High-Quality Career and Technical Education:
Essential Elements to Prepare Students for College and Career

The Urban Assembly

The Urban Assembly CTE Schools 2015-16

The Urban Assembly Maker Academy, founded in 2014, works with partners that include The Carnegie Corporation, Control Group, Intel and Parsons School of Design to prepare students for careers in the burgeoning sector of technology, coding, web applications and products design, also known as the "Maker Movement."

The Urban Assembly School for Collaborative Healthcare, founded in 2014, works with The Greater New York Hospital Association, Community HealthCare Association of NYS, FEGS, NY Alliance for Careers in Healthcare, Community Health Worker Network of NYC, and New Community College to prepare students for careers in care coordination, patient navigation, and healthcare education and outreach.

The Urban Assembly School for Emergency Management, founded in 2013, works with FEMA, the NYS Department of Homeland Security, the NYC Office of Emergency Management, global engineering firm Thornton Tomasetti, Inc, the American Red Cross, and Adelphi University to prepare students for careers in first response, emergency planning and mitigation, and visual inspection and repair.

The Urban Assembly School for Global Commerce, founded in 2013, works with the Port Authority of NY and NJ, Regional Plan Association, the NYC Economic Development Corporation, the NYC Department of Transportation, CSX, SUNY Maritime College, and Rutgers University to prepare students for careers in freight logistics and supply chain management

The Urban Assembly Gateway School for Technology, founded in 2010, works with Goldman Sachs, Hospital for Special Surgery, WNET 13 New York, and NYU Poly-Tech Brooklyn Media Center to prepare students for careers in digital design and animation, information technology and systems, and data management and health IT.

The Urban Assembly School for Green Careers, founded in 2009 as the first UA CTE school and the first school for green careers in the country, works with Jonathan Rose Companies, Thornton Tomasetti Inc., Turner Construction, NYC Parks Department, Solar One and NRDC to prepare students for careers in sustainable building operations and horticulture and landscaping.

The Urban Assembly New York Harbor School, founded in 2003 and converted to CTE, works with the Department of Environmental Protection, South Street Seaport, Waterkeeper Alliance, Sandy Hook Pilots, the US Environmental Protection Agency, and SUNY Maritime College to prepare students for careers in marine biology research, ocean engineering, aquaculture, vessel operations, marine systems technology, and professional diving.

High-Quality Career and Technical Education:
Essential Elements to Prepare Students for College and Career

The Urban Assembly

November 2015

Table of Contents

> "CTE programs are good for students because they can learn new skills and find their passion. They're good for businesses because they can tap into a pipeline of skilled talent. And they're good for our country because these programs help us grow our economy, compete with other countries, and unleash the next generation of entrepreneurs and innovators." — FIRST LADY MICHELLE OBAMA

Dear Colleagues,

The Urban Assembly began creating high schools in 1997 to provide high-quality college preparatory opportunities for children growing up in underserved communities throughout New York City. The idea was simple: usually, children's circumstances predict their life outcomes; we would change the outcomes by changing the circumstances. We thought opening academically rigorous high schools that would prepare economically disadvantaged children for college would put our students on a new, upward trajectory. For many, it did. However, year after year, we witnessed a stubborn and troubling trend: about 15% of our students were graduating and not enrolling in college. They were taking minimum wage jobs straight out of high school or remaining unemployed.

We realized that we needed to do a better job of addressing the needs of this population. These were deserving kids — people who were clearly capable of having meaningful careers and contributing to society — and it was our duty to give them the tools they needed.

This realization led us to create seven Career and Technical Education (CTE) schools, academically rigorous high schools that prepare students for college and in-demand careers in technology, commerce, healthcare, and more.

As we have created these schools over the past seven years, we have learned a lot — through recruiting and developing teachers, engaging with families and students, and forming deep partnerships with both colleges and public and private sector industries. We have learned what doesn't work and are committed to innovating and disseminating promising practices.

In this paper, we share key lessons that have led to the development of our CTE model. We believe our model in New York City has great potential to help students throughout the country.

Sncerely,

RICHARD KAHAN
Founder & CEO

ERIC WATTS
Director of CTE

Executive Summary

Today in America, millions of people are looking for jobs, even as employers are reporting that they are unable to find workers who have the skills they need. A recent Duke University survey[1] found that more than nine in ten companies have job openings and that half of these companies name a "skills gap" as the culprit. This "skills gap" — a mismatch between in-demand skills and the skills potential workers have — is not a fleeting problem; it is one that has been escalating over time, affecting companies, individuals, communities, and America's national competitiveness.

Career and technical education (CTE) programs can address these interlocking problems that are so centrally important to our nation's economic competitiveness and our citizens' wellbeing. CTE *should not be* confused with "vocational education," an old fashioned model that trained children for jobs in the 20th century industrial economy. In contrast, CTE programs are academically rigorous and prepare students for both college and careers. Through rigorous academic courses — with standards as high or higher than traditional high school programs — and career-focused skill development programs crafted in partnership with industry, CTE programs prepare students to access college and careers.

The Urban Assembly (UA) is dedicated to creating opportunities for and empowering underserved students. Over the course of seven years, we have worked with partners in government and the private sector to create seven unique CTE schools in New York City, which are currently serving 2200 students. Our students learn math, English, science, and social studies, but they also acquire technical skills and earn industry recognized certifications. When our students graduate, college is an option, but they also have marketable, in-demand skills, enabling them to launch productive, exciting careers.

In establishing and developing our seven CTE schools — working extensively with industry partners, as well as teachers, principals, guidance counselors, students, parents, and policymakers — we have learned a great deal about what sets these schools and their students up for success. We believe successful CTE programs require the following elements:

1. **Career pathways:** CTE programs should include career pathways that are responsive to economic trends and labor market needs, while providing students with certifications and credentials recognized by employers.

2. **CTE and academic content integration**: CTE and academic content must be cognitively demanding, experiential and aligned with state, national, and industry standards.

3. **Industry partners**: Collaboration with real-world companies that engage in CTE is essential. This includes, but is not limited to, assisting with curriculum design, providing students with out-of-class experiences, and advising students and teachers.

4. **Post-secondary education partners**: Programs of study must be designed to bridge secondary schools and post-secondary education partners to provide early college opportunities for all students.

5. **Work-based learning opportunities:** Students must have a series of work-based learning opportunities that increase in frequency and intensity from 9th through 12th grade.

6. **Effective counseling:** All students must have post-secondary education and career counseling that informs and guides students to educational and professional opportunities after high school.

7. **CTE teacher recruitment, support, and retention strategies:** Systems must be in place to help recruit, support, and retain CTE teachers in order to improve student outcomes.

CTE schools that implement these seven strategies are ready to prepare students with the knowledge and skills they need to make smart decisions when graduation approaches — whether that means starting a career and/or continuing with their education.

In this report, we describe CTE and Urban Assembly in greater detail and then provide an in-depth description of the seven essential elements we have laid out above. We conclude with a set of policy recommendations, which we believe will help to create environments that support the development of more high-quality CTE schools and programs across America.

Why Career and Technical Education?

Career and technical education (CTE) is defined as organized educational activities that provide students 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."[2] In addition to providing coherent and rigorous content, CTE programs must also provide technical skill proficiency that results in an industry-recognized credential or certificate.

The CTE guidelines set forth by Congress are a far cry from the vocational education movement of the turn of the 20th century; however, some professionals still refer to CTE as "vocational education" because the term "career and technical education" was not established as the preferred nomenclature until 2006.[3]

The vocational education movement was a direct response to the 20th century's changing economic landscape in which the need for skilled workers in manufacturing industries was met with an increase in working-class students enrolling in high school.[4] Much as the emergence of vocational education was a response to the 20th century labor market, the "new CTE" is a response to the current and burgeoning middle-skills movement.

UNDERSTANDING THE MIDDLE-SKILLS MOVEMENT

The middle-skills movement is the effort to address the shortage of workers in industries such as computer programming, medical technology and advanced manufacturing. These jobs typically require the acquisition of an industry certification/credential and academic coursework embedded in a post-secondary technical education program.

In response to the changing economic landscape and the increased importance of college and career readiness, the Perkins Act of 2006 called for increased accountability measures, collaboration between secondary and post-secondary institutions, rigorous academics, and a stronger focus on business and industry. This updated policy set the stage for the "new CTE" movement, a term coined by Arne Duncan in response to the *Pathways to Prosperity* (2011) report.

According to Secretary Duncan, CTE 2.0 should enable students to "earn a post-secondary degree or an industry-recognized certification—and land a job that leads to a successful career."[5] The new CTE or CTE 2.0 requires high-quality secondary and post-secondary programs that prepare students for both college *and* career.

In addition to Secretary Duncan's endorsement of CTE, First Lady Michelle Obama said at a recent White House event that CTE programs are "good for students because they can learn new skills and find their passion. They're good for businesses because they can tap into a pipeline of skilled talent. And they're good for our country because these programs help us grow our economy, compete with other countries, and unleash the next generation of entrepreneurs and innovators." [6]

For students, these jobs are direct paths to the middle class and do not require the time and financial commitment of a four-year college or university. Yet while middle-skills industries, such as computer programming, medical technology and advanced manufacturing, are in high demand, the labor market is still failing to meet the industry need.

HELPING STUDENTS BECOME COLLEGE AND CAREER READY

College readiness often refers to the academic knowledge and skills necessary to succeed at an institution of higher education without the need to take remediation coursework.[7] In response to this need to prepare secondary students for college, the college readiness movement of the last two decades has called for high standards, rigorous courses, and assessments to determine if students have met those standards.

But simply ensuring all students are college ready will not suffice. Recent research has shown that not all students need to attend and graduate from a four-year institution in order to collectively meet the needs of the labor market.[8] Middle-skill jobs that require more than a high school degree and less than a bachelor's degree will be the high-demand jobs of the future.

A purely academic course load would address students' academic knowledge but fail to provide the experiences necessary for students to obtain the technical skills and knowledge necessary for middle-skill jobs. In addition to academic and technical knowledge and skills, it is important to integrate social-emotional skill development throughout the high school curriculum to enable students to better manage the challenges of transitioning to a college or career. Essential to the acquisition of these skill sets is a successful high school experience, which a high-quality CTE program can provide through its curriculum of rigorous coursework combined with meaningful work-based learning experiences.

Furthermore, research has shown that CTE programs have the potential to increase the likelihood of students graduating high school. In 2012, all but one state reported high school graduation rates of CTE students higher than non-CTE students.[9] In addition to providing students with the opportunities to obtain industry-recognized

certifications and credentials important in today's economy, [10] CTE has proven to increase student motivation, which is one of the likely causes of such high graduation rates relative to non-CTE students.

VARIATIONS OF CTE ACROSS SECONDARY SCHOOLS

CTE courses and programs at the secondary level vary from school-to-school. Some CTE schools require *all* students to complete a sequence of courses and experiences for a particular career pathway. Other high schools offer CTE programs in which some students complete a career pathway while others choose to take elective coursework. And while some CTE schools have a variety of career pathways to choose from, other schools focus on one career area that offers several related pathways for students to choose. Furthermore, some non-CTE schools offer several CTE courses, but not enough for students to complete the full sequence necessary for a CTE endorsed diploma (e.g., in New York, the requirement is a minimum of seven credits in a pathway such as Digital Design & Animation, Information Technology & Systems, and Emergency Communications & Technology in addition to work-based learning experiences).

What distinguishes CTE programs and pathways from non-CTE programs are the requirements established by the federal, state, and local government. For example, CTE pathways are required to provide early college opportunities and industry experiences for students while general education programs are not held to that same standard.

For students to truly be college and career ready, they need to experience aspects of college and the workforce prior to graduation. Just as a novice teacher needs exposure to the classroom through student teaching, students need exposure to college courses and internships in order to adequately prepare for life after high school.

CTE in The Urban Assembly

The Urban Assembly (UA) is a non-profit organization dedicated to empowering underserved students by providing them with the academic and life skills necessary for college and career success. We create small public schools that are open to all students, scale up promising programs, and work with hundreds of partner organizations in the private, public, non-profit, and higher education sectors.

In the 2015-16 school year, we will serve nearly 9,000 students in 21 schools from under-resourced neighborhoods across The Bronx, Manhattan, and Brooklyn. Of the 21 UA schools, two are standalone middle schools, six are grades 6-12, and the remaining 13 are high schools. Of the 18 schools that have grades 9-12, seven are CTE schools (see appendix for descriptions) and among the remaining 13 non-CTE high schools, three will implement CTE programs in the coming academic year.

By 2008, two growing trends over time moved us to expand beyond college preparatory schools. First, it became increasingly clear that college was not the only or in some cases, the best post-secondary option for students. We were committed to helping our students enter the middle class and pursue productive lives rather than prescribing any one way of doing so. And secondly, educators began to embrace that meaningful career preparation could exist in schools alongside, and not at the expense of, college preparation, thereby expanding the versatility of a high school education and giving graduates both college and career options.

Those two trends combined with the middle-skills movement caused UA to turn to CTE as a promising way to prepare students for college and career. UA is committed to providing all students with equitable access to an education that prepares them for the increasingly competitive global economy they will face upon graduation. UA does this through rigorous academic coursework, cutting edge employability and technical skills preparation, social emotional skill development, and college and career awareness and counseling. UA students will be able to thrive in their post-secondary path of choice and have the skills, knowledge and preparation necessary to succeed.

To date, UA has successfully started and supported seven CTE schools and is in the process of developing career pathways in three of our non-CTE schools. Through this experience, we have addressed many of the challenges that

CTE schools face and implemented promising practices that have enabled thousands of students to acquire the academic, employability, and technical skills necessary to be college and career ready.

In the analysis that follows, we discuss each of the essential elements of CTE while including promising practices, challenges, and real-world examples from our CTE schools. When applicable, we also include examples from across the city, state, and country.
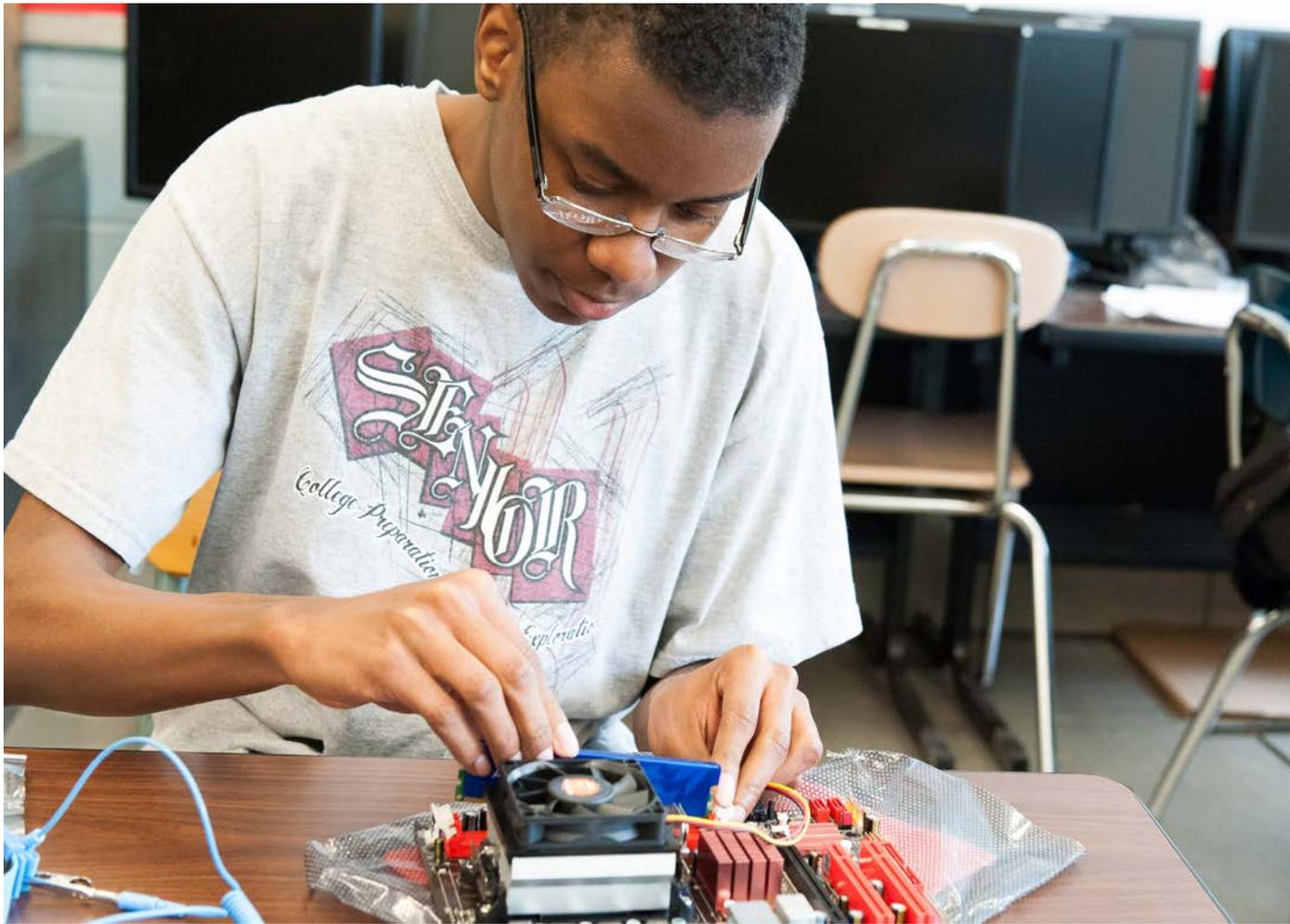
Essential Elements of CTE

The creation of the UA CTE model began with the collection of data across our seven CTE schools via a series of principal interviews along with an analysis of public and internal documents. The UA also hosted a CTE Symposium[11], sponsored by JP Morgan Chase in 2014, and collected data from keynote speakers, breakout sessions, and attendee evaluation forms. The symposium was attended by 200 practitioners, policy makers, industry and post-secondary partners, and other key stakeholders. UA staff also conducted an exhaustive review of CTE literature while collecting data. Two overarching questions framed our data collection:

1. What are promising practices in CTE?
2. What challenges do schools face when implementing CTE programs?

After analyzing the data and literature review, we identified the seven "essential elements of CTE," which serve as the frame for the remainder of this paper. Evidence of all essential elements were observed at UA CTE schools; however, no single school contained all of these elements, pointing to both the progress and potential for more wide-spread implementation of these practices.

7 ESSENTIAL ELEMENTS OF CTE EDUCATION

1. **CAREER PATHWAYS: CTE** programs should include career pathways that are responsive to economic trends and labor market needs, while providing students with certifications and credentials recognized by employers.

2. **CTE AND ACADEMIC CONTENT INTEGRATION: CTE** and academic content must be cognitively demanding, experiential and aligned with state, national, and industry standards.

3. **INDUSTRY PARTNERS:** Collaboration with real-world companies that engage in **CTE** is essential and includes, but is not limited to, assisting with curriculum design, providing students with out-of-class experiences, and advising students and teachers.

4. **POST-SECONDARY EDUCATION PARTNERS:** Programs of study must be designed to bridge secondary schools and post-secondary education partners to provide early college opportunities for all students.

5. **WORK-BASED LEARNING OPPORTUNITIES:** Students must have a series of work-based learning opportunities that increase in frequency and intensity from 9th through 12th grade.

6. **EFFECTIVE COUNSELING:** All students must have post-secondary education and career counseling that informs and guides students to educational and professional opportunities after high school.

7. **TEACHER RECRUITMENT, SUPPORT, AND RETENTION STRATEGIES:** Systems must be in place to recruit, support, and retain **CTE** teachers in order to improve student outcomes.

1. CAREER PATHWAYS

A strong CTE program begins with a well-selected industry theme that makes the program relevant to employers, compelling to students and families, compatible with broader educational needs, and both flexible and sustainable over time.

As described later in this paper, the UA model of CTE involves installing a single, overarching industry theme within a small school of choice where all students opt into the theme, but have a choice among subsector pathways.

Determining the Theme

We recommend that CTE programs conduct detailed labor market analysis prior to establishing a career theme and periodically examine labor trend data to ensure that the theme continues to align with industry needs. When determining a school's career pathway(s), we recommend investigating the following five questions:

1. Is this a growing industry and will there be a need for workers in the local, state, and regional economies?

2. Do the represented careers suggest multiple points of entry for people with varying degrees of post-secondary education?

3. Is the need being met by CTE currently? Are there enough seats in existing CTE school programs to address the anticipated volume of student interest?

4. Are there potential public and private sector partners (industry and post-secondary) willing to collaborate and offer opportunities to students, both during and after their high school education?

5. Will this industry and theme appeal to students?

Early findings might reveal a great need in an industry with a long-standing tradition of CTE and credentialing, such as information technology, or a new emerging industry with no existing CTE schools, such as emergency management. It is important to not let preexisting schools or the lack thereof impact the decision to establish a particular career pathway. If labor market needs exist and the program can prepare students for college and career, a school should move forward with the planning process.

At the UA, looking at labor trend data is the beginning, not the end, of the process. Informal employer interviews shed light on nuances, complexities, and potential industry disruptions that labor trend data might not reveal. Most of the work, elaboration of the theme, and identification of potential program features happens in the course of these interviews.

After conducting labor market analysis and interviews with potential employers, the UA uses the following list of criteria to determine the career pathways at each CTE school:

- **Stackable credentials:** Programs should offer a "first-rung" industry-wide certification that can accommodate multiple career ladders with "stackable credentials" that provide students with a strong element of choice through high school and beyond. For example, students in an information technology pathway could obtain entry-level certifications in Cisco, Microsoft, VMware, CompTIA, AccessData, and HDI in addition to an industry neutral credential such as ACT's National Career Readiness Credential before graduating high school.

- **Industry connection:** The potential for direct connection to industry in all facets of a program, so that everything from curriculum to internships reflects what employers consider necessary knowledge and skills in order to enter the workforce.

- **Post-secondary opportunities:** Connection to courses of post-secondary study at local colleges in order to foster a seamless transition to undergraduate degree programs in a given industry and jump-start the accumulation of college credits while in high school.

Developing an Initial Program Vision

Once a theme meets all criteria, we begin backward-planning a CTE program in collaboration with industry and post-secondary partners. This process involves multiple steps of questioning, list making, and drafting.

One important first step is creating a list of industry skills and standards to guide the program. The industry skills and standards must be integrated with the Common Core and other academic standards.

Another important step is drafting a course sequence, including courses before and after students select their subsector pathway. This course sequence should, at minimum, include:

- Tentative course titles;
- Skills to be developed in each course;
- Potential formative and summative assessments, including those associated with credentials;
- Ideas for integration with core academic classes by topic, concept, or skill;
- Suggestions for work-based learning opportunities for each course or grade level;
- Anticipated space and equipment needs for instruction and work-based learning per course.

HIGH-QUALITY CTE CAREER PATHWAYS IN ACTION:
URBAN ASSEMBLY SCHOOL FOR EMERGENCY MANAGEMENT

The way in which industry themes and their subsector pathways evolved at UA School for Emergency Management (UASEM) illustrates the process of theme selection. After examining local and regional labor market data and interviewing industry professionals, the UA identified a marked need in the career field of emergency management. Emergency managers are calm under-pressure helpers who think on their feet and apply expertise with agility to changing circumstances, which is exactly what students learn to do at UASEM.

Within UASEM, the first school of its kind in the nation, there are three distinct pathways: (1) emergency management, (2) response and recovery, and (3) emergency technology and communications.

The development of these pathways was very much dependent on the presence of active, vibrant practitioner communities in NYC. The school has highly engaged industry partners, such as NYC's Office of Emergency Management, Federal Emergency Management Agency (FEMA), and the New York City Fire Department, along with strong college partnerships with Metropolitan College and Adelphi University.

2. CTE AND ACADEMIC CONTENT INTEGRATION

Core academic content such as mathematics and English language arts coupled with CTE knowledge and skills are essential for any student to be considered college and career ready. Historically, CTE knowledge and skills have been taught separately from academic coursework covered in non-CTE courses.[12] According to Luke Bauer, Principal at the Urban Assembly Maker Academy, "creating quality academic learning experiences for students in CTE programs is essential to ensure that students graduate from our schools being college and career ready in reading, writing, speaking, critical thinking, and problem solving."

Although the benefits of integrating CTE and academic content have been established and the practice of integration has been encouraged by the Perkins Act since 1990, barriers, further discussed in the "Challenges" section below, continue to prevent teachers from integrating both content areas in their respective curriculum.

Benefits of CTE and Academic Integration

Effectively integrating CTE and academic content begins with an examination of CTE curriculum in order to identify the academic content naturally occurring within it. Rather than forcing academic content into CTE, a contextualized approach calls for finding authentic opportunities to integrate academics into CTE using real world examples.

Making connections to industry themes within academic areas such as mathematics and social studies can increase students' motivation and enable them to make connections across their coursework. For example, a United States History lesson at the UA School for Global Commerce, which prepares students for careers in supply chain management and freight logistics, could investigate the increase in exports during World War II, while the math class could run the calculations of the leading economic indicators during that same time period.

In addition to integrating industry specific content, academic courses are also an excellent place to integrate "soft skills" desired by employers and internship supervisors. Teaching skills such as teamwork, communication, project management, and time management in academic and CTE courses is essential to preparing all students for college and career.

"Making connections to industry themes within academic areas such as mathematics and social studies can increase students' motivation and enable them to make connections across their coursework."

Several studies sponsored by the National Research Center for Career and Technical Education found that CTE courses including such "enhanced" academic instruction had significant positive impact on knowledge and skill acquisition. To support the integration of academic content into CTE instruction, the National Association of State Directors of Career and Technical Education Consortium (NASDCTEc) developed a series of resources and promising practices that help CTE teachers implement Common Core State Standards in their classrooms. For example, it is essential that UA students can read at or above grade level in order to avoid remediation in college and be prepared for the workforce. The UA provides literacy support in all content areas, with CTE teachers playing a key role in ensuring their students meet state literacy standards.

Strategies for Integration

Research conducted by the U.S. Department of Education on content integration in CTE established five core principles of academic integration:

1. Develop and sustain a community of practice among teachers.
2. Begin with the CTE curriculum, not the academic curriculum.
3. Understand that academics are essential to workplace knowledge and skills.
4. Maximize academics in the CTE curriculum.
5. Recognize that CTE teachers are teachers of academics *in* CTE, and not academic teachers.

Teachers and administrators must establish a community within the school so that academic and CTE teachers can work together to contextualize learning for students. Because CTE teachers are not academic teachers, they will need peer support from their colleagues in academic subjects such as English and mathematics.

It is also important to start with CTE teachers and integrate academics into their courses. Without academically rigorous CTE courses, students will be ill-prepared for the workplace and will struggle to acquire the knowledge and skills necessary for the industry-recognized assessment(s) they must take before graduating from the program.

Schools should also provide thorough professional development to CTE and academic teachers on effective instructional strategies while improving their pedagogical content knowledge. CTE teachers often lack the formal education of academic teachers, making integrating literacy and mathematics into their courses a challenge. Conversely, academic teachers lack the industry

experience that CTE teachers have, so ongoing professional development is essential to their work in the school.

Professional development opportunities like externships over the summer months and field trips to industry partners will enable academic teachers to gain a better idea of the industry theme at their school, which should translate into increased CTE content integration in their courses. UA devotes extensive support to its CTE schools to promote the effective integration of academic and CTE content using a team of instructional coaches. One coach is dedicated to each content area, including CTE, and providing strategies for instructional integration are essential to that support.

Challenges of CTE and Academic Integration

All of UA's seven CTE schools struggle with academic content integration into CTE courses. CTE teachers from specific industries in the UA network tend to lack the formal teacher training that academic teachers have completed, making the integration of rigorous academics a challenge. As a result, instructional coaches, administrators, and school leaders work with UA CTE teachers to help them obtain the knowledge and skills necessary to integrate academics in their lessons. This takes time and as a result, the quality of students' learning suffers while teachers work to develop their instructional strategies and improve their academic content knowledge.

Academic teachers experience similar challenges, each entering the profession with varied levels of knowledge regarding the career pathway(s) at their school. Similar to CTE teachers, it takes time for academic teachers to acquire the knowledge and skills necessary to integrate CTE into their courses. Both groups of teachers need structured and extensive professional development to establish a strong community where they can learn from one another and overcome the challenges of CTE and academic integration.

This work must be a priority for the school. The principal must establish systems and processes that allow CTE and academic teachers to work together and learn from one another. Cross-department grade team meetings, monthly professional development on multidisciplinary instructional strategies, co-taught (one CTE and one academic teacher) lessons/units/courses, and academic and CTE teacher peer observations and feedback are several strategies to effectively address the challenges of CTE and academic content integration.

3. INDUSTRY PARTNERS

Long before UA began creating CTE schools, the organization emphasized the meaningful involvement of external partners at high schools. While non-CTE schools benefit from the involvement of outsiders, CTE programs not only benefit, they simply cannot exist without such external partnerships.

The central premise of CTE is that education must include rigorous academic content, which prepares students for college, alongside meaningful technical skills and knowledge, which prepares them for a career. CTE involves the collaboration between educators providing academic expertise and employers who understand career competencies, but are less versed in pedagogy. A CTE program's success hinges on the continued presence of both players.

Industry Partner Engagement

A CTE school's industry partners possess content knowledge and experience in the school's focus industry, which informs the school team on how to best structure a comprehensive, four-year educational experience that prepares students for the industry's most promising careers.

Industry partners understand that the school is beholden to the imperatives and requirements of a sound general secondary education. They defer to the principal on the school's overarching instructional vision, while seeking creative and meaningful ways to integrate industry skills and standards with those of

traditional high school academic disciplines. Partners' work includes, but is not limited to the following categories:

- Strong influence over CTE scope and course sequence.

- Advisement on an industry credential that serves as the terminus or central focus of the CTE course sequence.

- Support in the creation of career advisement practices and work options and opportunities for graduates.

- Guidance and support in procuring adequate technology, supplies, and resources needed to train students.

- Direct engagement with students through events, activities, student awards, and scholarships as able and interested.

- Teaching in schools and working with students on projects and career guidance.

A recent graduate of The Urban Assembly Gateway School for Technology, Venitia Boyce participated in a series of work based learning opportunities in the technology field. According to Venitia, "After some great experiences with AT&T and Goldman Sachs, I chose information technology as my CTE pathway of choice and currently have several hardware and software certifications that guarantee me an entry-level job in my field." While Ventia is attending college full-time in the fall, her experiences with industry partners informed her pathway selection and helped prepare her for an entry-level job after high school. She is ready to succeed in college and a career and there is no doubt that the A+ and Net+ certifications she obtained in high school will be an asset as she enters college and the workforce.

The Benefit to Partners

Employers have the potential to benefit significantly from this type of collaboration. In particular, two factors have proven most effective in attracting and retaining strong employer involvement in UA CTE programs: (1) from the employer side, an articulated sense of the labor market needs and clear evidence that the CTE program can effectively meet that need, and (2) from the educator side, a coherent vision for employer engagement along with a demonstrated capacity at the school to maximize the partners' input through well-organized, mission-driven collaboration. Gathering employer input prior to selecting and implementing an industry theme increases the chances that employers will be strong partners in implementing a program they helped conceive.

Advisory Boards: An Organizing Framework for Partnership

Schools and companies often approach CTE learning with disparate goals, demands, and immediate priorities. That is why creating an advisory board of industry leaders and educators is critical to bridging the gap between priorities and establishing a common ground for communication and collaboration.

Boards that serve UA CTE schools are effective because our approach has been to treat them as any other professional board. For example, the UA collaborates with in-school leaders to help them develop the skills and habits of mind needed to work substantively with a formal board over time. As with any other board, systems and structures that clarify how collaboration will work are essential and board members are encouraged to take ownership of and guide projects and initiatives, the end product of which remains ultimately at the school's discretion to implement. For example, board members are instrumental in a range of areas such as consulting on course offerings, identifying the knowledge and skills taught in industry-related courses, providing internship placements for students, hiring students upon graduation, and making professional connections between the school and their colleagues in industry.

Challenges to Industry Partnership

Operational and cultural challenges are inevitable in the process of recruiting and engaging industry partners. Some of the challenges experienced at UA CTE programs include:

- An insufficient number of industry partners or opportunities (particularly internships) created through partnerships.
- Partners are often unfamiliar with the ways in which schools operate and the realities present within today's high schools.
- Teacher and leader preparation programs often fail to cover the value of partners and how best to engage them.
- Industry themes and assessments recognized by the state do not always reflect the realities of the workplace, especially in emerging industries.

The UA has found that articulating needs and goals clearly to industry partners and clarifying the benefits derived from partnerships helps resolve many of these issues. Advisory boards, as detailed above, also prove to be an invaluable resource in mitigating such challenges.

4. POST-SECONDARY EDUCATION PARTNERS

Programs of Study (POS), a new aspect of CTE established in the Perkins Act of 2006, aligns academic standards and career and technical content through a non-duplicative progression of courses that bridge secondary and post-secondary institutions. These programs often include opportunities for students to participate in dual or concurrent enrollment programs with the chance to receive college credits while in high school. The end goal of any POS is to obtain an industry-recognized certificate or credential at the post-secondary level or an associate's or bachelor's degree.[16]

Students receive certifications or credentials at the secondary level; however, the goal is to continue education into a post-secondary institution to receive more advanced certifications, credentials, or a degree. The integrated academic and CTE curriculum that connects secondary and post-secondary institutions has contributed to the college and career readiness of participating students.

Elements of Programs of Study

We recommend a POS have the following key features in order to best serve CTE students:

- **Readiness standards:** National college and career readiness standards should establish fundamental capabilities students must possess before entering college or a career.

- **Instructional strategies:** Promising practices that build academic knowledge and essential 21st century skills.

- **Industry partners:** Relationships with external industry partners to ensure that up-to-date industry knowledge and skills are taught within the program.

- **Professional development**: Structured learning opportunities for administrators, teachers, and faculty in order to establish the POS as a school-wide initiative.

- **Evaluation system:** An evaluation system that gathers data on student outcomes while in school and also follows graduates into the workplace and/or college to help track and measure progress and program efficacy.

- **Non-duplicative course sequences:** Creating course sequences across secondary and post-secondary schools with the goal of ensuring a smooth transition to college.

- **Memorandum of Understanding** (MOU): To enable students to receive college credit while in high school upon completion of particular established secondary and post-secondary courses.

- **Academic advisement:** Guidance and support to help students make informed decisions about which POS they should choose.

- **Industry assessments:** Established modes of assessment to determine whether students have obtained the knowledge and skills necessary for entry or advancement in college and career.

Challenges of Programs of Study

One major challenge of designing and implementing POS is the potential for cultural or mission misalignments between secondary and post-secondary partners.[17] Close collaboration between high schools and colleges is essential in order to design and implement an effective POS; however, communication between faculty and staff at each institution can be challenging. Secondary and post-secondary institutions have enough trouble breaking down silos within their own campuses, which makes collaboration outside of campus all the more challenging.

Of our recommended nine elements of POS, three (partnerships, course sequences, and MOUs) require extensive collaboration between secondary and post-secondary institutions. In the case of partnerships, representatives from the high school and institution of higher education need to work together to design, implement, and maintain the POS. In order to design non-duplicative sequences of courses that bridge high school and college, teachers and faculty must work together to plan courses and establish the knowledge and skills each course is designed to provide.

In order for high school students to gain post-secondary credit through articulated courses, it is essential for staff and administration to collaborate in order to establish credit transfer agreements. The process of students taking articulated courses is mutually beneficial to secondary and post-secondary institutions. High school students receive early college experiences and credit, while colleges and universities are given the opportunity to recruit potential students by providing positive learning experiences and offering articulated credits. Collaboration is essential to all of these POS features and can be a major challenge, particularly for high schools that often lack the staff to establish and maintain such collaborative efforts.

Another challenge of POS is the potential for misalignment between secondary and post-secondary coursework. While this challenge is a direct result of poor collaboration, a misalignment of coursework can cause a difficult transition for college-bound students.

Teacher and faculty turnover is also an inevitable challenge. With each new instructor, comes the potential for altered course material. If a POS and course sequence is established by a group of high school teachers and college faculty, there is potential for misalignment whenever those positions turnover. Creating a standardized set of promising practices decreases the chances of miscommunication and can help smooth the transition process.

URBAN ASSEMBLY SCHOOL FOR GLOBAL COMMERCE & ARIZONA STATE UNIVERSITY

After participating in work-based learning opportunities with the **NYC Economic Development Corporation**, the **Port Authority of New York & New Jersey**, and **CSX**, three students from **Urban Assembly School for Global Commerce (UASGC)** were selected to engage with the school's most active post-secondary partner, **Arizona State University (ASU)**.

UASGC's pathways focus on logistics and supply chain management, making **ASU's** department of supply chain management in the **W.P. Carey School of Business** an invaluable partner. Despite the geographic distance, both institutions have not allowed the **2,400 miles** separating them to inhibit meaningful engagement. **ASU** faculty have visited East Harlem to work with students and recently, students visited the university campus to work with **ASU** faculty and students.

In a project funded by **ASU**, three rising **UASGC** high school juniors lived in **ASU** dorms and spent five days with faculty, students, and alumni from the **Carey School of Business**. While on campus, **UASGC** students participated in a series of activities and meetings that involved project-based learning, community service, business etiquette, and peer mentoring.

5. WORK-BASED LEARNING

Work-based learning (WBL) is a strategy that schools implement to help students apply academic and technical skills while developing real-world employability skills. Often coordinated with school-based learning, WBL experiences offer project- and problem-focused teaching and learning as opposed to the more theoretical teaching and learning that takes place in traditional classrooms. WBL opportunities range from job shadowing with limited workplace interaction to apprenticeships and paid internships that have extensive workplace experience.

WBL has always been a cornerstone of effective CTE programs. Over the past several decades, various efforts have been made to bring WBL into education reform in an effort to better prepare students for college and the workplace. In particular, scholarship in the field, including *Pathways to Prosperity: Meeting the Challenge of Preparing Young Americans for the 21st[18] Century* and *Learning for Jobs*[19] have made the claim that a traditional classroom-based educational experience does not adequately prepare secondary students for college and careers.

WBL has become a requirement for CTE program approval in many districts and states across the country; however, each state differs in what qualifies as a WBL experience. Essentially, WBL falls into two categories; (1) career exploration programs, and (2) work experience programs. Career exploration programs include career fairs, industry professional guest speakers, industry-based field trips, and job shadowing. Work experience programs include paid and unpaid internships, apprenticeships, and school-based enterprises.

Both categories of WBL offer valuable hands-on experience to students, but each must be undertaken strategically in order to ensure students reap the greatest benefits. Career exploration programs should start as early as possible during the 9th grade and continue through the 11th grade. Work experience programs can start as early as the 10th grade, but should be available to all students by the 12th grade. It is essential to WBL that these opportunities increase in frequency and intensity throughout a student's high school career.

Essential Components of WBL

The cooperation and coordination among academic teachers, CTE teachers, WBL coordinators, and school administration is necessary to implement essential elements of WBL. Continuous professional development needs to be provided to the entire faculty, as well as industry-based supervisors, in order to maximize the benefits of WBL for students.

Several national and international studies have investigated the components of WBL that provide meaningful learning opportunities for students.[20] According to the research and experiences at UA CTE schools, below are seven essential components of WBL implementation:

- **Connection:** Students must be aware of the connection between WBL and specific coursework.

- **Reflection:** Students are given the opportunity to reflect on their learning.

- **Final project/assessment:** WBL culminates with a project, activity, or assessment that demonstrates learning.

- **Off-campus time:** Schools allow time in the schedule for students to leave campus for WBL activities.

"When WBL is mutually beneficial to all parties, it is far more likely that the collaboration will continue into the foreseeable future."

- **Student-employer liaisons:** A dedicated WBL staff member matches students with employers.
- **Guidance and supervision:** Students receive close supervision from teachers, coordinators, and workplace supervisors.
- **Employer support:** Support is provided to employer supervisors so that they are aware of WBL expectations and ways to assess student learning.

Benefits of WBL

If implemented effectively, WBL can provide benefits to both students and employers. While schools should be focused on the student experience, often they do not pay enough attention to the potential impacts WBL has on employers. As a result, schools run the risk of losing valuable industry partners if they come away with a negative experience or should the potential of the relationship not be fully realized.

For students, the benefits are often quite apparent. WBL enables students to apply school-based learning in a workplace setting, explore career options, and increases their awareness of post-secondary options. It also promotes positive work habits and increases student motivation by making school more relevant. Lastly, WBL provides students with the invaluable opportunity to network with professionals and enhances their workplace competencies, such as communication, collaboration, creativity, and technical skills.

As Rob Magliaro, Assistant Principal at Urban Assembly School for Emergency Management, stated: "We try to create experiences where students can interact with business partners in the real work and help solve real problems faced in the industry." Those real-world experiences provide students with opportunities to develop and sharpen their critical thinking, problem solving, and communication skills.

The benefits to employers are also substantial and articulating them is important for maintaining strong and effective WBL relationships with external industry partners. When WBL is mutually beneficial to all parties, it is far more likely that the collaboration will continue into the foreseeable future.

WBL gives employers the unique opportunity to be involved in planning and implementing CTE curricula and improves a company's connections with parents, students, and teachers. Work-based learning programs also create opportunities for community service and the development of workplace mentors. Lastly, WBL creates an invaluable pipeline, providing employers with access to potential skilled employees who can be trained and engaged while still in high school.

Challenges of WBL

Designing and implementing WBL learning can be challenging given that schools have historically limited opportunities for students to connect work-based experiences back to their school-based learning. Challenges that CTE schools across the country have experienced include finding the time, supervision, and financial resources to make these experiences a reality.

CTE schools are faced with the challenge of designing both the school day and year to include designated time when students can participate in WBL and time for teachers and staff to supervise those experiences both inside and outside the school building.

Schools also have the challenge of finding industry partners to participate in WBL and then developing and maintaining those relationships. Supporting teachers and employer mentors to work closely with WBL coordinators is another challenge, as is finding funding to provide WBL coordinators with adequate support and resources for each project.

HIGH-QUALITY CTE WORK-BASED LEARNING IN ACTION:
URBAN ASSEMBLY NEW YORK HARBOR SCHOOL

Students from the Urban Assembly New York Harbor School (Harbor School) benefit from engaged industry partners throughout their four years of school. Students participate in a four-year sequence of WBL experiences that connect them with industry partners such as the Department of Environmental Protection, South Street Seaport, Waterkeeper Alliance, Sandy Hook Pilots, and the US Environmental Protection Agency.

One intensive and on-going WBL opportunity that students participate in throughout their time at Harbor School is the Billion Oyster Project, an ecosystem restoration project aimed at restoring one billion live oysters to New York Harbor. With the support of several industry and non-profit partners, students learn to build and operate oyster nurseries, raise oyster larvae, SCUBA dive in order to place the oysters in oyster beds, operate and maintain boating vessels, design underwater monitoring equipment, and conduct research on the impact of the project. Students learn academic and technical knowledge and skills in the CTE classroom and have the opportunity to put their expertise into practice while helping restore the natural ecosystem of New York City.

6. EFFECTIVE COUNSELING

In CTE high schools, effective counseling prepares students for both college and career pathways. This type of student advising requires deeper expertise than that of an advisor strictly focused on college. In a college preparatory environment, advising is often dedicated to those students attending college while non-college students are largely ignored. In the case of the CTE, all students must be college and career ready and have a post-secondary plan that might include a combination of work and continued education. Even students who directly enter the workforce should have a post-secondary educational plan in order to continue developing professionally.

While college counseling has been a standard practice in secondary schools, career guidance remains the missing link in CTE schools. Many feel that identifying a career in high school is too early, creating potential for students to make an uninformed career decision. The need for students to feel supported and well informed about their post-secondary options—whether that means making career choices or continuing their education—is invaluable.

College and career counseling is challenging, mainly due to the high caseloads for counselors. In 2012, the average caseload per counselor in the United States was 367 students.[22] Counselors' lack of expertise is another significant hurdle. Many counselor preparation programs do not include career guidance within their curricula.

We recommend a CTE school's post-secondary advising relationship with students begin in the recruitment period. When first approaching prospective students, the school's job is to explain its industry theme with enough detail so students understand each potential career path. Once students are enrolled, the school must support them as they investigate and experience early college and career opportunities.

Distributed Counseling

A counselor with expertise in post-secondary preparation, including both college and career, should lead this effort. Directed by the vision of the school leader, this counselor

> "The need for students to feel supported and well informed about their post-secondary options — whether that means making career choices or continuing their education — is invaluable."

not only determines the nature of the school's counseling with students and families (conducting much of the counseling personally) and also provides teachers with the college and career resources they need.

Having a counselor who understands both paths is critical to a successful college and career counseling program. The counselor should be well-versed in college admissions criteria and in what makes a campus a good fit, while also having an understanding of companies' hiring criteria and what makes a strong workplace fit.

Finding a professional with experience in both college and career counseling particular to the school's industry theme is a challenge. A more likely scenario would be to hire a counselor with knowledge and experience in colleges or career and facilitate targeted professional development for the counselor in any area of expertise needed to better support students. For example, the majority of UA counselors in CTE schools have expertise in college counseling, but their understanding of career counseling often gets acquired on the job and with the help of industry partners.

In addition to counselor-led college and career advising at a school, all teachers and staff must participate to establish a whole-school approach. The concept of distributed counseling acknowledges the role that all staff members have in the process. According to the National Center for Restructuring Education, Schools, and Teaching at Columbia University[23], distributed counseling requires the following components:

- Team collaboration and integration of counseling strategies;
- A dedicated counselor integrated into the team;
- Teachers as advisers;
- Student-support mechanisms;
- Consistent communication with parents;
- College preparation throughout all four years of high school.

The Urban Assembly School for Global Commerce (UASGC) recently developed a College and Career Center, which is led by a designated college and career counselor. The college and career office is designed as a resource for students and families to explore potential post-secondary opportunities and receive counseling on strategies to meet their college and career goals. The center also provides leadership within the school to ensure a viable approach to college and career readiness.

While led by the college and career counselor, the guidance provided at UASGC is truly a school-wide effort. Academic and CTE teachers provide ongoing counseling through the school's advisory curriculum, while the counselor directs early college awareness, the development of students' college and career plans, and the process for applying to potential colleges and jobs. The distributed counseling approach requires continuous professional development and a commitment from the teachers and staff at UASGC.

7. TEACHER RECRUITMENT, SUPPORT, & RETENTION STRATEGIES

CTE teachers come to school with a different set of skills and experiences than traditional academic teachers. For example, secondary CTE teachers are less likely to have a bachelor's or master's degree than colleagues in academic content areas. CTE teachers are also less likely to hold a regular state certification and often enter the profession through an alternative certification process as compared to their counterparts in academic fields.

While CTE teachers have other forms of preparation and qualification, including work experience and industry certifications, their lack of traditional teaching preparation is the primary reason it is essential to have systems in place to help recruit, support, and retain CTE teachers.

CTE Teacher Recruitment

Ideally an applicant for a vacant CTE teaching position would have a combination of work experience, teaching experience, and education that would enable him/her to quickly be an effective teacher. Unfortunately, such candidates are hard to find. Given that recruiting candidates with a combination of work, teaching, and education experience is challenging, we take two approaches to CTE teacher recruitment.

The first approach is to seek out someone with excellent work experience and an educational credential that at minimum includes a two-year degree or more. Some CTE teachers enter the profession with all the qualifications for teacher licensure; however, many enter the profession under a provisional or temporary teaching license that provides them with time (usually between one and three years) to fulfill additional certification requirements such as coursework and passing teacher certification tests.

At UA's CTE schools, those teacher candidates who are not certified must be able to obtain certification within two years of accepting the position. Principals and school systems must review each candidate's prior work experience and level of education to determine whether that person can complete the certification requirements within the allotted time before the provisional license expires.

The second approach is to take a certified academic teacher with interest in CTE and support that person as he/she obtains the proper work experience and/or content courses needed for certification.

Both approaches have their challenges, but at the end of the day, it's important to find a promising candidate with a commitment to the profession of teaching. Without that commitment, we have seen candidates from industry leave after a few days, weeks, or months due to the challenges they face in the classroom.

"Ideally an applicant for a vacant CTE teaching position would have a combination of work experience, teaching experience, and education that would enable him/her to quickly be an effective teacher."

CTE Teacher Support and Retention

Once a promising teacher candidate has been identified and brought on board, supporting and retaining that teacher is critical, especially considering how difficult it is to recruit CTE teachers.

The prior work and educational experiences of CTE teachers should dictate the focus of the support that schools, districts, and networks provide. For example, the UA New York Harbor School has found success by recruiting academic teachers to teach CTE courses under a transitional certificate while they work to get their CTE teacher certification. For these teachers, support in pedagogy is not as necessary as help attaining advanced understanding of the industry they are preparing students to enter. Providing summer externships for these teachers is essential along with having them work with industry partners to gain a better understanding of the field.

In the case of CTE teachers with substantial work experience and little to no teacher preparation or teaching experience, support in pedagogy and pedagogical content knowledge is essential. These teachers should rely on teacher leaders, school administrators, and instructional support to learn how to best relay their years of industry expertise to students.

Challenges to CTE Teacher Recruitment and Retention

CTE teachers are more likely than academic teachers to engage in professional development, with 58 percent reporting 17 hours or more of professional development as compared to 52 percent of academic teachers.[26] Nonetheless, finding the time and resources to provide high-quality professional development can be difficult.

One challenge to recruiting and retaining CTE teachers from industry is the salary dedicated to teachers and the resources spent on supporting programs. Depending on the industry, career changers can experience significant pay cuts when entering teaching.

Furthermore, CTE teachers often lack the specialized equipment they may have used when working in the field and may find themselves faced with outdated textbooks and teaching resources. Schools and districts must provide the funds necessary to support CTE programs with the technology and resources necessary to retain high quality teachers.

HIGH-QUALITY CTE TEACHER RECRUITMENT, SUPPORT & RETENTION IN ACTION:
SUCCESS VIA APPRENTICESHIP AT UA GATEWAY SCHOOL FOR TECHNOLOGY

Success Via Apprenticeship (SVA) is a collaborative program between New York City College of Technology, the New York City Department of Education, and the United Federation of Teachers, that addresses the shortage of certified CTE teachers in the city. The UA Gateway School for Technology has gotten some of their most promising CTE teachers from SVA along with pre-service teachers completing their clinical experiences.

SVA recruits outstanding NYC high school students, many of whom received a CTE endorsement on their diploma, and provides them with college-level coursework, student teaching experiences, and industry work experience over a five-year period. Graduates of SVA leave the program with all the requirements to be a certified CTE teacher and are contractually obligated to teach in a New York City public school for three years after graduation.

Once SVA graduates begin teaching full-time at UA Gateway School for Technology, they receive intensive and on-going support from an instructional coach from UA. The instructional coach supports SVA graduates as they develop and implement lesson plans, unit plans, and assessments.

Conclusion and Policy Recommendations

The seven essential elements—career pathways; academic and content integration; industry partners; post-secondary education partners; work-based learning; effective counseling; and teacher recruitment, support, and retention—are extremely powerful. Not only do these strategies improve students' college and career readiness; they also benefit CTE educators and partners in industry and post-secondary institutions.

In our experience, the essential elements can be implemented at little to no additional financial cost to CTE schools, but that does not mean these elements are easy to put into practice: implementation requires excellent teachers and staff and purposeful collaboration. All stakeholders—school leaders and staff, industry partners, post-secondary partners, school districts, non-profit partners, and students—must cultivate and demonstrate a strong commitment to the mission and goals of their school and students.

School leaders must believe and invest in CTE. They must recruit students, teachers, industry partners, and post-secondary partners who share their passion and commitment. Non-profit partners (such as UA) must commit to supporting CTE programs and schools, while also promoting promising practices. School district leaders must recognize that CTE programs and schools have different needs than comprehensive high schools. They must make the financial commitment to provide CTE programs and schools with the funding and support they need to succeed.

While a strong school-level commitment to career and technical education is critical for the success of these programs, it is not enough to ensure CTE success. The state and local policy environment must also support the creation and ongoing maintenance of CTE schools and programs.

In conclusion, we propose three policy recommendations that would help CTE schools and programs better serve students and communities:

- **States and districts must ensure that CTE schools and programs receive the funding they need to provide a state-of-the-art technical education.** Federal Perkins grants are not sufficient to support CTE. For example, most CTE programs in New York City received less than $30,000 in Perkins dollars in 2014. Given the specific needs and demands of these programs, CTE schools must be supplemented by the district and state.

- **States must provide flexibility in teacher certifications so that industry experience and education qualifications are both valued.** The best CTE teachers are experts in particular industries, but often this doesn't help them gain certifications. In New York State, for example, there are 16 general content areas for CTE teacher certification. One of these areas is a "unique and emerging occupations" category, but the state often denies requests for teachers to be certified under this category. States should update their antiquated list of content areas to reduce barriers to entry.

- **States and districts should create rigorous but appropriate graduation requirements for CTE students.** Often CTE students have *higher* requirements than other students, and sometimes states' efforts to adjust requirements are not properly implemented. For example, the New York Board of Regents approved the Multiple Pathways to Graduation, which enables students to replace one of the five required Regents Exams necessary for graduation with a technical assessment. As of Spring 2015, when the policy first went into effect, the state had acknowledged 158 technical assessments, but had only approved 14 technical assessments to meet the graduation requirement. That leaves hundreds of CTE programs across New York without an approved assessment associated with their career pathway. Therefore the new policy, while well intentioned, does not affect most CTE students.

The Urban Assembly's commitment to career and technical education is rooted in a passion for giving students' options and opportunities and a belief that educators, communities, and industry will benefit from strong CTE programs. We believe CTE collaboration at the local, state, and national levels, will not only make the high school experience more valuable, but will help America meet growing market needs and ensure our students are prepared for success both in college and throughout their careers.

Notes

1. Duke's Fuqua School of Business (2015). CFO Magazine Business Outlook Results for 510 U.S. firms (own-firm changes expected during the next 12 months). Retrieved from http://www.cfosurvey.org/2015q3/Q3-2015-US-KeyNumbers.pdf

2. Carl D. Perkins Career and Technical Education Improvement Act of 2006, § 3, 20 USC § 2301 (2006). Retrieved from http://www.gpo.gov/fdsys/pkg/BILLS-109s250enr/pdf/BILLS-109s250enr.pdf

3. Mitkos, Y., & Bragg, D. (2008). School counselors' perceptions of the community college of high school counselors and advisors. *Community College of Journal of Research and Practice,* 32(4), 373-390.

4. Gordon, H. (2014). *The history and growth of career and technical education in America* (4th ed.). Long Grove, IL: Waveland Press.

5. Duncan, A. (2011). *The New CTE: Secretary Duncan's Remarks on Career and Technical Education*. U.S. Department of Education. Retrieved from http://www.ed.gov/news/speeches/new-cte-secretary-duncans-remarks-career-and-technical-education

6. Obama, M. (2015, June). *Celebrating innovations in career and technical education.* Speech presented at the White House, Washington, DC.

7. Glancy, E., Fulton, M., Anderson, L., Dounay Zinth, J., Millard, M., & Delander, B. (2014). *Blueprint for College Readiness.* Denver, CO: Education Commission of the States.

8. Carnevale, A. P., Smith, N., & Strohl, J. (2013). Recovery: Job growth and education requirements through 2020.

9. U.S. Department of Education. (2014). *National assessment of career and technical education: Final report to congress*. U.S. Department of Education. Retrieved from http://www2.ed.gov/rschstat/eval/sectech/nacte/career-technical-education/final-report.pdf

10. Holzer, H., Linn, D., & Monthey, W. (2013). The promise of high-quality career and technical education: Improving outcomes for students, firms, and the economy. Washington, DC: The College Board and the Georgetown Law Center on Poverty, Inequality, and Public Policy.

11. See http://ctenyc.splashthat.com/

12. Gordon, H. (2014). *The history and growth of career and technical education in America* (4th ed.). Long Grove, IL: Waveland Press.

13. Stone, J. R., III, Alfred, C., Pearson, D., Lewis, M. V., Jensen, S. (2006). *Building academic skills in context: Testing the value of enhanced math learning in CTE.* St. Paul, MN. National Research Center for Career and Technical Education, University of Minnesota.

14. Stone, J. R., III, Alfred, C., Pearson, D., Lewis, M. V., Jensen, S. (2006). *Building academic skills in context: Testing the value of enhanced math learning in CTE.* St. Paul, MN. National Research Center for Career and Technical Education, University of Minnesota.; Park, T.D., Santamaria, L.A., van der Mandele, L., Keene, B.L., & Taylor, M.K. (2010). *Authentic literacy in career and technical education: Technical appendices to the spring 2009 pilot study.* Louisville, KY: National Research Center for Career and Technical Education, University of Louisville.

15. Stone, J. R., III, Alfred, C., Pearson, D., Lewis, M. V., Jensen, S. (2006). *Building academic skills in context: Testing the value of enhanced math learning in CTE.* St. Paul, MN. National research Center for Career and Technical Education, University of Minnesota.

16. Carl D. Perkins Career and Technical Education Improvement Act of 2006, § 3, 20 USC § 2301 (2006). Retrieved from http://www.gpo.gov/fdsys/pkg/BILLS-109s250enr/pdf/BILLS-109s250enr.pdf

17. Shumer, R., & Digby, C. (2012). The future of CTE: Programs of study. *Techniques*, 87(1), 36-39.

18. Symonds W. C., Schwartz R. B., & Ferguson R. (2011). *Pathways to prosperity: Meeting the challenge of preparing young Americans for the 21st century*. Cambridge, MA: Pathways to Prosperity Project, Harvard University Graduate School of Education.

19. Field, S., Hoeckel, K., Kis, V., & Kuczera, M. (2009). Learning for jobs: OECD policy review of vocational education and training. Paris: Organisation for Economic Co-operation and Development.

20. Alfeld, C., Charner, I., Johnson, L., & Watts, E. (2013, February). *Work-based learning opportunities for high school students.* Louisville, KY: National Research Center for Career and Technical Education, University of Louisville.; Darche, S., Nayar, N., & Bracco, K. R. (2009). Work-Based Learning in California: Opportunities and Models for Expansion. San Francisco, CA: James Irvine Foundation.; Hoffman, N. (2011). Schooling in the workplace: How six of the world's best vocational education systems prepare young people for jobs and life. Cambridge, MA: Harvard Education Press.

21. Stone, J. R., III, & Lewis, M. (2012). *College and career ready in the 21st century: Making high school matter.* New York, NY: Teachers College Press.

22. College Board Advocacy and Policy Center (2012). *The College Board 2012 National survey of school counselors and administrators. Report on survey findings: Barriers and supports to school counselor success.* New York: College Board.

23. Allen, D., Nichols, P., Tocci, C., Hochman, D., & Gross, K. (2006). Supporting Students' Success through Distributed Counseling: A Core Principle for Small Schools. *National Center for Restructuring Education, Schools and Teaching*.

24. U.S. Department of Education. (2014). *National assessment of career and technical education: Final report to congress*. U.S. Department of Education. Retrieved from http://www2.ed.gov/rschstat/eval/sectech/nacte/career-technical-education/final-report.pdf

25. Zirkle, C., Martin, L., & McCaslin, N.L. (2007). *Study of the State Certification/Licensure Requirements for Secondary Career and Technical Education Teachers.* St. Paul, MN: National Center for Research for Career and Technical Education, University of Minnesota.

26. U.S. Department of Education. (2014). *National assessment of career and technical education: Final report to congress*. U.S. Department of Education. Retrieved from http://www2.ed.gov/rschstat/eval/sectech/nacte/career-technical-education/final-report.pdf

ACKNOWLEDGEMENTS