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CEUs for Teachers and Educators

Strategies for Incorporating Career Technical Education

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Introduction

Schools across America are learning to embrace Career and Technical Education—or CTE. In a CTE program, a student in middle or high school learns practical, specific, and highly marketable skills that can be applicable to a wide array of industries that need reliable talent. CTE programs are often available, as well, in post-secondary institutions; however, CTE programs that serve middle and high-school students are often more cost-effective and efficient.

In a CTE program, students have the chance to personalize their own educational pathways based on the types of careers they wish to pursue—as well as their own unique learning needs. CTE programs can also help provide a relevant, real-world context for students' academic experiences and help them learn real-world skills such as communication, teamwork, digital literacy, and time management.

Section 1: The Importance of Career and Technical Education

CTE has long been seen as a secondary choice for many who are more familiar with the school-college-career model. Today, CTE is not only an option that a majority of young students are choosing, but it is also a path that can result in high-value, long-lasting careers. What is this type of education, and how can we incorporate it into our curriculums or school programs in an accessible way? To delve into these questions, we'll begin by offering a working definition of Career and Technical Education.

What is Career and Technical Education (or, as it's known, CTE)?

In a sentence, CTE consists of courses or classwork that directly prepares students for work, a job, or a specific career. While a common goal of every type of academic endeavor is for a child to be able to pursue a career when the time comes, CTE is particularly useful in fulfilling this aim. Such programs strive to teach students very practical, marketable, and often technical skills that translate immediately to an in-demand career (Gewertz, 2018).

In the past, CTE has often been seen as a college alternative. Today, it still has that utility, but it has also become a new type of pathway to or through college. CTE is also frequently categorized with vocational education—or practical education for careers that can be embarked upon without a college degree (e.g., welding, cosmetology, plumbing,

or child care.) In many ways, CTE is very similar. However, it's also different in some key ways. For one, many CTE programs provide a focused, extremely practical approach to a career that might traditionally have been associated with a bachelor's degree (e.g., business or engineering). In addition, CTE is often framed as a way to study after high school to attain a higher-value career. To this end, modern CTE courses also tend to be more rigorous than vocational education courses were in the past (Gewertz, 2018).

How many students are opting to pursue CTE pathways after high school?

As far as current trends in education go, CTE is a big one. In the 2016-2017 school year, approximately 8.3 million high school students enrolled in at least one CTE course. This number represents nearly half of the population of students enrolled in United States high schools. Recently, the government invested in CTE programs in the United States by re-authorizing the Carl D. Perkins Career and Technical Education Act, which boosted funding for this type of education (Gewertz, 2018).

This particular investment has gone a long way toward closing the gap in access or matriculation in high-quality education for many students. In the past, vocational schools or programs that led to careers in areas such as plumbing and cosmetology have been largely associated with low-income or minority students. Now that CTE is becoming an increasingly valuable and attainable option, students are able to enter professions that would have likely been inaccessible to them in the past. For example, those who may have not been able to afford the type of education that would lead to a career in the medical field, are able to work—in an efficient way—toward entry-level jobs in this and other previously-guarded industries (Gewertz, 2018).

This does not mean that CTE is a route enjoyed by a necessarily diverse population. Although the hope is that this will change in the near future, studies have noted that students who enroll in CTE courses still tend to come from minority and low-income households (Gewertz, 2018).

CTE is neither a college nor a high school substitute. In many cases, it operates as an amalgamation of both: Many CTE students will take courses to prepare themselves for a chosen field while still in high school, and then go on to matriculate in a program after high school that either incorporates an associate's or bachelor's degree or includes some type of rigorous postsecondary training (e.g., a cybersecurity certification). Many CTE programs, especially those built for high school students, seek to ensure that all CTE students have a way to move from CTE to a more traditional four-year college

experience if that's what they want. In the meantime, CTE often focuses on helping students navigate situations that allow them to apply academic concepts to real-world situations (Gewertz, 2018).

What can CTE students expect to do in their career with a CTE education?

The answer, as you might expect, depends a great deal on which field students decide to pursue—and which CTE cluster they matriculate into. There are fields in which the highest earning potential is difficult to attain without a four-year education. However, there are also careers where a student with a two-year certification can expect to make at least as much as someone who was in school for a much longer time. In either case, modern CTE programs strive to place an emphasis on leaving the door open for college attendance or additional education for those students who wish to complete further schooling or training prior to pursuing a career (Gewertz, 2018).

In the second section of this course, we'll dive into the different career pathways that most CTE programs are currently geared to support.

Why are CTE programs important for modern American schools?

Many experts believe that CTE is more than just *important* - in fact it should be one of the most vital components of the education system in modern-day America. Why? Completing CTE tracks has been proven to be an excellent method for preparing students to achieve success in a wide array of incredibly high-demand careers. Additionally, CTE programs provide numerous benefits to assist students in their overall academic goals and endeavors, while incorporating applied learning across disciplines, and helping students see the relevance of their studies.

CTE programs have been associated with (Zook, 2019):

- Higher high school graduation rates (around 95%)
- A pipeline to high career demand
- Better grades
- Satisfied students
- Increased confidence and happiness with a student's chosen direction in life
- Extremely low investments for schools

- Increased benefits for the communities in which CTE programs are located

A more in-depth look at each of these assertions recognizes the following advantages of CTE programs (Zook, 2019):

1. An average of 95% of students who enroll in CTE programs graduate high school. (The national average for all students is lower, at 85%). How does this happen? Students who take a different educational pathway and choose to work for CTE credits have often reported a more enjoyable and engaging learning experience. It's theorized that this higher engagement leads to a reduced number of students 'falling through the cracks' and failing to make it to their graduation day. It's also postulated that students who struggle in traditional classroom settings, but who are willing to try CTE programs, may be more likely to find a scholastic track that works better for them. It should also be noted that CTE graduates don't necessarily embark on CTE careers such as health care, business, technology, construction trades, human services, agriculture, manufacturing, hospitality, and so on immediately after high school graduation—a very high percentage matriculate into higher education before starting their careers.

2. CTE programs help students find careers that are incredibly in-demand. In fact, over an eight-year period, the United States had over *fifty and a half million* job openings that could be filled by someone with a CTE certification. Many of these jobs are new, which means that they're recently-created jobs that have been established to address current needs that people or professions have—e.g., cybersecurity or health management. This type of career demand is incredibly high, and such demand can lead to increased awareness of the value of CTE programs. Additionally, these careers are often high-paying and provide ongoing job security for employees. CTE graduates typically have similar types of income opportunities as do their peers who have a more traditional education.

3. CTE programs benefit students while they're still in school by helping them boost their academic performances and deficiencies. When surveyed, the vast majority - 70% - of CTE students reported that their involvement in the CTE program helped them work toward better grades. This is *extremely* important because it helps debunk the long-held theory that CTE students are less motivated or intelligent than their peers. When compared with the total number of students who matriculate in American schools, the fact that 70% of CTE students experience better grades means that the American CTE program has helped 11.3% of all high school students achieve their educational goals.

4. CTE students enjoy their education, reporting satisfaction with both the program and their career prospects. When surveyed, 80% of CTE students reported this contentment—compared with 45% of more traditionally-educated students when asked a similar question. Importantly, a large percentage of CTE students do go on to pursue college—and, if these statistics are to be believed, CTE may do a better job (at least for some) to prepare students for that end than more traditional high school programs.

5. CTE helps students find direction in their lives. Many high school students, when surveyed, report that they're not really sure what they plan to do after school or for their careers. CTE students respond differently. In one study, over 80% of CTE students reported that they felt they knew where their education was leading them, and where they were going professionally. As one of the goals of school is to help students figure this out, it seems that CTE programs at least do well in this specific regard.

6. CTE programs don't cost much for schools to implement. With the versatility and all-encompassing components of CTE programs, it's often assumed that such programs are very expensive. This does not actually seem to be the case. Thanks to stipulated government funding of CTE programs, such as the financing from the Carl D. Perkins Act, schools may not have to pay much (or anything) to run their CTE programs. This would categorize CTE education as a high-yield, low-cost investment—particularly when considering the numerous benefits and ways in which CTE programs give back to their communities.

7. CTE programs make the country a better place. The high-demand careers that often follow a CTE education are exactly the careers that the country needs qualified people to fill. One study found that for every dollar of government funding in CTE programs, the country realized over a $12 benefit—a 1200% return on interest.

With all of the advantages for students and communities alike that are associated with CTE programs, it's easy to see that it's a good investment for many schools. We'll talk in a later section about the specific types of CTE instruction and the different careers that CTE programs can prepare students for. Now, we'll briefly discuss the components and key elements of high-quality Career Technical Education.

What are the components and key elements of high-quality Career Technical Education?

In order for a CTE program to deliver all of these benefits to its students, it needs to be an exceptional program that is academically oriented and student-focused. To help schools ensure that their CTE programs are poised to deliver the greatest advantages, they need to realize that successful CTE programs concentrate their resources on (Reimers, 2021):

- Delivering student-centered services that point to all pathways involved in the CTE program. This will include the emphasis on multiple and varied ways to get involved in CTE, different ways to move through CTE, and various ways students can exit CTE programs.
- Promoting equity in terms of access to CTE programs. Schools must work to eliminate any barriers that may stand in the way of students hoping to matriculate in these programs, including working to reduce the achievement gap so that all students have the opportunity to realize their career goals through accessible, high-quality education.
- Ensuring that the systems that support CTE programs are aligned across the state —e.g., that all programming, common terminologies, central data repositories, and document sharing systems are up-to-date and easily usable so that system administrators and teachers are best poised to support their students.
- Working toward continuous improvement for a school system's CTE education, and, in particular making progress to expand the capacity at all levels of a system's CTE education so that a school can continually offer high-quality CTE instruction to increasing numbers of students.

These are the guiding principles of a great CTE program from the administrative point of view. However, when looking at essential elements of a CTE program from the student's point of view, a slightly different set of elements becomes clear. The following student-focused elements of a favorable CTE program include the above values (e.g., student-centered services, equity, and accessibility) as well as (Reimers, 2021):

- Aligned leadership at each level of the CTE's organization: All students need to be able to utilize and understand all systems across the CTE platforms, which requires flawlessly implemented and led integration. This will not happen if people don't

work together well, which requires top-tier CTE system administration and leadership.

- High-Quality Curriculum (and Integrated Instruction): One might say that one of the largest selling points of CTE is its ability to teach students real-life skills in extremely practical ways. Informed by student interest and current industry trends, schools should figure out ways to provide relevant learning opportunities that are work-based and reflective of real-world engagement. These programs should be rigorous and aligned with what students might expect to do once they enter the workforce. To that end, any work-based learning opportunities that utilize external resources—such as apprenticeships or internships—should be included. This can extend to dual enrollment or dual credit partnerships with nearby community colleges. As an additional perk, this can help ensure that students do not have to repeat courses as they shift from high school to college.

- Skilled, Informed Instruction: The faculty members assisting in a CTE program need to be academic and professional leaders—ones who will facilitate an environment of entrepreneurship and innovation among their students.

- Student Support and Career Exploration: CTE programs need to have the support and connections in place to help students identify both careers that they may be interested in as well as the courses, education, and training that will help them be competitive in their chosen fields. This will include having information about industry trends and in-demand jobs as well as the flexibility to create different student pathways based on where a student plans to specialize. Students need to be able to speak with job counselors about their prospects; they should also have individualized support to help them get through their education, even if (or especially if) they have significant barriers to education standing in their way (including the need for financial aid, child care, transportation, lingual support, part-time education, or support for special needs education).

- Informed Outreach, Intentional Marketing, and High-Quality Recruitment: Neither the students nor the faculty involved in CTE programs should either have a hard time finding CTE programs or feel like their CTE programs represent secondary or somehow less preferable options. As such, schools need to use the tools available to them to create messaging that attracts students to their CTE programs, to make consistent positive messaging available to stakeholders, and to recruit high-quality faculty to assist with its educational content.

- Strong Industry Partnerships: As CTE programs are very career-driven, it's crucial to build relationships with potential employers—and to ensure that the education offered in a CTE program is relevant to current industry standards. Industry partners should consistently review the curriculum in a CTE program to ensure that it reflects the current demands in the real workforce, and to make sure that CTE students are sufficiently prepared for the real-world demands they will encounter.

This is a tall list of requests for the typical school. The state of California has found that the following working norms can help a CTE program foster these principles and elements, both internally and externally (Reimers, 2021):

- Frequent communication that is open and intentional between the school administration, partnering industries, teachers, and students
- The prioritization of interdependency between a CTE program and nearby community workplaces—making the best use of public funds and an available workforce
- Constant effort on the part of a school's administration to look for new opportunities for students and build more effective practices to benefit from new industry trends
- A commitment to the sustainability and stability of a school's CTE program

If a school is able to concentrate on these elements, it stands a good chance of creating a meaningful and successful CTE program for its students (Reimers, 2021). Moreover, a highly effective CTE program is mutually advantageous for students, schools, and communities as it provides an opportunity to engage with the businesses and industries in the school's area. This in turn leads to everyone being able to realize the benefits of the CTE program.

What benefits does CTE bring to the table? What improvements could be made?

For a long time now, many people involved with and surrounding educational communities have realized that traditional middle and high school education is not always the right answer for every child. CTE programs present a useful alternative that can offer more practical, hands-on, and comprehensive educational opportunities for

students who have a good idea of what they want to do with their futures (Niehoff, 2018).

Modern CTE programs, as an upgraded version of the more streamlined vocational schools of the past, tend to offer a wide array of in-demand skills that will likely translate to stable, well-paying careers. By following this line of thinking, there are many things that CTE programs 'get right'—and that they bring to the table for today's students. These benefits include (Niehoff, 2018):

- **An emphasis on student choice.** By leveraging students' areas of interest and helping them figure out how to match a career with something they may already be good at, we're empowering our students to take responsibility and increase enjoyment in their education.
- **Strong cohorts of students, working together.** CTE programs often group students into cohorts, which are groups of students that take courses together and tackle projects as a unit. This fosters community, enables the learning of good communication skills, and can set the groundwork for long-lasting professional relationships.
- **Skills-focused scholarship.** CTE programs tend to focus less on theory and more on technical and soft skills. CTE students should graduate knowing how to solve problems, with the confidence to attack real-world projects, and with the ability to begin making an impact in the field of their choice.
- **Community partnerships.** CTE students often work with mentors in their community or take on internships with local industries. This helps these students learn more about their fields of interest in a real-world setting—and it also helps local community members work on their priorities and initiatives. It's a win-win situation.

Of course, CTE programs as they currently stand are not perfect. Critics of CTE programs often state that the following improvements are needed (Niehoff, 2018):

- **Professional development for CTE teachers.** Often, CTE teachers come directly from the industry they represent. They have rich experience, but do not have any training in education specifically. Other times, CTE teachers are more traditional instructors who are looking to serve their students with a CTE experience—and these teachers may know how to teach well, but they don't have specific

knowledge of the CTE career track they are trying to enrich. Figuring out how to balance these two extremes will make CTE much more effective in the future.

- **More integration with technology.** As more and more academic programs go remote, there is a push for CTE to do so as well—and this will require a widespread embrace of technology. Even for students who are local and learning in person, CTE programs need to be equipped to use the technology unique to their pathway or industry (something many already do well) as well as more typical educational software such as Google applications, video chat, and other types of communicative and presentational software.
- **More of a focus on public work and portfolios.** Because CTE instruction and experiences depend so strongly on hands-on training, many CTE students graduate from their programs with a good amount of high-quality work. However, they often don't have an effective way of showing this or proving it! CTE representatives need to learn that in order to make their students truly competitive in the workforce, all tracks, even those that are less technologically inclined, need to support their students with portfolio websites or similar tools to display their accomplishments.
- **Preparation for the future of work.** The way people are working is changing. Today, workers often are their own bosses or they embrace the gig economy instead of choosing a more traditional nine-to-five workday. In addition, there are several emerging industries that will be extremely in-demand over the next decades—from climate-related industries to new energy options, along with developments in artificial intelligence, and more. CTE has a unique opportunity and foundation to help students be prepared for tomorrow's careers—as long as today's CTE instructors have the foresight and flexibility to incorporate these new themes into their curricula.

Section 1: Reflection Questions

- What types of benefits does my school's CTE program (if applicable) bring to my students?
- Are there local community resources we could be using but haven't yet leveraged?
- Are there ways we could enhance our CTE program to focus more on the future of work?

Section 1: Summary

CTE programs have a unique opportunity to meet students where they are and prepare them for practical, satisfying careers. They benefit students, schools, communities, and even our country. However, CTE programs can fail to take advantage of existing resources to the greatest extent possible. A successful CTE program, one that provides real benefits to its students, also requires a good deal of time, communication, thought, and investment.

In the next section, we'll go into a little more detail regarding the types of career clusters (or tracks, or pathways) that CTE programs offer.

Section 2: The Different Types of CTE Instruction

From an external perspective, it's easy to lump many different types of targeted CTE instruction together. However, the numerous career paths that one can follow after a high-quality CTE education are extremely varied—making it vitally important that teachers understand how important CTE is (and what it can offer to their students). In this next section, we'll go over the career clusters that CTE programs typically cover.

What career clusters are covered in CTE?

In order to support the increasingly diverse and technical workforce opportunities as we move further into the twenty-first century, CTE programs tend to cover career clusters that can be applied to a variety of high-demand careers. CTE programs are unique in the way that they present information and in their goals for the use of this particular information. Such programs exist to help students become competitive for immediate placement and performance in necessary jobs. This means that most of the education featured in these programs will be focused on skills and getting tasks done efficiently and effectively—instead of focusing more on theory, as is often the case in more traditional modes of education (Stauffer, 2020).

This is not to say that CTE programs do not include theory—every field, in fact, will require some background so that students know how best to apply the skills that they're quickly learning. However, the bulk of time spent in a CTE program will be spent on information directly relating to skills and performance. After an introductory module that covers some background and relevant information, CTE students will spend most of their educational time practicing their newfound skills, gaining hands-on experience through internships and partnerships within their community, and taking tests that show

they are understanding the application of the knowledge they're gleaning (Stauffer, 2020).

Why is this important? Many of the in-demand careers that CTE programs directly feed into require a decent amount of experience before a student gets that first job. CTE programs circumvent this common first-time-applicant issue by infusing a student's training with many hours of experience (Stauffer, 2020).

This makes sense because many of the careers that CTE students later embrace are vital and even life-saving. CTE students go into construction, agriculture, health science, and even law; all professions in which their performance could have a direct effect on the safety and health of other people. To this end, in CTE courses students will spend less time studying from textbooks and more time talking about how to apply their skills in various realistic situations—or simply applying their skills through a supervised real-world project (Stauffer, 2020).

Another myth surrounding CTE concerns its appropriateness for different age ranges. Perhaps because it is so

focused on career readiness, there is a misplaced belief that only older students (e.g., those in high school) should think about this type of coursework. This is not the case. Very young students, including those in middle school, can learn the overarching themes of many different career clusters. They can begin to practice the types of essential skills that will fuel many of these careers. Since this is the case, many schools are starting to offer CTE tracks that are available in these earlier years. This also allows students to get many of the more generalized CTE courses out of the way early on before concentrating on earning in-demand certifications just prior to graduation (Stauffer, 2020).

What are the 16 career tracks featured in many CTE programs in America?

It's important to remember that CTE programs are both highly specific and highly versatile. Furthermore, just because students may elect to pursue specific tracks of CTE training, this does not mean that they must pursue those careers for the rest of their lives!

CTE programs also tend to do a good job of making clear to students which tracks may be more poised to lead to long-lasting careers, depending on how the economy and culture are trending, as well as which might require further post-secondary education or certifications. Additionally, CTE tracks in a good program will also be flexible, and will

change based on advancements in technology, decisions by the government, and other influencing factors (Stauffer, 2020). The following career clusters are recognized across the United States in middle schools, high schools, community and technical colleges, and the workforce (Stauffer, 2020):

1. **Health Science.** This CTE track is very popular because it fills a growing and diverse need. There are more people living on the planet now than there have been at any other point in human history. Those people are living longer than ever, and they tend to have more chronic illnesses than their ancestors. In addition, current United States university and higher education programs are very popular and competitive, particularly in the medical sciences, which has created a large pool of current and future doctors. Health support roles are crucial but tend to receive less of a focus in the traditional education system. Students who take classes in a Health Science CTE track could earn qualifications that they could later use as nurses, certified medical assistants, or patient care technicians. These types of jobs have a great deal of security, as the need for them will not likely diminish over time. Other certifications under this cluster could include becoming a medical administrative assistant, a phlebotomy technician, or a medical or nursing assistant. Importantly, these types of in-demand and well-paid positions show students that they don't necessarily need several years of postsecondary education to make a large, helpful impact in a medical service role. In addition, this type of direct medical experience can be useful if a CTE student does, later on, wish to pursue higher education in the medical field.

2. **Business, Administration, and Management.** If a CTE student wishes one day to work in Human Resources, Business Management, or Data Entry, this track might be a good one to consider. It's one of the more popular CTE areas because it is extremely versatile. This track can enable students to be well on their way toward many careers. The types of certifications that a CTE student can pick up through these modules include the Project Management Professional certification, the Certified Scrum Master designation, the Six Sigma Green Belt certification, and a certification as a Microsoft Office Specialist. In virtually every field, these certifications will be seen as an asset. Therefore, this CTE track is often recommended to students who may not have a more specific idea of what they want from their CTE experience.

3. **Sales, Marketing, and Service.** This CTE track leads to many popular careers, including those of Data Analysts, Sales Representatives, and Marketing Specialists.

Service, sales, and marketing are the lifeblood of the American economy, and these types of specialists are often the ones who help these professions run smoothly. By easing the various parts of the customer experience, they can help companies grow in a critical way. This CTE track helps students build the skills they need to ensure customer success later in their careers—which will make them invaluable to any company they choose to work for.

4. **Finance.** In the past, students have had to pursue a degree in mathematics or business to achieve a successful career in the finance sector. Now, a CTE track in finance can lead to a stable and satisfying career as a Controller, an Accountant, or a specialist in Accounts Receivable. In this track, a student might learn how to handle accounting and bookkeeping on a large scale. If students wish to learn more about revenue, cash flow, expenditures, profit margins, and the other nuts and bolts of how to ensure that a company manages its money responsibly, this is the track for them. Finance is an essential component of every company in America and will continue to be going forward—likely enabling hard-working finance CTE students to enjoy a long and stable career. The Finance CTE track effectively prepares students for either an introductory position or for further investment in their own education.

5. **Information Technology, or IT Services.** This CTE track can easily lead to careers like a Site Reliability Engineer, a Network Specialist, or an expert in more generalized Information Technology Solutions. Every company in the world will need at least one expert, and more likely an entire team, of people in this field—and CTE programs can prepare a student for success in this field with direct experience. While in the IT track, CTE students learn what is needed in order to bring companies up to date with technology in a safe and secure way. This involves managing equipment maintenance, figuring out networking setup, and optimizing the performance of local servers. The field of IT is one of the most in-demand job markets globally. A student with an IT certification can, in theory, get a job anywhere—from a global corporation to a tiny local business down the street. As we move further into remote working, IT professionals will be even more crucial to assist with the shift to internet and cloud-based work solutions.

6. **STEM (or Science, Technology, Engineering, and Mathematics) Careers.** Students frequently believe that they need higher education degrees to become professionals in one of these more technological, data- or science-heavy careers, but this simply isn't the case. CTE STEM graduates can earn high salaries with

their CTE coursework in any of many different careers, from becoming a Computer Aided Drafting (CAD) specialist to a mechanic, or working as an expert in Engineering Technologies.

7. **Manufacturing.** There are small companies—particularly in the Midwestern states—who are maintaining manufacturing facilities that produce American-made products. If a student wishes to get involved in this process, a great way to do so is through the Manufacturing CTE track. Through this track, students can learn the basics of manufacturing, including all protocols, processes, and materials involved in mass production. In the end, they will obtain certifications and experience that can lead to any of an array of popular careers, including Production Specialist, Materials Acquisition Expert, and Materials Manager.

8. **Logistics, Distribution & Transportation.** If a student wishes to be a Transportations Analyst, a Distribution Manager, or a Logistics Planner, this is the ideal CTE track. Our world's economy is built on accurate and efficient distribution and logistics processes. Students with a keen eye for detail and an innate knack for organization can hone their skills and gain industry knowledge that will make them very competitive in today's (and tomorrow's) logistics industry. This CTE track holds many different specialties and sub-disciplines under its umbrella, including storage logistics, shipping, and trucking. Students will learn to track inventory, schedule orders, manage identification technologies, and more to help companies run consistently and smoothly.

9. **Tourism and Hospitality.** Throughout our nation, entire cities and states depend on a thriving tourism industry in order to stay afloat. This CTE track can help a student learn how to manage seasonal visitors with expertise and help communities exist on that revenue throughout the year. Careers associated with this track include that of Guest Experience Specialist, Reception Manager, Hotel Director, and more. If a student wants to learn how to manage motels, hotels, tourist attractions, and bed-and-breakfasts, this track will offer targeted training. This is also an excellent track for young people who wish to travel for a time after they're done with school, as the hospitality and tourism industries are particularly valuable in popular tourist destinations. On the other hand, if students wish to stay put in the place they've lived their entire lives, they can use their expertise to become excellent resources for their town's visitors.

10. **Public Administration & Government.** Today's CTE students learn all about local governments when they enroll in the government track. This can include

everything from information regarding the creation of parks to budgeting, being on councils, and managing taxes. Through this track, a CTE student can prepare for a career as a Zoning Specialist, an Administrative Assistant, or a Project Manager. Students getting involved in this career cluster should know that there can be a good, reliable income associated with government work—but it can also result in significant stress. This track is a good one for students who are looking for a quick launch into government work.

11. **Public Safety, Security, and Law.** A CTE student who goes through this type of track can look forward to a career as a Criminal Justice Expert, a Paralegal, or as an officer within Law Enforcement. This track is one of the ones best-known for being associated with a potentially profitable career. A student who becomes a paralegal or a legal bookkeeper after this track can expect high job security and a competitive income. This track is also a good option for students who want to go into further law or criminal justice careers, or for students who wish to join their local police jurisdiction. Students will learn how to perform and manage clerical work, understand legal language, and respond to security concerns.

12. **Natural Resources, Food, & Agriculture.** If a student wishes to learn more about how the human race has learned to sustain itself, this may be an appropriate career track. Graduates of this CTE speciality will have the experience and background necessary for pursuing a wide range of fields, including careers such as Agriculture Inspector, Wildlife Administrator, Agronomist, and more. Students can also go on to become farmers, lab technicians, and researchers that support our country's natural output and economy. Agriculture is an enormous field that will only be growing in the future, particularly as the plant-based food industry continues to skyrocket. Students do not need to wish for a primarily outdoor-oriented career, but this could be a perk of the type of job an agriculture CTE track might prepare them for.

13. **Human Services.** From Social Workers and Rehabilitation Experts to Social Services Assistants and more—if a student goes through the Human Services CTA track, they will surely have the skills necessary to embark on any of many careers that focus on the health and happiness of individual people. This is distinct from the type of health work performed by medical professionals but is often just as important. While some careers within this field may require higher, further, or more specialized education, this is certainly a high-demand field that attracts students who are drawn to a helping profession.

14. **Construction & Architecture.** A student who has gone through the Construction CTE track can work toward a career as a Project Estimator, a Construction Inspector, or an expert in Construction Technology. It's important to note that this track does not qualify or certify individuals for immediate work as contractors or architects, but it can help them gain the experience necessary to achieve an entry-level job working with these professionals and thereby put them on that career path. These are growing and in-demand industries. As one expert put it, the cities of tomorrow are going to need to be designed and built. This CTE career track can help students be involved in these processes.

15. **Training & Education.** If students wish to teach others the skills and processes that they've learned, there's no better track than that of education and training. This track alone won't certify a student to become a teacher directly, but it provides experience and training to go into recruitment, training, or for becoming support staff—and if students decide to pursue higher education in order to become teachers, they'll be able to fall back on the foundational skills they learned in CTE. This track will also enable a student to pursue a more immediate career as a training consultant, a teaching assistant, or a safety specialist—among other options.

16. **Audio-Visual Technology, Communications, and Arts.** This diverse track could prepare a student to go into a wide variety of careers, including becoming an Audio Engineer, a Lighting Technician, or an A/V Technician. If students wish to go into the entertainment industry as support or staff members, this track could help them learn the skills that are vitally important for creating entertainment and media. Students could build upon their CTE formation with further audio engineering or lighting education, but their CTE education alone could help them get a job in a concert hall or stadium.

Implementing CTE Programs-Where can students find such programs?

CTE programs are implemented most in post-secondary academic institutions that specifically cater to students looking for career schools and hands-on experience prior to launching into a career. As of late, CTE programs are more frequently emerging in middle and high schools, as more and more school districts are realizing how beneficial these programs and skills are for all students—even those who wish to pursue traditional collegiate coursework after their high school graduation (Stauffer, 2020).

Most schools and CTE programs don't offer all 16 career paths or clusters that we described above. The most popular one, found in the vast majority of CTE programs, is the health science pathway. This is partially because healthcare is a rapidly expanding field right now, and students can usually find a good job very easily with a CTE certification or degree—or use their CTE experience to bolster further education as they work toward a higher medical degree. The rapid expansion of the healthcare field is not expected to slow down anytime soon, as more of the United States population begins to shift towards retirement age (Stauffer, 2020).

The second most common CTE program is the business track, as the type of classes and experience that a student can glean from this track is so versatile. A student who graduates with a CTE certification or degree in the business career cluster can go on to get a desirable job in a variety of industries, so it's seen as a high-value option (Stauffer, 2020).

Whether CTE programs offer any of the other 14 career clusters depends on many factors, such as the school's location. For example, if a school with a CTE program happens to be near a community that is rich in farmland and that supports agricultural manufacturing businesses, there's a higher chance that this particular CTE program will have the agriculture career pathway. Unfortunately, this may limit some CTE students' opportunities if they were looking for a specific and less-offered CTE career track; however, more and more schools are increasing their CTE offerings, which will make it easier for students to find what they want to study (Stauffer, 2020).

What does CTE look like when it's taught at a middle school level?

When younger students choose to enroll in CTE courses, it does look a little different than it may look for their older peers. First of all, middle schools offer CTE as an elective; very few schools in America require middle school students to include a career track in their required educational experience. The types of tracks that are made available to middle school students tend to be relatively selective; for example, a school might offer only computer application coursework, or a more universal career readiness track that teaches very general workplace skills. When a student graduates from middle school and matriculates in the higher grades, the CTE experience becomes much more expansive and targeted (Stauffer, 2020).

How does CTE change when students move from middle school to high school?

For the most part, schools continue to offer CTE as an elective, unless the student goes to one of the few American schools that requires its students to choose a career track. As mentioned above, health science and business are very common across CTE tracks in this country (Stauffer, 2020).

What does CTE look like in post-secondary institutions?

While this course is primarily focused on CTE offerings for middle and highschool aged students, another valuable component of CTE is that which is extended to older students. Post-secondary CTE programs tend to include very tangible choices for students, such as certifications that they can use to immediately start their careers. At post-secondary institutions, CTE programs will tend to guide students from the introduction to their career cluster of choice all the way through to employment (as opposed to the more measured, elective approach seen in middle and high schools). These CTE programs may be layered more with internships, as post-secondary CTE students may have a more flexible schedule than a typical high school student. However, taking a CTE track at a specific designated CTE institution will likely cost more for the student than simply taking similar or equivalent coursework while still in high school (Stauffer, 2020).

What qualifications do teachers need in order to teach CTE?

Unfortunately, a shortage of CTE teachers exists today, and in addition to this, many current CTE teachers are expected to leave the teaching profession in the near future for various reasons. Although it is becoming abundantly clear that CTE programs are worthwhile, effective, and are here to stay, teachers may be unsure about the qualifications required in order to teach in a CTE program or they may face difficulty in meeting credential requirements Each state is currently working to expand its own policy regarding CTE, and each state may have different pathways toward becoming a CTE educator. Because of that, it's best to look at the licensure and certification requirements for CTE education positions within your state (Kelly, T and Perez Jr., Z, 2020).

In general, there are five requirement areas that a prospective CTE instructor must gain experience or certifications in prior to becoming a CTE instructor. These five areas include (Kelly, T and Perez Jr., Z, 2020):

- **Appropriate education.** A CTE teacher must have a high school diploma (or a GED, or an equivalent), as well as a post-secondary degree or the completion of post-secondary coursework in the education field.
- **Targeted experience.** If CTE teachers wish to contribute to a specific career cluster or pathway, they should have some number of hours (or more) of experience within that industry or field.
- **Certifications and licensure.** Prospective CTE teachers must have all of the qualifications necessary to teach in their geographic location; and, if they wish to teach within a more technical pathway, they should have licenses that are recognized within that field.
- **Assessments.** CTE teachers will have to complete a series of tests in the CTE pathway they would like to teach. These tests may cover both content in the teacher's stated area of expertise as well as other more general work-preparedness information.
- **CTE-specific training.** A prospective CTE teacher will have to attend professional development seminars or complete a mentorship experience with another CTE teacher in order to learn how best to serve CTE students.

Various states will have different approaches to which of these requirements are truly necessary. There are some states that modulate which requirements a prospective CTE teacher must have based on the candidate's own level of education. For example, in Maryland, a candidate could have a bachelor's degree, some higher professional education, or simply an associate's degree with two years of experience and some targeted CTE training prior to employment (Kelly, T and Perez Jr., Z, 2020).

Section 2: Reflection Questions

- In my community, what resources do we have that could be used for a CTE track?
- What CTE tracks do I think my students would be most interested in?
- If I (or one of my colleagues) were to want to become a CTE teacher (or invest in our professional development as a CTE teacher), would we be able to find the resources to do so?

Section 2: Summary

The 16 career tracks that American schools offer provide a wide variety of training and target future careers for American students. However, every school doesn't offer all 16 tracks. As we'll discuss in the following section, this could indicate a need to bring some aspects of CTE education online. For now, it's good to remember that many CTE tracks are location-based, or are more or less available based on current (or projected) market trends.

If you're a CTE teacher or would like to be, it's also key to know how to implement, bolster, and invest in your educational style to support your students in the best way possible.

Section 3: Incorporating a Robust CTE Curriculum for Your Students

CTE, much like any other type of education, requires strategic implementation and ongoing investments. However, it's also different from many types of education in its innate practicality. How should CTE teachers go about providing the best education possible to their students? We'll discuss this question in detail in this section.

What's the best way to teach CTE courses?

While there are as many ways to teach CTE effectively as there are teachers (and students), the uniquely pre-professional, practical, problem-solving nature of most CTE tracks invites a similarly practical learning method. Many experts believe that the best way to approach CTE teaching involves a concept known as 'blended learning' (Stauffer, 2020).

When using a blended learning education strategy, instructors incorporate many different teaching methods into their didactic style. Each day or lesson might feature a completely different instructional tactic. This works to keep students interested, involved and intrigued—and it also helps appeal to students who simply learn in different ways. As many students who opt for CTE may have experienced frustration with a less interactive, more presentation-based educational style with their other coursework, emphasizing blended learning structures can be the strategy they need for success (Stauffer, 2020).

Blended learning principles involve several different strategies. These strategies include (Stauffer, 2020):

- As mentioned above, simply using a wide variety of materials and methods when approaching instruction for students
- Reinforcing points made in presentation-style educational sessions with technology (e.g., applications, websites, podcasts, or videos that a student can access on their own and rewatch as necessary)
- Integrating new teaching techniques on a regular basis, or varying one's go-to instructional style periodically
- Modifying the assessment style that the students experience (e.g., implementing pop quizzes and tests, but also sitting down and having discussions with students, asking them to prepare their own presentations and projects, having students assess each other, and other methods of learning how much a student has learned from their experience)
- Having your students work independently, as well as in partnerships, small groups, and larger groups. In CTE programs, this will also help students learn how to work with others, practice team leadership skills, sharpen communication skills, and more.

Because CTE career clusters often lend themselves well to very practical projects and problem-solving, it can be easier to incorporate blended learning educational strategies than it is for more traditional general education coursework (Stauffer, 2020).

How to teach work preparedness to younger students and teens

If you're a middle school teacher, educating a student within a more technical or specific CTE cluster may simply not be constructive or realistic. However, students at both the middle and high school levels in CTE programs (as well as those outside of specific CTE tracks) will need to learn work preparedness skills. These types of skills include 'soft skills' such as time management, self-motivation, communication, and delegation. These skills can be difficult to teach; they can also require some outside-of-the-box educational strategies (Mulvahill, 2021).

If you're looking for ways to include work preparedness aims into your instruction, here are some practical tips to do so in as effective (and fun!) a manner as possible (Mulvahill, 2021):

1. **Listening and recapping.** Knowing how to understand others and communicate well is one of the most important skills that a student can have—and it's definitely a skill that is often under-used in many workplaces, causing constant frustration for adults. Sometimes miscommunication can even lead to costly or vital mistakes. A simple way that you can help students practice these skills involves, very simply, having them take turns listening and recapping what they have said. Start by having your students pair up. Give them a topic; this can be a good time to double-up on course aims, or, alternatively, it can be more natural just to let students talk about their days. The person talking should concentrate on providing detailed information in an easy-to-understand manner (talking at a good pace, not being repetitive, providing logical statements), but the focus isn't really on the content of what the person is saying. The listener should focus on what the person is saying without thinking about other aspects of the topic and without considering a response. When the person speaking is done (after a minute or two of speaking), the listener should provide a brief recap of what the person has said. This recap should not contain a rebuttal or any injected opinions, but rather a summary. Then, the two should switch places. This is an exercise that can easily be adapted to socially distanced or remote learning. Through this exercise, students will learn to be respectful of one another while working on communication, listening, and interpersonal skills.

2. **Team-building activities.** Playing fun games or having your students perform activities that will naturally help them come together as a team will help increase their communication skills as well. Whether you put together a human marble run, have your students take care of eggs, have your students navigate a human knot, stack cups together, or figure out how to solve a hypothetical challenge such as an island-survival-scenario together, these activities will help your students learn to function as a team. These activities, whether you conduct them over a Zoom call or in your classroom, will help students build patience and negotiation skills (and enhanced communication).

3. **Time-management challenges.** Even competent adults have difficulty figuring out how to manage their time well. We can give our students a huge boost, later in life, if we help them learn how to sort their agendas now. Give your students a list of hypothetical tasks (the zanier, the better); or, if you're able to work in person, give your students a list of in-person tasks or exercises (e.g., performing 25 jumping jacks). Give each task a point value and then divide the students into groups and give them a set amount of time in which to get as many points as

possible. They will have the freedom to choose which tasks are necessary or which will give the highest return on points with the constraints they are given.

How to incorporate a high-quality CTE curriculum at your school

If you're learning about the benefits of CTE programs and want to consider implementing one at your school—or take action to improve the robustness of the CTE curriculum that you are currently using—there are steps that you can take. This can feel like a very large project to take on, but—as with every large undertaking—launching a CTE program can be broken down into discrete, achievable steps (Stone, 2017).

Focus on solidifying these steps to increase the efficacy of your current CTE program or take action toward starting one (Stone, 2017):

1. **Make sure that you have an articulated purpose for doing so.** As we've learned, CTE instruction is unique, practical, and purpose-driven. That sense of purpose needs to permeate the entire program; not just the industry-driven purpose of each cluster's focus, but an overall sense of targeted motivation that will provide cohesion to the entire program. From the start, identify why you want a CTE program at your school. In which specific ways do you hope your students will benefit? Are you hoping to reduce or prevent dropouts? Do you want to provide support for a specific local industry? Are you passionate about providing students with choices for their post-secondary education? There is no absolute right or wrong answer for why you wish to implement a CTE program, but you need to know what that answer is prior to getting started.

2. **Decide which career clusters and courses your CTE program will offer.** CTE programs are varied and versatile, and, as we discussed in the second module, their inner workings can be inspired by your students and the location and needs of the community. Use your stated purpose and your logistical constraints to decide which of the 16 CTE clusters would be the best fit for your school and your student population. You should also decide how you'll implement CTE into your existing curriculum: Will you teach job preparedness to middle schoolers, or keep CTE as an elective track for older students?

3. **Think about the resources that you already have on hand.** Are there already teachers in your district who have targeted expertise in the career tracks that you'd like to provide? Will your school district allow you to hire additional teachers to cover any gaps in your existing knowledge base? Will you be able to access online courses or external training to offer your students additional

resources beyond traditional education? Are there companies or businesses in your community that could offer internships or resources to assist with your initiative? Because CTE programs specifically offer so much practical support to their students, it's key that you focus on the logistics behind providing that support early on in the brainstorming process.

4. **Consider whether professional development for your existing staff is an option.** The faculty members at your school are going to be the ones who bring your CTE program to life, so they need to be the ones who have the greatest knowledge about what they're doing. Having ongoing training opportunities for your faculty members can be a cost-effective way to offer more programs for your students and to invest in your teaching staff. It's vital that CTE staff know about the goals and benefits of CTE programs and have all of the knowledge and resources that they need in order to help students in the best way possible. If you're able to invest in your own staff in this manner, you may be able to reduce the cost of implementing a CTE program because you could avoid having to bring in additional staff.

5. **Ascertain where your funding is coming from.** You're going to need to understand how you're going to fund your CTE program or its enhancements—even if you're doing as much as possible to keep the overall cost low. Fortunately, there are national funding options for CTE programs such as federal Perkins grants. If you're able to do research on the matter, you may also be able to find specific grants for career clusters—agriculture, technical education, healthcare—that are in demand in your area or nationally. You'll have to spend time managing paperwork and applications in order to qualify for these programs, but the results can be well worth it.

6. **Invest in your community partnerships.** You'll find that you can reduce the bill for your CTE program and a good deal of the work involved if you spend time creating connections with real-life industry partners in your community. You'll also be able to increase networking experiences for your students and demonstrate the in-demand potential of their training and future careers. Do some research to see which companies in your area may need more help, and then propose internships. Try to set up ongoing site visits or visits from staff members at those companies as in-class speakers. Ask local experts if they'd like to be project mentors for CTE students. If positioned in the right way, these types of partnerships can reflect a true win-win situation.

7. **Set up a plan to evaluate your CTE program growth incrementally and over the long term.** Investing in a CTE program involves flexibility and response to industry conditions and market trends. Whether you're starting a new CTE program, a new chapter of growth for your CTE program, or simply a new career cluster, create a metric or rubric for determining the success of your endeavor and any other steps needed for continued growth as time goes on. These can involve student surveys, data from student assessment, parent surveys, discussions with your industry partners, and even just keeping an eye on the national and local news to stay ahead of trends that could affect your program.

What are some differentiated instruction strategies for teaching CTE to a wide array of students who have different learning modalities?

Every student is different—yet all of the students in a specific career cluster or track are going to need to be able to learn similar skills at a similar pace. How is this going to happen?

Blended learning strategies, as mentioned above, will likely be a vital part of your approach going forward. However, these can be difficult to practically implement in your current methods of instruction. Here, we'll present several discrete strategies for helping your class of students as individually and effectively as possible (Stauffer, 2020).

1. **Accept the fact that not all of your students learn the same way.** This isn't necessarily a strategy; it's more a prerequisite for supporting your students as they need it. However, you're going to experience much less frustration in your role as an effective instructor if you truly realize the ramifications of this simple fact. Your students may not respond to lectures and they may need more than information from a textbook. You may have students who require remediation techniques—and they may be sitting right next to students who are ready to learn from textbooks and traditional presentations. Finding ways to reach all of these students where they are can be very frustrating and time-consuming—and you need to be able to perform at your finest to support your students. Creative solutions will be necessary in order for you to do your job well.

2. **Divide your students into groups based on how much they know about the topic at hand.** This may feel odd, but it's practical. In many CTE programs that don't embrace differentiated learning techniques, many students are simply left behind. By grouping your students flexibly based on the ways they learn, their

previous experience, or even just their interests and planned specialties, you can meet each group where they need the most support—and you may even be able to take advantage of each group's talents (e.g., leveraging a student who may learn well by discussing or presenting with a student who may wish to learn from presentations or discussions). For example, a group of students that work well by themselves can easily be set on a long-term project that they can present to the other groups at the end of the week or month. This will allow you the bandwidth necessary to support other groups in the ways they need it most. You can apply this strategy by completing a simple review or assessment at the beginning of each semester or by assigning a module to see how much material each student is comfortable with. Consider these groupings flexible as the weeks go by; if a student needs to move to another group, that should be able to happen relatively easily.

3. **Create learning 'pods', and assign student captains.** If, during your initial assessment at the beginning of the semester, you learn that you have a few standout students who may have an abundance of previous experiences and expertise, you can assign them other students to teach in a more personalized manner. This will help the student captains as much as the students they work with, because we all know that teaching a subject is often the best way to learn it yourself! If you're able to work in person, we recommend actually reconfiguring the chairs in your classroom into groups or circles, each with a student captain or two, so that group members can focus in their own space. Then, you can ask student captains to initiate or manage conversations, or you can assign group work and encourage struggling students to reach out to a student captain first before they reach out to you.

4. **Embrace a tiered learning style.** CTE attracts a diverse array of students with many different levels of expertise and varied types of learning styles. When you're creating your curriculum for a specific subject, see if you can create tiers for each lesson or unit that can be catered to students of different academic and experience levels. Make it clear to your students that achievement of the highest tier is not necessary for passing your class— students will simply be required to complete the tier most appropriate for their learning modalities, level of experience, or future plans in their industries of choice. For example, if you're teaching a module on merchandising, assign three semester-long projects. One will involve building a website, the other will require creating a recurring order mockup, and the third will include developing a detailed sales report. Expect only

a small number to be able to complete all three projects without help from you in a reasonable period of time.

5. **Rely on detailed handouts for your students.** In the real world, students are often responsible for figuring out processes on their own with documentation to guide them through confusing and frustrating projects. In school, the idea is to be substantially more available to help your students succeed—but you can still help them cultivate those needed skills through practice that will help you, too. Putting together a comprehensive handout that contains the answers to questions that students commonly ask will help your students feel more secure in your classroom. These resources can also help students assist each other, which will make your job as a CTE teacher much easier. On a similar note, you can also simply provide your students with more study guides, worksheets, and printed notes to help them follow along in class and take their own notes.

6. **Prioritize hands-on projects and interactive activities.** We've included this point before, but it's a good one to remember. These types of activities can keep an entire group of students busy and engaged while teaching fundamental skills in an often more memorable way than a lecture or a presentation. Start with small projects that help illustrate larger, more overarching points, and build your way up to more complex, self-driven projects that are more aligned with what individuals might actually do in a career related to their CTE track.

7. **Consider utilizing flipped learning strategies.** In a flipped learning classroom, students do most of the theoretical work at home by reading material or watching videos that paint an overall picture of a concept that they're learning. Then, in class, you have the time and bandwidth to build on that concept or theory, instead of spending valuable class time essentially reading the textbook aloud. Start small. Instead of asking your students to read an entire chapter of a book in the evening (particularly if you're aware that your students might have other responsibilities outside of their CTE program), give them easy-to-incorporate resources such as videos or podcasts and ask that they come prepared for a general discussion, one with little pressure to perform in front of a group. As you invest more into flipped learning strategies, you can figure out how to check work done at home, expand the types of work students are doing at home, and more to best utilize the time you have together in class.

8. **Consider implementing the think-pair-share method of learning.** This three-pronged approach is an excellent way to help students with different learning

modalities process brand-new information in a relatively short period of time. This is partially because it centers on helping students connect with each other, and can really leverage the different ways that people learn and feel comfortable sharing. With the think-pair-share method, you as the instructor begin by introducing the new topic to your students. Allow them a moment to think about what you have said. Then, you'll have the students consider a question or a discussion prompt that relates to that topic and discuss that question or prompt with the person next to them. After the students have a moment to confer, ask if anyone has anything that they wish to share—and initiate a classroom discussion.

Can CTE programs be taught online?

It may seem contrary to the purposes and goals of career technical education to teach the modules online; after all, isn't the entire idea that students have the opportunity to get hands-on experience that prepares them for a career?

Consider this: Many careers are going remote. Many schools are, as well. Launching remote or online CTE programs can also make resources available to students who need to stay at home or don't have a CTE career cluster in their geographical area that they'd like to specialize in (Castelo, 2020).

Of course, there are some components of a well-rounded CTE program that require hands-on tutelage. However, much of the theory work that is included in the modules can be communicated through calls, videos, and other methods of remote instruction. The remaining in-person requirements that will better prepare students for their careers can occur through site visits or can be spread out at convenient times throughout the year in order to make a student's educational experience more possible, if their circumstances merit it (Castelo, 2020).

CTE educators may need to prepare for unique challenges if they are going to attempt a blended or entirely remote learning structure. Rethinking course delivery and strategic, creative uses of available technology will be necessary in order to provide a helpful education for your students (Castelo, 2020).

While this may be a difficult endeavor, benefits of of bringing technical education online include the following (Castelo, 2020):

- **Flexibility.** If students can learn from anywhere and are able to learn at their own pace, this can reduce the likelihood that they will have to drop out of their programs due to necessity or major life changes. Students who have additional

constraints on their time, such as family, work, or other school obligations, may be able to continue in their CTE coursework more easily, as they'll be able to work on their modules at night or on the weekends.

- **Responsibility.** If students are responsible for finding ways to solve problems or incorporate projects based on materials they have at home or by working with industry partners they have in their own, remote communities, they will realize that they have ownership over their careers in a very material way.
- **Digital Literacy.** Increasingly (and particularly in the aftermath of the COVID-19 pandemic), tomorrow's workers are going to need to be innately familiar with technological tools, online communication and presentation, and other 21st-century skills that will be—going forward—absolutely necessary. Some fields, such as tech support or cybersecurity, may even benefit from being online because by completing the program remotely, participants will reinforce needed skills.
- **Cost Efficacy.** Although there will be an investment associated with initially bringing the program online, after the remote CTE program is launched the cost of onboarding additional students will be minimal. For districts that are strapped for resources, this can be a legitimate option for cutting costs and making academic investments last for a very long time.

It's clear that there are benefits associated with teaching CTE programs online; however, how is a teacher to do so in an effective manner? Next, we'll present some tips that should make this easier going forward (Castelo, 2020).

1. Embrace a wide array of online tools such as videoconferencing, pre-recorded video and audio, and online resources to help students launch their projects at home. An effective online CTE program will need to take advantage of as many different and creative uses of available technology as possible. You will need to find digital ways to present new concepts, allow students to practice those concepts, and prepare students for their certification exams. There are some instances in which educators have been able to leverage virtual reality and augmented reality solutions for healthcare and technical practice. There are also tools (such as IBM's Open P-TECH platform) that allow students to train in technologies such as cloud computing and artificial intelligence from the comfort of their homes. Coding and digital media manipulation can, similarly, be taught through online modules.

2. Ensure that students have the technology they need. If a program is going to require a specific type of technology, you're going to need to make sure that students have devices that can support that technology. This is another arena in which adequate amounts of funding can make a large difference in the student experience. If your school is able to allocate funds strategically to provide assistance for students who need devices in order to learn, that may be worth considering.

3. Provide strategies and resources for students to find their own locally-based mentors and industry partners. If your students are in an agriculture track, they may need to partner with a local farmer or similar entity in order to gain the experience they need. If part of your time as a teacher involves helping your students learn basic networking skills or helping them find the local connections they need, that may need to happen—but it's also an investment in that student's work readiness and future networking skills, so it may be a good use of your time.

Section 3: Reflection Questions

- Does your school have the infrastructure and tools necessary to support your CTE students? What about bringing your CTE program (at least partially) online?
- Would a blended or flipped learning strategy work well within your educational style?
- How would you go about tiering a subject you already teach with practical projects and accessible aims?

Course summary and conclusion

CTE programs can provide immense practical benefits for our students. Through these targeted educational experiences, students can gain skills that will make them incredibly competitive for the rest of their lives—ensuring that they can have a stable career and contribute in a positive way to their communities for years to come. However, CTE is also changing—as is education, in addition to the industries that CTE programs often support. CTE programs are also shifting to be more accessible from every part of the nation, as well as online. Today's teachers need to realize this and update and enhance existing CTE programs to support students through these fluctuating trends. CTE programs will also be constantly changing to meet the needs of a workforce that is growing and progressing. We can support our students best if we meet the challenge of evolving with

the needs before us. By ensuring that we're teaching future-proofed skills, immersing our students in digital literacy and workplace preparedness, relying on our communities, and finding ways to serve our students where they are, we can use CTE programs to create more comprehensive and fulfilling educational options for today's students.

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