Miller Electric, a national welding equipment manufacturer, provides much of Warren Tech's welding equipment and uses it to train its own employees outside of school hours. Equipment used in many other programs has similarly been donated or purchased with aid from outside entities. An additional example might be the computers and software used by Warren Tech's emergency dispatch program,

which were all provided by Jeffcom 911, the dispatch communications center for Jefferson County.

It is also worth mentioning that Warren Tech works together with Red Rocks Community College (located near Warren Tech's Central campus) to offer accelerated Associate's of Applied Science (AAS) programs. Currently, these degrees are available in welding, power equipment and motorcycle technology, and precision machining. Students enrolled at Warren Tech as high school juniors can enter accelerated AAS pathways and will enroll in community college courses during the summer after their junior year and during both senior semesters. These courses will count both toward their Jeffco graduation requirements and toward the general education requirements of their AAS degrees. In order to enroll, students must meet a set of college readiness parameters dictated by Red Rocks Community College (as measured by GPA, ACT or SAT scores, and Accuplacer scores), as well

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as a set of program-specific requirements like instructor recommendation and adequate progress in their junior year CTE courses. Although these students continue to be enrolled full-time in Jeffco Public

Schools, they do not attend any classes at their respective home high schools.

Students who successfully complete the accelerated pathway will receive a high school diploma and an Associate degree in the same month. The accelerated AAS pathway is not a fifth-year ASCENT Program, nor does it provide high school credit recovery: students enrolling in the program must be on track to graduate high school in four years.<sup>15</sup> In addition to a degree that is relevant to their post-secondary goals, students who complete the accelerated program also have the benefit of earning at least 18 guaranteed transfer courses that may be used toward a potential bachelor's degree.

### **Cherry Creek Schools**

In contrast to Colorado's oldest DCTS Warren Tech, Cherry Creek Innovation Campus (CCIC) is Colorado's newest facility. During its initial planning stages, Cherry Creek School District staff and administrators visited career and technical centers in other states and consulted with local businesses to learn which career fields have talent shortages.<sup>16</sup>

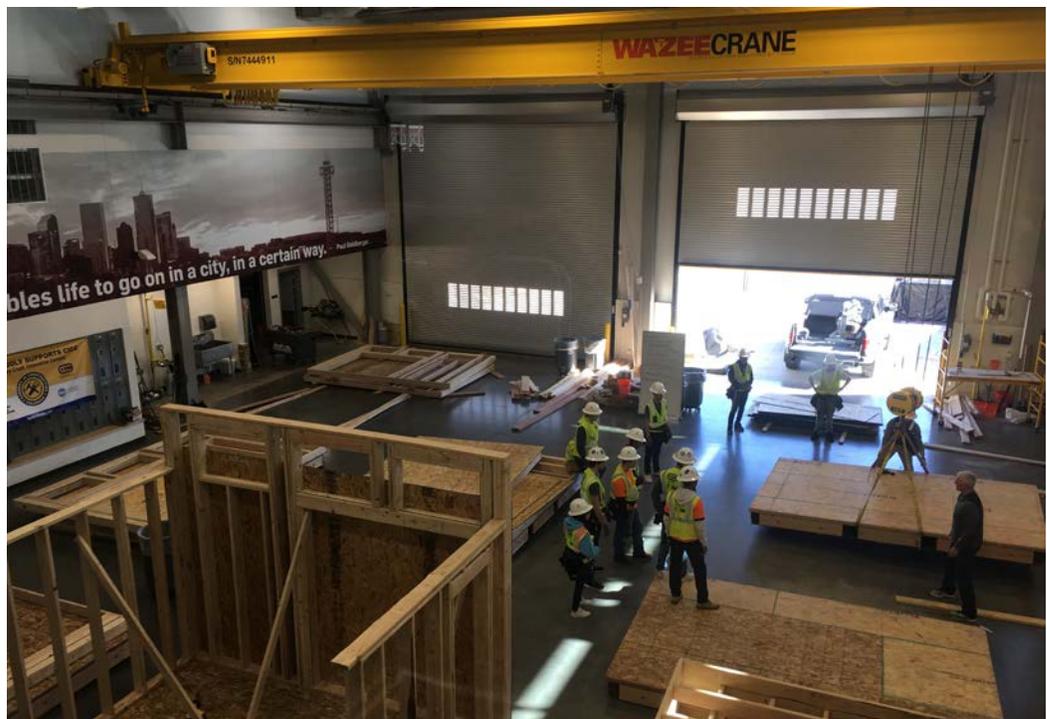
The investigative team's research resulted in the creation of a unique, state-of-the-art 117,000 square-foot facility specially designed around seven career pathways. Most notably, glass walls line the hallways and allow students to observe their peers participating in class activities. The building is also designed so that from the second floor you can observe the first floor, where you will see students working in the construction area with a crane and building tiny houses in partnership with the Colorado Village Collaborative for the local homeless population. It's this type of architectural design that makes CCIC so unique and innovative, as the visual exposure to other career fields educates students about different pathways without them having to take a semester or year-long course.

Each career pathway space was designed for the requirements of a particular industry and each has a designated collaboration and instruction area. The CCIS's pathways include: Advanced Manufacturing, Business Services, Health and Wellness, Hospitality and Tourism, Infrastructure Engineering

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(Building Trades), IT and STEAM, and Transportation (Automotive and Aviation).

CCIC emphasizes collaboration not only between students in a classroom but also between career fields—since in the real world, one industry is dependent on other industries for products and services. This theme of collaboration and innovation is not limited to CCIC, however. All Cherry Creek School District elementary and middle schools have a redesigned space in existing buildings that aim to educate students about collaborative and innovative work environments.

In light of collaboration, CTE programs do not discriminate on the basis of a student’s level of content knowledge. Students from different Cherry Creek high schools at various academic levels are brought together to learn new skills. Core

content specialist for math Mike Degitis explained that CCIC has students who struggle with Algebra I to students who have successfully completed Calculus III and will someday intern with Google or Microsoft. However, CCIC provides a level playing field because the course content is new for everyone.



## Career and Technical Education Integrated into Comprehensive High Schools

At the outset it is important to mention that countless comprehensive public high schools and middle schools across Colorado offer CTE programs and pathways. Some schools may provide a wider range of programming than others, but there are over 1500 approved programs in operation across over 200 schools. Indeed, as mentioned above, even in places like Jefferson County that support a DCTS, comprehensive high schools and middle schools offer their own CTE programs, though these are not duplicates of pathways already offered at Warren Tech. There are similar examples elsewhere; Boulder Valley School District, which supports a DCTS in Boulder

Technical Education Center, operates five traditional high schools, all of which offer their own CTE pathways in fields like business, marketing, STEM, or consumer science; these are courses that generally do not require substantial investment in additional facilities or technology on par with fields like automotive services, cosmetology, or collision repair, which are all housed at Boulder TEC. In this section, we focus on districts where what might subjectively be described as more resource-intensive Career and Technical Education programs are integrated into comprehensive high schools.

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## Westminster Public Schools

While most school districts throughout the Denver Metro Area enroll enough students to warrant several high schools, there are a handful of districts that operate a single



high school. While all of these schools provide some CTE course offerings, Westminster Public Schools (WPS) operates a particularly extensive CTE program integrated into its one comprehensive high school.<sup>17</sup>



Westminster High School moved into its current building in 2011 as a result of the merger of old Westminster High and Ranum High School.

According to CTE Administrator, Lottie Wilson, prior to the school's opening, the district had operated a centralized career training facility which served students from both schools.<sup>18</sup> When the new building was opened, the already existing CTE programs were integrated into the new Westminster High School. This transition eliminated



public access to CTE programs, like culinary arts, where community members

had become used to dining on a regular basis. This lack of access and visibility resulted in the perception that CTE was no longer a priority for WPS.

However, CTE became a focal point in the Vision 2020 Strategic Plan as a means for WPS students to become truly postsecondary ready. CTE is well respected in the Westminster community. Local support coupled with the Competency-Based instructional model employed by the school district means that students are able to demonstrate their proficiency and readiness for the next level, whether that is an instructional level within the school or a credentialed demonstration of readiness for business and industry. In recent years, WPS has undergone a wide-ranging transformation intended to provide personalized support for every student toward their career and academic goals. These efforts have been steered from the level of the district's board of education and central administration and have most notably included additional programs, credentials, and project based learning to support the Competency-Based Learning at all levels of instruction.<sup>19</sup>

A key component of Westminster Public Schools' efforts over the past couple of decades is an emphasis on "future planning" whereby students—again, at all levels of instruction including elementary schools—are asked to make a concerted effort to understand their education as a stepping stone to life after graduation and not as an end in itself. Indeed, the concept of "the day after graduation" is commonly repeated in Westminster's schools. As part of this commitment, in 2015 Westminster High School opened its Future Center which offers counseling dedicated to career and college preparation. The Future Center is both a set of online resources dedicated to fostering student academic and career success, but also a physical location within the library at Westminster

High School. There, students have the opportunity to meet with counselors or a career coach dedicated to career and postsecondary preparedness.

Wilson sees CTE as an indispensable facet of preparing for life after high school. She references studies that demonstrate that a strong CTE program has a positive effect on metrics such as graduation, dropout, and truancy rates due to its relevancy and project-based nature. In order to offer a tangible way of preparing students for life after graduation, Westminster's CTE program offers a certificate at the end of each of its pathways with some (such as computer science) offering as many as five credentials. For most students at Westminster High School, CTE instruction takes place over the course of one class per day, though some students pursue multiple pathways and credentials simultaneously. Though it may seem small and insignificant from an administrative standpoint, the high school awards graduation cords for the completion of pathways and its students can letter in their Career Training Student Organizations; both of these efforts, according to Wilson, have helped raise student interest in CTE programs in general.

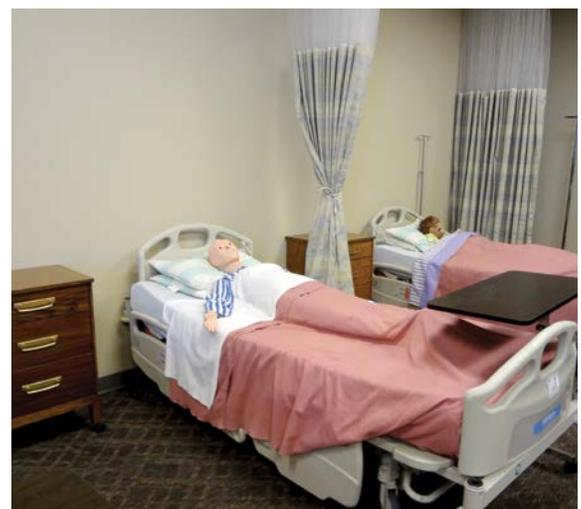
Westminster High School currently operates 13 approved CTE pathways and the school has extensive on-site facilities to accommodate these. These include a number of rooms dedicated specifically to CTE instruction, which range from more traditional shop classrooms where students might learn the basics of construction, to floral workshops or a greenhouse adjacent to the school that is used by students in the school's various agricultural pathways. Additionally, the school has facilities for students to acquire hands-on experience related to both the hardware and the software ends of computer science. Meanwhile, Westminster students interested in nursing careers may enroll

in the school's health occupations course, which makes use of a classroom equipped with hospital beds and mannequins, and at the end of a two-year track can take the exam necessary for CNA certification. It is also worth mentioning that Westminster High School partners with the nearby Front Range Community College to offer concurrent enrollment opportunities in a number of CTE fields including Irrigation Technology, Automation Technology, or Precision Machining; in addition to these, concurrent enrollment coursework in welding are offered through Emily Griffith Technical College.<sup>20</sup>

### **Douglas County School District and District 49**

Douglas County School District (DCSD) offers CTE programming in each of its nine neighborhood high schools. Across the school district, the range of CTE pathways is comparatively broad and as a whole can be said to be on par with that of districts that operate DCTS facilities.

What makes DCSD rather unique is the fact that its CTE offerings are deliberately dispersed throughout the district. This means that while some pathways are duplicated across the district's high schools, some are only available at one facility. To this end, for instance, programs in biotechnology or fire



science are only offered at Rock Canyon High School while Highlands Ranch High School handles all of the district's training in aerospace engineering and cybersecurity. Students at Douglas County schools can enroll in programs located at their home high school or at other schools within the district, though in the latter case they are required to provide their own transportation.<sup>21</sup>

To the northeast of Colorado Springs, District 49 utilizes a similar strategy, offering extensive CTE programming at six high schools and four middle schools across the district. A handful of pathways are offered only at a single high school (for example agriculture and marketing

are taught only at Falcon High School while Vista Ridge High School is the only facility to offer Teacher Cadet and Early Childhood Education pathways). District 49 makes transportation available to students interested in courses not offered at their high schools.<sup>22</sup> District 49 authorizes multiple charter schools (including Power Technical, discussed at length below) and does assist its CTE charter schools with accessing state program approval and CTA funding.<sup>23</sup>

## Concurrent Enrollment

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Colorado's program of concurrent enrollment was officially established in 2009 with the passage of House Bill 09-1319, signed into law as the Concurrent Enrollment Programs Act.<sup>24</sup> Additionally, Senate Bill 09-285 passed in the same year and extended concurrent enrollment programs to also include Career and Technical Education.<sup>25</sup>

Concurrent enrollment, which serves as a cornerstone of many school districts' CTE programs, entails the simultaneous enrollment of a student in a local secondary education provider and in one or more postsecondary courses which may be related to either career training or core academic content. Noteworthy, concurrent enrollment as created by the Concurrent Enrollment Programs Act may entail participation in coursework related to apprenticeships or internships. Concurrent enrollment opportunities are open to all high school students under the age of 21 who meet the relevant course requirements at the postsecondary

institution that they are applying to, meet all application deadlines, and receive approval. Students may not take remedial courses unless enrolled in the 12th grade. A Local Education Provider (LEP) (school districts, a board of cooperative services, district charter schools, or charter schools authorized by the Charter School Institute) wishing to provide its students with concurrent enrollment opportunities must enter into an agreement with a higher education institution per the Colorado Concurrent Enrollment Model.<sup>26</sup> In 2017-18 there were 511 such cooperative agreements concluded with 25 public colleges and universities.<sup>27</sup>

When it comes to funding, Local Education Providers use their Per Pupil Revenue in order to pay on behalf of their student directly to the higher education institution at the agreed rate. In some circumstances (that is, if the student fails, withdraws from, or receives an incomplete grade in their course) students and their parents may be obliged to reimburse

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...Senate Bill 09-285 passed in the same year and extended concurrent enrollment programs to also include Career and Technical Education.

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their LEPs for the costs of the concurrent enrollment course. Colorado rates of participation in concurrent enrollment have risen from under 20 percent in 2012 to nearly 35 percent (or almost 46,000 students) in 2017-18. The bulk of learning under the auspices of enrollment took place at two-year colleges. Per a Colorado Department of Higher Education report, current year-over-year growth in concurrent enrollment participation stands roughly at 10 percent with 97 percent of LEPs and 85 percent of high schools participating in concurrent enrollment.<sup>28</sup>

Concurrent enrollment students may take CTE courses at their respective higher education institutions and thus earn credit applicable toward a technical certificate or degree. In 2017-18, 13,000 students (or 43 percent of all concurrent enrollees) participated in courses designated as part of a CTE pathway. Over 15,500 concurrent enrollment students registered for their courses as part of a specific credential program. The vast majority of these credentials were various associate degrees (Associate of Applied Science, Associate of General Studies, Associate of Arts or Science), but roughly 4,500 students worked toward non-degree certificates. Not surprisingly, certificates requiring less than one year of coursework were the credential category with the highest rate of completion at 65 percent.<sup>29</sup>

In 2019, Senate Bill 176 expanded concurrent enrollment significantly by requiring all public schools in the state to offer concurrent enrollment opportunities; LEPs can request waivers from the requirements imposed by the new legislation.<sup>30</sup> Additionally, SB 19-176 created the Concurrent Enrollment Expansion and Innovation Grant Program that

provides funds to partnerships between LEPs and institutions of higher education that either expand their existing concurrent enrollment programs or begin to offer such opportunities. Districts with low or no concurrent enrollment opportunities before the 2020-21 academic year are to be prioritized in the grant disbursement process.

The current Perkins Act requires eligible CTE programs to make information about career training options in general and specific career pathways available to students, parents, and educators. In Colorado, there already is a state requirement that all secondary education institutions provide information about concurrent enrollment opportunities to all students. Furthermore, Senate Bill 19-176 established the requirement that a state-level website containing information on concurrent enrollment be maintained; the law also provides that the Colorado Department of Higher Education and the Colorado Department of Education collaborate in the development of this resource. The new website was recently launched and can be found on the Colorado Department of Education's website.<sup>31</sup>

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# Early Colleges

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Colorado's Early Colleges as defined in Colorado law offer an opportunity for high school students to complete secondary courses while enrolled in four year high school and upon graduating obtain both a high school diploma and an associate's degree or another form of a postsecondary credential.<sup>32</sup> Crucially, curriculum at Early Colleges must be designed in such a way that a student could complete it in four years. Whether the education they provide is explicitly technical and career oriented or not, the concept of Early Colleges adheres closely to the key CTE tenet that education at the secondary level go hand in hand with and serve a real and discrete purpose in a student's postsecondary plans.

Founded by former Colorado Representative and Senator Keith King, the network of Colorado Early Colleges (CEC) with campuses in Colorado Springs, Fort Collins, Parker, and Aurora is authorized by the Colorado Charter School Institute. In order to be designated by the state as Early Colleges, the CEC schools give their students the opportunity to graduate high school while concurrently earning a post-secondary credential which may include an associate degree, a CTE industry certificate, or at least 60 college credits.

CEC's oldest branch is its Colorado Springs facility established in 2007.<sup>33</sup> The school's students come from across the Colorado Springs area including Teller County. According to Head of School, Jennifer Daugherty, one of the biggest selling points—and unique challenges—of the Early College system in general is that the schools help to fulfill any student career goal while meeting a wide range of student needs. For instance, even though the Colorado Springs Early College aims to address a specific set of local employment needs and is hence expanding its computer science and cybersecurity programs, some of its students may want to pursue postsecondary training in careers like welding. Consequently, for some of the school's students their time at CEC may be a stepping-stone to prestigious universities while others will obtain one or several industry certifications that will allow them to work immediately after graduation.

Although the network of Colorado Early Colleges accounts for several such schools, they are not the only ones. There are currently 19 schools across the state recognized by the State Board of Education as Early Colleges.<sup>34</sup> It is important to stress that the Early College label is not a matter of self-designation on the part of a school but rather occurs at the authorization of the State Board of Education. Further reviews are required at five year intervals, though the Colorado Department of Education is authorized to recommend an earlier review. If a school fails to submit a scheduled or recommended application, it effectively forfeits its Early College designation.



# Pathways in Technology

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In 2015, Governor Hickenlooper signed into law House Bill 15-1270 which created a new educational program centered around partnerships between public schools, local business communities, and community colleges.<sup>35</sup> The program established the category of Pathways in Technology Early College High Schools (P-TECH) where students can elect to enter upon a pathway that allows them to continue their education for two years after high school and thus graduate—upon the completion of 14th grade—and receive an associate degree in an industry deemed high growth in their geographic area. The idea of P-TECH initially emerged in New York State as an effort to help address needs and vacancies in the local information technology sector. Most Colorado P-TECH programs continue this legacy by preparing students for careers in high-tech fields, but this is not necessarily always the case.

P-TECH programs are distinct from other Early Colleges in a handful of ways. First and foremost, while an Early College has to be a standalone school,

a P-TECH program may be a separate school or may comprise only a portion of a school's mission. Second, an Early College curriculum must be designed in such a way as to allow students to complete it in four years, whereas a P-TECH program is intended to last for six. Third, there are no explicit constraints on the focus of a student's education at an Early College, while at a P-TECH program students are to be instructed in STEM fields in ways that are "informed by current and projected industry standards;" P-TECH students are additionally required to receive workplace training and experiences. Fourth, there are extensive differences between P-TECH programs and Early Colleges in the area of outside partnerships. Where the latter only has to enter into an agreement with a higher education partner, P-TECH programs are required to communicate and share decision making responsibilities with local community colleges and industry partners. Industry partners, meanwhile, are asked to work with high school and community college programs to ensure that pertinent coursework meets broader industry

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expectations and needs. Finally, there is a stipulation that P-TECH programs be open to all students with a “special focus on socio-economically/racially diverse; 1st generation; English language learners; students with disabilities.” In their first four years, P-TECH students are funded at the same PPR rates as their district or charter school, while in years five and six (grades 13 and 14) are included in extended high school pupil enrollment and thus receive state base per pupil revenue.<sup>36</sup>

**Power Technical (PTEC)**, a James Irwin Charter School in District 49 was approved to offer a P-TECH program in 2015 and was among the first such schools in the state.<sup>38</sup> Power Technical is a school dedicated primarily to instruction in skilled trades. Authorized by District 49, the school enrolls students in both middle and high school grades. In the early grades, students rotate through all of the school’s CTE course offerings, which include welding, construction, machining, pre-engineering, CNC machining, CAD, robotics, woodshop, and electronics. They then select a specific focus while in high school. In addition to career preparation and core academic instruction, Power Technical integrates extensive character training into its mission. PTEC’s administration is keen to stress that while the character education the school offers is valuable for the sake of helping students lead better and more fulfilling personal lives, it also has a practical dimension: the school hopes to educate students who are not only academically qualified for future success, but also possess intangible interpersonal skills that will help them secure jobs and succeed in professional settings.

In the 10th grade, students at Power Technical choose between one of three different paths to follow. Students have to decide whether they wish to enter the workforce immediately upon graduation, pursue a degree at a four-year university, or if they wish to continue on to Pikes Peak Community College as 13th and 14th graders in the P-TECH program. The decision has to be made roughly around the midpoint of high school as the different paths entail different academic requirements: if, for instance, a student wishes to go on to a four-year university, he or she may have to fulfill additional course

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In the early grades, students rotate through all of the school’s CTE course offerings, which include welding, construction, machining, pre-engineering, CNC machining, CAD, robotics, woodshop, and electronics.

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As of the end of the 2020 academic year, there are eleven approved P-TECH programs across Colorado:

- Abraham Lincoln High School PTECH Academy (DPS)
- Cañon City High School (Cañon City RE-1)
- EC@N-STEM (Adams 12)
- Greeley Central High School (Greeley-Evans)
- Greeley West High School (Greeley-Evans)
- Jefferson High School (Greeley-Evans)
- Pathways in Technology Early College High School (St. Vrain Valley)
- Power Technical – James Irwin Charter School (District 49)
- STEM School Highlands Ranch (Douglas County)
- Warrior Tech (St. Vrain Valley)
- Warrior Way High (Mesa 51)<sup>37</sup>



requirements. Because students have the opportunity to make this choice, PTEC is not an Early College even though it is a participant in the Pathways in Technology Early College High Schools program, as only a subset of its enrollment are in fact Early College students.

While Power Technical offers a range of P-TECH pathways in a range of trades, **STEM School Highlands Ranch**, a charter school authorized by Douglas County School District, which also houses a P-TECH program, currently focuses on a single pathway in mechatronics, a field best understood as a convergence of several subfields of engineering that generally finds applications in the world of advanced manufacturing.<sup>39</sup> The school partners with Arapahoe Community College and its students will eventually obtain Associate of Applied Science degrees in Mechatronics Engineering Technology. Although Panther Industries, Inc. is listed as the STEM School's chief P-TECH industry partner, Mike Shallenberger, who both heads the engineering department and oversees the P-TECH program, notes that in crafting the mechatronics AAS pathway, he and the school partnered with over a dozen industry representatives. In the coming years the STEM School intends to launch a second P-TECH pathway in cybersecurity.

The P-TECH pathway is a significant albeit small component of the STEM School's broader academic mission. The school enrolls 600 students at the high school level, which accounts for roughly a third of its total K-12 enrollment. STEM Highlands Ranch integrates elements of STEM curriculum into many of its courses beyond the STEM-specific electives that a student will take over the course of their high school career (in fact, content related to programming and robotics,



for instance, is even integrated into instruction in elementary school, starting in kindergarten). High school students have the option of pursuing industry certificates in a number of courses, most in fields related to engineering, computer science, and information technology. In 2018-19 the school received in excess of \$60,000 from the state of Colorado, through a funding stream made possible by the Career Development Success Program created in House Bill 16-1289.<sup>40</sup> Participating districts or charter schools can receive up to \$1,000 in incentive funds for each student who completes “qualified industry credential programs, internships, residencies, construction pre-apprenticeship or construction apprenticeship programs, or qualified AP courses.” At the STEM school, the funds, which are distributed as reimbursements for earned credentials and certificates, are reinvested directly into the computer science and engineering programs.

Despite tapping into this relatively new and lucrative source of funding, administrators at STEM School Highlands Ranch point to one significant funding obstacle; namely, the issue revolves around accessing CTA funding. According to Shallenberger and Dr. Penny Eucker, the school's executive director, Douglas

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...administrators at STEM School Highlands Ranch point to one significant funding obstacle; namely, the issue revolves around accessing CTA funding.

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County School District, which authorizes the school, will not apply for state program authorization. STEM administrators are confident in asserting that their institution meets all the requirements that schools must adhere to in order to be authorized as CTE programs eligible for state or federal reimbursements. In accordance with the regulations governing the administration of the Career and Technical Act, applications for program approval and for funding reimbursements are submitted by Local Education Agencies (LEAs), which in this case is Douglas County School District. Hence although there is a formal program approval process that is handled at the level of the Colorado Community College System, districts effectively conduct their

own approval of school-level programs when determining whether or not to apply for approval. Districts complete applications and provide supporting documentation that attest to the adequacy of each of their school-level programs. Once programs are approved by Colorado CTE as meeting all of the required assurances, districts may claim those programs' expenses for reimbursement through CTA.<sup>41</sup>

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## Other Institutions and Opportunities for CTE Students

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As the range of educational options made possible by technological advances increases, online Career and Technical Education might become a viable option for students across the state, especially those living far from schools that offer CTE programming. While concurrent enrollment programs have long relied on online instruction, online CTE programs are only beginning to emerge in Colorado. One such program is operated by Julesburg School District, a rural district located in the north-east corner of the state. The district contracts with K12inc. to provide educational services through **Destinations Career Academy of Colorado**. The school is a multi-district full-time online school serving students in grades 6-12. In addition to its academic curriculum, it offers courses in six CTE pathways. Destinations Career Academy also runs Julesburg's agriculture pathway, which currently is only available at the brick-and-mortar school. The online school serves 515 full-time students from

across the state. Students benefit from many of the same opportunities that other CTE programs provide, though arranging hands-on and work-based-learning activities can prove challenging. Currently, Destinations Career Academy offers courses in Business, Information Technology, STEM, and Health and Human Services.<sup>42</sup> Springs Studio for Academic Excellence, a blended learning school in Falcon District 49, can serve as a second example. The school offers several CTE pathways, with some programs being available for online learners. It remains to be seen whether educators will be able to overcome the obvious challenges that stand in the way of offering long-distance career and technical instruction in pathways that require significant investment in, and use of equipment and facilities.

Because of its very nature, Career and Technical Education should not be thought of exclusively in terms of classroom instruction. Founded in 2016 in part as an

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effort to emulate the model provided by Switzerland, where nearly three quarters of the country's secondary students participate in youth apprenticeships, **CareerWise Colorado** is a non-profit organization that exists on the peripheries of the Career and Technical Education landscape but the role that it plays is in fact a crucial one. CareerWise works by fostering partnerships between participating school districts and local businesses to provide students with youth apprenticeship opportunities during their last two years of high school and in the first year after graduation. The aim of CareerWise apprenticeships is to complement, but in some cases to provide an alternative for traditional higher education programs. According to Meaghan Sullivan, Chief Program Officer at the organization, efforts to promote youth apprenticeships have arisen at least in part from the realization that students employed while pursuing postsecondary degrees typically work in fields unrelated to their course of study and post-graduation goals. In other words, career apprenticeships strive to make youth and young adult employment among high school and college students more additive to the student's career after graduation. Sullivan explained that most CareerWise apprentices plan to pursue higher degrees and do not regard their employment as an alternative to further education. Instead, they see it as an opportunity to build their résumés, expand their professional networks, and obtain industry certifications that they will need even after obtaining higher degrees. The goal over the coming years is for the partnership programs to develop to such an extent that the role of CareerWise as a facilitator will gradually decrease.

Currently, CareerWise partners with 14 Colorado school districts and over 140 employers which employ over 400 active apprentices. Prior to their junior

year in high school, students apply for apprenticeships at partnering businesses, which currently operate in seven different career pathways, which include Education, Hospitality, Healthcare, Business Operations, Information Technology, Advanced Manufacturing, and Financial Services. These pathways map onto many existing CTE career clusters. Students are not guaranteed a position, but instead must pass a competitive hiring process.

A student's commitment to the program in terms of hours increases with each year in the three-year program, to total over 32 hours per week in the year after high school graduation. While still enrolled in high school, students gradually move up from roughly 12-15 to 20-24 hours per week while receiving elective credit for their workplace experience.

Sullivan notes that the distinction between internships and apprenticeships (as used by the program) is an important one that bears reminding: where an internship will be a position designed specifically to be filled by an student not fully qualified for employment at a specific company, CareerWise apprenticeships are intended to fit into a company's existing structure and fill specific workplace needs. This is also why CareerWise is a three-year program, as companies have more of an incentive to train young employees in relevant workplace tasks if they know that they will be there for a longer duration. In other words, long-term apprenticeship partnerships offer more of a possible return on companies' investments than do semester- or year-long internships. Sullivan asserts that by the end of their second year at a company, CareerWise apprentices are generally as productive and contribute as much to their companies as their adult, full time counterparts.<sup>43</sup>

It should be restated that Career and Technical Education is a subfield of

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CareerWise works by fostering partnerships between participating school districts and local businesses to provide students with youth apprenticeship opportunities during their last two years of high school and in the first year after graduation.

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education policy that touches on a number of disparate fields; for this reason, much work has to go into synthesizing information from disparate agencies and sources into resources that are useful for policymakers, nonprofits, administrators, and educators. **Colorado Succeeds** has developed a work-based learning roadmap that constitutes just such a resource and thus may be of use for parties looking to assess the current state of the CTE field in Colorado.<sup>44</sup> The extensive project not only guides the reader toward relevant state guidelines and information detailing state-level and regional industry partnerships, but also delves deep into the benefits, challenges, and best practices pertaining to various, highly specific sub-areas of Career and Technical Education. The

site provides explanations and analyses of concepts that are specific to the landscape of Colorado as well as information relevant to CTE in general. The Colorado Succeeds roadmap is a valuable source of additional information on topics covered in the paper at hand, including for instance P-TECH programs, where the roadmap showcases tools for assessing the readiness of the contributing parties for forming P-TECH partnerships.<sup>45</sup> In addition to its roadmap project, Colorado Succeeds offers a source for many news and policy updates.<sup>46</sup>

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## Policy Recommendations

### **CTE Charter Funding Equity**

In recent years, Colorado lawmakers have devoted much attention to Career and Technical Education and especially to improving student access to CTE programs. Colorado policy affecting CTE at district-authorized charter schools should be evaluated.

The Career and Technical Act (CTA) clearly states that state funding is available for approved “school districts, boards of cooperative services, and institute charter schools conducting career and technical education courses.”<sup>47</sup> CTA was amended to include charter schools authorized by the state’s chartering authority, the Charter School Institute (CSI), when CSI was established in law. However, nowhere does the CTA Act mention district-authorized charter schools conducting career and technical education. Therefore, district-authorized charter schools must depend on their authorizing district to apply for state approval of their CTE program.

To make matters more difficult for some charter schools, there is nothing in law to require a school district to assist a charter school with gaining program approval and therefore access to funding.

The problem is exemplified by the actions of two different local school districts in regards to the CTE charter schools located in their districts. District 49 successfully applied for program approval for Power Technical, while Douglas County School District (DCSD) has not applied for program approval for STEM Highlands Ranch. Our communication with DCSD reveals that the district does not believe it is their role to apply for program approval for STEM Highlands Ranch.<sup>48</sup> Yet, our communication with the Colorado Community College System (CCCS) has been clear that district-authorized charter schools must rely on their authorizing district to apply for program approval to access funding.<sup>49</sup> STEM School’s case indicates the need to create a workable process that requires districts to assist

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Therefore, district-authorized charter schools must depend on their authorizing district to apply for state approval of their CTE program.

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their district-authorized charter schools, conducting qualified CTE programs, to access state and federal financial support. As the law is currently written, some public school students enrolled in charter schools are not receiving the benefit of tax dollars allocated to support CTE programs.

To ensure that charter school students benefit from state and federal CTE funds, we recommend the following policy changes:

1. CCCS should consider clarifying to school districts the current process for district-authorized charter schools to receive program approval and access to state and federal funding by adding this information to its *Career and Technical Education Administrators' Handbook*.<sup>50</sup>
2. The Colorado General Assembly should consider a statutory change to the Career and Technical Act to include the eligibility of district-authorized charter schools conducting Career and Technical Education and provide for a reliable process for these schools to receive program approval and therefore access to funding.
3. The Colorado General Assembly should consider adding “assistance to charters schools, conducting qualified CTE programs, to receive program approval and therefore access to state and federal grants” to the statutory list of ways a local school board must demonstrate fair and equitable treatment of charter schools to retain exclusive chartering authority.<sup>51</sup>
4. The CCCS Board should consider creating a new appeal process, perhaps to itself, to allow all public schools, not only charter schools, to challenge a district’s decision to refuse to apply for program approval for a qualified CTE program.

## Staff Retention

CTE programs in Colorado often encounter issues related to the inability to retain qualified instructors for extended periods of time. Because of high rates of faculty turnaround, schools must expend significant resources to seek out and train new instructors for their CTE course offerings. This challenge stems, in part at least, from the schools’ inability to compete financially with private sector employers. In certain fields, the disparity between the compensation that a school can offer and what a qualified instructor might earn in his or her respective trade is insurmountable. In others, however, steps can be taken to help alleviate the problem.

The Colorado Department of Education has created sets of industry-specific requirements that CTE instructors must meet in order to receive their authorization (authorized instructors, in turn, are one of the requirements that programs must meet in order to be approved and to thus be eligible for potential reimbursements).<sup>52</sup>

These requirements involve a component that mandates a certain number of hours of workplace experience.

As in Jeffco, schools, districts, and, where applicable, teachers’ unions should work together to create local policies whereby years of professional experience in the field could translate into years of experience on the traditional educator salary schedule or other salary arrangement. Although these conversions may not necessarily be direct (i.e. one to one) and could vary from one profession

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In certain fields, the disparity between the compensation that a school can offer and what a qualified instructor might earn in his or her respective trade is insurmountable.

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to another, they may go far to lessen the financial impact of a qualified instructor entering the field of education.

Additionally, applicable stakeholders could work to create similar systems of conversion for the second ingredient in traditional salary schedules, which adjusts pay for post-graduate credits and degrees. Masters' level degrees may not be available in CTE instructional areas and degrees in education may be of limited value in a vocational classroom. Districts could therefore work to make lateral jumps across columns in pay schedules available

to CTE instructors who, as a matter of good occupational practice, may pursue continued occupational training in order to provide their students with the best possible instruction.

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## Conclusion

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...CTE should be viewed as a crucial facet of the educational choice conversation.

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Today, a growing number of school districts allow for students to adjust their experience in high school to their personal objectives after graduation. Where CTE options are available, a student has a choice to specifically focus on higher-level core academic courses or concentrate on a particular career pathway. As such, CTE should be viewed as a crucial facet of the educational choice conversation.

Colorado's Career and Technical Education programs strive to meet the unique needs of their student populations in a number of different ways. Indeed, one of the most important lessons to be drawn from this overview of Colorado's CTE efforts should be that no two districts' or schools' experiences and practices in the area of career preparation are exactly alike.

Workforce needs vary not only between states or regions, but also between towns, districts, or even the enrollment areas of individual schools; moreover, due to the vast variation in local demographics, the need for CTE course offerings (especially those more closely resembling traditional vocational education) will be greater in

some areas than in others. By allowing districts and schools considerable latitude in determining what career pathways to focus on and through which overarching model to deliver this instruction, the way in which CTE is currently administered in Colorado goes a long way to help tailor career training to the specific needs of local communities.

The inherent autonomy of charter schools can help further the benefits of Career and Technical Education, but in order for charters to adequately meet the needs of their student populations, they should have equal opportunities to access state and federal funds.

# Endnotes

- <sup>1</sup> For an overview of the history of federal programs supporting vocational education and/or CTE, see Cassandra Dortch, *Career and Technical Education (CTE): A Primer*, CRS Report No. R42748 (Washington, DC: Congressional Research Service, 2014), pp. 1-5. <https://fas.org/sgp/crs/misc/R42748.pdf>.
- <sup>2</sup> For an overview of recent trends in the development of vocational education/CTE, see Nat Malkus, *The evolution of career and technical education: 1982–2013*, American Enterprise Institute (May 1, 2019) <https://www.aei.org/wp-content/uploads/2019/04/The-Evolution-of-Career-and-Technical-Education.pdf>.
- <sup>3</sup> <https://www.cde.state.co.us/postsecondary/cte>.
- <sup>4</sup> 2019 -2024 Colorado Career and Technical Education Strategic Plan, <http://coloradostateplan.com/v/Vision%20&%20Strategic%20Plan.html#/>
- <sup>5</sup> <http://coloradostateplan.com/administrator/career-and-technical-act-cta/>.
- <sup>6</sup> Colorado Department of Higher Education, Rules for the Administration of the Colorado Vocational Act, <http://www.coloradostateplan.com/wp-content/uploads/2016/04/CTA-RulesEffective8-6-2008.pdf>.
- <sup>7</sup> Ibid. This definition is taken directly from the Perkins Act (see, 20 U.S.C. § 2302 (5)).
- <sup>8</sup> Colorado Community College System, 48th Annual Career Technical Act (CTA) Report for Fiscal Year 2017-2018, <http://coloradostateplan.com/wp-content/uploads/2019/12/CTA-Report-17-18-accessible.pdf>.
- <sup>9</sup> Ibid.
- <sup>10</sup> Colorado Community College System, Fiscal Year 2020 Reimbursements, <http://coloradostateplan.com/wp-content/uploads/2019/12/FY20-District-Allocations-CTA.pdf>.
- <sup>11</sup> SBCCOE Rule 8CCR 1504-2
- <sup>12</sup> <http://coloradostateplan.com/administrator/career-and-technical-act-cta/designated-career-and-technical-school/>
- <sup>13</sup> In this section, unless otherwise noted, all information about Warren Tech in Jeffco is based on an in-person interview with Principal Heather Keeton, Assistant Principal Martha Patton conducted on January 24, 2020.
- <sup>14</sup> [https://warrentech.jeffcopublicschools.org/our\\_programs/list\\_of\\_warren\\_tech\\_programs\\_by\\_campus](https://warrentech.jeffcopublicschools.org/our_programs/list_of_warren_tech_programs_by_campus)
- <sup>15</sup> Information about Accelerating Students through Concurrent Enrollment (ASCENT) programs can be accessed through the CDE website at [https://www.cde.state.co.us/postsecondary/ce\\_ascent](https://www.cde.state.co.us/postsecondary/ce_ascent).
- <sup>16</sup> All information provided about the Cherry Creek Innovation Campus is based on an in person interview with Mike Degitis, Math Content Specialist conducted on March 5, 2020.
- <sup>17</sup> Lists of approved CTE programs in Colorado can be obtained through a CCCS database at [https://ctep.ccs.edu/energizer/reports/report\\_list.jsp#allapp](https://ctep.ccs.edu/energizer/reports/report_list.jsp#allapp). According to this report, there are 13 authorized CTE programs at Westminster High School.
- <sup>18</sup> In this section, unless otherwise noted, all information about Westminster High School and Westminster Public Schools is based on an in-person interview with CTE Administrator Lottie Wilson conducted on October 22, 2019.
- <sup>19</sup> Information about the Competency Based System in use at Westminster Public Schools can be accessed through the district’s website at <https://www.westminsterpublicschools.org/domain/1686>.
- <sup>20</sup> <https://www.westminsterpublicschools.org/cte>.
- <sup>21</sup> <https://www.dcsdk12.org/cms/One.aspx?portalId=220484&pageId=5755156>.
- <sup>22</sup> <https://www.d49.org/Page/4867>.
- <sup>23</sup> Telephone conversation with Cristina Cvetromile, CTE Program Manager, District 49, February 25, 2020.
- <sup>24</sup> [http://www.leg.state.co.us/clics/clics2009a/csl.nsf/fsbillcont3/1E0CD0AF8CFD8C268725753C006E97B4?open&file=1319\\_enr.pdf](http://www.leg.state.co.us/clics/clics2009a/csl.nsf/fsbillcont3/1E0CD0AF8CFD8C268725753C006E97B4?open&file=1319_enr.pdf).
- <sup>25</sup> [http://www.leg.state.co.us/clics/clics2009a/csl.nsf/fsbillcont3/8CFEC02A1C75DCC38725757D0073F9CD?open&file=285\\_enr.pdf](http://www.leg.state.co.us/clics/clics2009a/csl.nsf/fsbillcont3/8CFEC02A1C75DCC38725757D0073F9CD?open&file=285_enr.pdf).
- <sup>26</sup> C.R.S. §22-35-104.
- <sup>27</sup> Concurrent Enrollment Factsheet, Colorado Department of Education, <http://www.cde.state.co.us/communications/factsheetconcurrentenrollment>.
- <sup>28</sup> Colorado Department of Higher Education and Colorado Department of Education, Annual Report on Concurrent Enrollment: 2017-2018 Academic Year, (April, 2019), [https://higher.ed.colorado.gov/Publications/Reports/Enrollment/FY2018/2018\\_Concurrent\\_Enrollment\\_April\\_2019.pdf](https://higher.ed.colorado.gov/Publications/Reports/Enrollment/FY2018/2018_Concurrent_Enrollment_April_2019.pdf). Colorado’s highest concurrent enrollment participation rates can be found in smaller and more rural school districts: Crowley County (74%), Edison 54JT (72%), Fowler R-4J (60%), McClave (51%), Canon City RE-1 (49%). Pass rates for students attempting to complete courses for concurrent enrollment credit were between 89% at Adams State University and 100% at University of Colorado Colorado Springs, while the statewide pass rate stood at 94 percent.
- <sup>29</sup> Colorado Department of Higher Education and Colorado Department of Education, Annual Report on Concurrent Enrollment: 2017-2018 Academic Year. [https://higher.ed.colorado.gov/Publications/Reports/Enrollment/FY2018/2018\\_Concurrent\\_Enrollment\\_April\\_2019.pdf](https://higher.ed.colorado.gov/Publications/Reports/Enrollment/FY2018/2018_Concurrent_Enrollment_April_2019.pdf).
- <sup>30</sup> [https://leg.colorado.gov/sites/default/files/2019a\\_176\\_signed.pdf](https://leg.colorado.gov/sites/default/files/2019a_176_signed.pdf).
- <sup>31</sup> The new Concurrent Enrollment website required by Senate Bill 19-176, <http://www.cde.state.co.us/concurrentenrollment>
- <sup>32</sup> C.R.S. §22-35-103(10)(a).
- <sup>33</sup> In this section, unless otherwise noted, all information about Colorado Early College—Colorado Springs is based on an in person interview with Jennifer Daugherty Head of School, conducted on November 1, 2019.
- <sup>34</sup> Email communication with Carol Earle, Assistant to the Director of State Board Relations, May 19, 2020.
- <sup>35</sup> [http://www.leg.state.co.us/clics/clics2015a/csl.nsf/fsbillcont3/4F14B4BA0DF5D8B887257DDD005FC4E1?Open&file=1270\\_enr.pdf](http://www.leg.state.co.us/clics/clics2015a/csl.nsf/fsbillcont3/4F14B4BA0DF5D8B887257DDD005FC4E1?Open&file=1270_enr.pdf).
- <sup>36</sup> “P-TECH - Early College Comparison Chart,” Colorado Department of Education.
- <sup>37</sup> <https://www.cde.state.co.us/postsecondary/p-tech>.
- <sup>38</sup> In this section, unless otherwise noted, all information about Power Technical is based on in-person interviews with Rob Daugherty, Principal, Linda Carroll, Director of Advancement, James Irwin Charter Schools, and other members of the Power Technical staff conducted on November 11 and December 2, 2019. See Education Policy Center, *Power Technical: Preparing Educated and Ethical Leaders in the Trades*, Independence Institute School Profile, (January 2020), [https://i2i.org/wp-content/uploads/PTEC\\_e\\_web.pdf](https://i2i.org/wp-content/uploads/PTEC_e_web.pdf).
- <sup>39</sup> All information about STEM School Highlands Ranch is based

on an in-person interview with Dr. Penny Eucker and Executive Director, Dan Schallenberger, head of Engineering and the P-TECH program, conducted on November 14, 2019.

<sup>40</sup> [https://leg.colorado.gov/sites/default/files/2016a\\_1289\\_signed.pdf](https://leg.colorado.gov/sites/default/files/2016a_1289_signed.pdf).

<sup>41</sup> Telephone conversation with Jacqui Geiselman, CTA Manager, Colorado Community College System, February 11, 2020.

<sup>42</sup> <https://codca.k12.com>.

<sup>43</sup> Telephone conversation with Meaghan Sullivan, Chief Program Officer, CareerWise Colorado, January 24, 2020.

<sup>44</sup> <https://coloradosucceeds.org/work-based-learning-roadmap/home/>.

<sup>45</sup> <https://coloradosucceeds.org/work-based-learning-roadmap/ptech/>.

<sup>46</sup> <https://coloradosucceeds.org>.

<sup>47</sup> [http://www.leg.state.co.us/clics/clics2008a/csl.nsf/fsbillcont3/D33C245489ABC665872573A1005DC03C?open&file=1079\\_enr.pdf](http://www.leg.state.co.us/clics/clics2008a/csl.nsf/fsbillcont3/D33C245489ABC665872573A1005DC03C?open&file=1079_enr.pdf).

<sup>48</sup> Email communication with Stacy Rader, Communications Officer, Douglas County School District, February 11, 2020.

<sup>49</sup> Telephone conversation with Jacqui Geiselman, CTA Manager, Colorado Community College System, February 11, 2020.

<sup>50</sup> <http://coloradostateplan.com/wp-content/uploads/2019/08/2019-2020-CTE-Admin-Handbook.pdf>

<sup>51</sup> C.R.S. §22-30.5-504(5).

<sup>52</sup> Career and Technical Education (CTE) Authorization General Information, Colorado Department of Education, [https://www.cde.state.co.us/cdeprof/cte\\_generalinfo](https://www.cde.state.co.us/cdeprof/cte_generalinfo).

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