Developing a Model for Industry Engagement at the New York City Department of Education: A Report for the New York City Department of Education’s Office of Career and Technical Education

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The NYC CTE Capstone Team
May 2015
2 Executive Summary

Our objective was to identify ways to strengthen interest and engagement in Career and Technical Education (CTE) programs of the New York City Department of Education (DOE). Our scope of study included consideration of both the demand (student and parent interest) and the supply (industry partners) sides of the equation. DOE’s research over the years has shown that CTE high schools have a 20 percent point higher graduation rate than non-CTE high schools. Given that the value of a CTE education is not well understood by parents and students, there is an opportunity to better communicate the educational enhancements offered by CTE programs to students and parents across the five boroughs.

In order to gain a holistic perspective, we mapped and reached out to the various stakeholders for the CTE project. This included interviewing and/or surveying industry engagement coordinators, high school principals, assistant principals, middle school counselors, CTE alums and DOE staff members. This feedback informed our insights and became the foundation for our recommendations.

We also reached out to individuals in other states and other organizations running similar CTE programs to understand the best practices outside the DOE network. Some of our interviewees included CTE high school teachers and industry coordinators in Chicago, individuals from Pearson’s CTE program and Columbia University professors specializing in NYC urban policy. Secondary research was also conducted on best practices in California, Boston, Germany and Sweden.

A key obstacle we had to tackle was to work with outdated data systems. Most existing research and data were from the 2000s, with no nationally unified data system. In fact, the definition and meaning of CTE is also not standardized across the nation. Further, our data collection process was severely hampered due to the long delay in getting Institutional Review Board (IRB) approval. With a restricted time frame, it was difficult to secure interviews, especially with middle school counselors. Not having the permission to interview the direct beneficiaries, students and their parents, further limited the relevance of the information collected.
Based on our research, we identified key insights, which cut across stakeholder groups. They shed light on opportunities to embolden positive student and industry engagement within CTE programs. CTE has reflects notable strengths: including a highly relevant curriculum and happy alumni. However, the value-proposition of a CTE education remains murky to students, parents, and guidance counselors. An enhanced focus on alignment of expectations between key stakeholder groups would yield large dividends, specifically:

- Industry and the Department of Education;
- Parents, students and schools
- Schools and the Department of Education

We have identified several key insights for strengthening future engagement strategies. These reflect new opportunities for DOE policy, practice, and marketing approaches; most were rooted in the adjustment and management of stakeholder perceptions of each other:

1. Funding and human capital constraints;
2. Alignment between industry and DOE;
3. Pre-high school student understanding of CTE;
4. Student exposure to selected trades;
5. Teacher professional development;
6. Parent-student generation gap;
7. Lack of systemic understanding as to how CTE fits into a broader educational plan for students and parents;
3 The Scope of Our Engagement

CTE programs are rapidly gaining national recognition both as an important contributor to 21st century education, but also as crucial innovator helping to bridge the gap between needed skillsets and quality jobs. Outdated perceptions are slowly crumbling as a growing pool of research reveals the relationship between CTE and positive student outcomes both in terms of academic and career success. Our objective for the project was to identify ways to strengthen DOE’s CTE initiative in New York City with a focus on its marketing and communications strategy. Specifically, we aimed to determine the most effective strategies to strengthen partnerships among the DOE, NYC high schools and CTE industry partners; to enhance the recruitment of interested students in the CTE program; and to expand and to deepen industry engagement.

We were required to interview the various stakeholders within New York City and also provide insights on the best practices being used elsewhere in the country or internationally. We identified the following stakeholders as key to our analysis:

Figure 1: Stakeholder Map
We aimed to understand the perspectives of each of these mapped stakeholder groups to better evaluate effectiveness. Our understanding took shape as we heard from CTE alums, parents, industry coordinators, principals and assistant principals. Through these conversations, we arrived at an understanding of the perspective and priorities of each group. It should be said that the depth of our research was constrained by protocols on who we could directly contact.
4 Methodology

Our methodology for this project contained 4 key steps: performing background research, conducting primary research, analyzing and making recommendations.

4.1 Background research

We began with a literature review of the CTE history in the United States to gain an understanding of the context in which CTE has evolved. This was coupled with a literature review of the CTE program in New York City. Understanding how the program has evolved and where it currently stands allowed us to glean an understanding of the inherent strengths and weaknesses of the program such as the vision, team capabilities, funding limitations.

We next went on to perform a literature review of CTE programs in other cities in the United States. This helped us with the performance of comparative analysis and understanding the best practices adopted in other places that could be brought into New York City. This piece was highly useful in providing us insights into creative strategies as well as implementation tactics adopted by cities. It enabled us to set benchmarks for DOE to follow.

We then interviewed leaders of Pearson's Career Development and Technical Education Unit to apply useful findings from their marketing and outreach to that of the New York City Department of Education.

4.2 Primary Research

After completing the background research, we surveyed and interviewed the various stakeholders in New York. Specifically we reached out to alumni of the program, school administrators, industry coordinators, industry partners, DOE employees, NYC government experts, academics and education companies like Pearson.

The focus of our research was to understand from the different stakeholders’ perspectives what about the program worked well for them and the areas that needed
further attention. Approaching the topic as third-party observers, we were able to gain critical feedback that informed our analysis.

4.3 Analysis and Recommendation
To identify the key trends and challenges that DOE should focus on, we focused on identifying crosscutting themes shared by multiple stakeholders including the DOE staff. We then compared these with what was being done in other cities to identify effective solutions. What we present in the remaining sections of this report is a synthesis of our findings and effective and easily implementable recommendations for DOE.
5 Best Practices from Other Cities

Across the nation, cities and states are experimenting with different approaches to training students for the expected growth in vocational opportunities.

5.1 Domestic

Turning first to Chicago, the number of industry certifications earned by CTE students in the Windy City nearly tripled between AY 2008-09 and AY 2009-10. Chicago students who had achieved fewer than 1,000 certifications could claim nearly 2,800 by June 2010\(^1\). We found two notable features of the city's approach to CTE programs: one, effective partnership management by outsourcing management of industry partnership to outside companies. Two: the appointment of specific liaisons as point of contacts for each industry track.

Chicago measured and effectively communicated the increased academic returns of CTE:

*Academic Returns to CTE Programs in Chicago (2009):*

- 1 CTE Course increases overall graduation rate 15% \(\rightarrow\) GPA +. 12
- 2 in the same academic program = increase of 20% \(\rightarrow\) GPA +. 20
- 3 CTE courses in the same program = Increase of 28% \(\rightarrow\) GPA +. 30\(^2\)

These findings highlight a point made by a New York City Industry Commission Chair: one essential feature of an extremely successful CTE program was a clear narrative which explained to students and parents how CTE worked as a *system*. What comes before and after the CTE piece should be clearly defined with linkages, which connect one step to the next as part of a larger roadmap. CTE wasn't a nice-to-have after-thought; rather it


\(^2\) Ibid
reflected a distinctive approach to education with the requisite administrative commitment that it represents.

Boston’s experience further highlights the importance CTE: More than 50 percent of vocational and technical education (VTE) high school graduates pursue postsecondary education. The benefits appear particularly pronounced for learners with alternative-learning styles: special-needs students outperform in vocational schools. Students graduating from vocational high schools have a 20 percent higher clip than the state average (82.0 percent v. 62.8 percent)³.

The Bay State has a long, proud history of VTE education. Virtually all VTE schools within the state have admissions waiting lists⁴. Research shows that one of the major contributors to Boston’s achievement was industry alignment. Hence, CTE instructors asked to provide feedback for aligning industry standards with curriculum, which helped them to adjust their coursework to the industry’s demand.

Research shown to vocational schools demonstrated that the academic skills needed for entry-level career success have become those required for college entrance. The manuals used by professional plumbers, major appliance repair people and auto mechanics were now written to a grade 14 reading level. States who ignored this reality court disaster: 95 percent of Connecticut vocational students failed an electrician’s license test⁵, for example.

One of the major problems with CTE is that in most cases new high school students do not possess enough information about CTE or the programs, which are being offered. North Carolina is preventing this problem by first exposing students to CTE programs in middle school. CTE programs have supporting student group organizations, focused on skill and leadership development at both the high school and middle school levels focused on skill and leadership development; 47,045 students participated in these groups during

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³ Fraser, Alison. Vocational-Technical Education in Massachusetts No. 42, 2008 (P. 9) <http://www.nyctecenter.org/content/userfiles/files/voc-tech%20ed%20in%20massachusetts.pdf>
⁴ Ibid, P.4
⁵ Ibid, P.5
2008. The state also offers two career development courses for students, one for middle-school students and one for high-school student\(^6\).

### 5.2 International

On a more international plane, Sweden and Germany have been on vocational education’s cutting-edge. In Sweden, for instance, industry partners and employers play a strong role in structuring current and future programs. One support these partners provide is a compensation of roughly $2,000 per student for apprenticeships. This incentivizes students and serves to increase participation in vocational education every year.

In Germany, on the other hand, the federal government invests in launching large-scale campaigns across the country, which aims to increase student enrollment in vocational education. The German system also offers vocational counseling for students who are unsure about their future career plans. The difference in wages between those who pursue vocational educations and more academic paths is relatively smaller in Germany than it is in the United States. This explains why about three of five German high school graduates choose vocational education over academic education\(^7\).

One avenue which warrants further exploration: consideration of demography and geography as shapers of the decision-making process about which vocational tracks are offered in different areas and how these community features are reflected back by enrollment counts.

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6 Strengths of NYCDOE CTE Offerings and Growth Opportunities

KEY FINDINGS

• DOE CTE program has the required capacity to adapt curriculums to match evolving labor and market needs
• Alumni believe CTE to be an academic-plus experience
• New York City CTE programs are relevant and in demand

New York City houses the largest public school system in the United States; serving a total student population of roughly 1.1 million pupils. The resulting demands on the NYC DOE – and associated stakeholders – for time, financial and human capital, and support are significant; available resources are inadequate to fully meet these prodigious demands. By extension, the New York City CTE program is the largest portfolio in the country. While it encompasses only 10% of the total New York City public student population, nearly CTE programs serve 48% of the entire New York City high school student population.

There are important strengths that highlight the increasing value of these programs. While we have identified many of NYC CTE’s successes during our secondary and primary data collection, the following characteristics are noted as defining assets:

*Capacity for Flexible and Adaptive Curriculum Development*: New York City's CTE programs are well positioned to respond to changing market and labor demands. While city schools are annually accountable to state education mandates, these are comparatively flexible. This allows for greater flexibility to design and adapt CTE industry tracks to better customize programs that maximize student college and career readiness. Some tracks within the NYC DOE system, however, seemed to be better positioned than others to adapt and revitalize their curriculums. This capacity to adapt is especially salient for certain
tracks which change quickly and require curricular materials which reflect that rate of change, to preserve and enhance student learning and employment preparedness.

**A Proven System for Long-Term CTE Teacher Retention:** Recruiting and maintaining qualified and certified instructors for CTE programs is a challenge, and one that is not unique to New York City. The SVA program was designed to fill this gap. As demand for CTE programs grew amongst incoming high school students, recruiting and retaining certified teachers became an increasingly difficult challenge.

This program selects a cohort size – contingent on available funding – of roughly 50 students annually, and over the last 30 years, has produced roughly 500 additional CTE teachers. The SVA program boasts a remarkable completion rate of 90%, but more importantly, a retention rate of 85%. These SVA students who train to become CTE teachers are dedicated, passionate, and likely to stay for a significant portion of their professional careers.

**Alums Understand the Value of CTE and Work-Based Learning:** Alums crucially appreciated the tangible and vital added value of their CTE experience. The hands-on exposure to industry was credited as having fostered the acquisition of hard and soft technical and interpersonal skills. These skills were seen as having enhanced income potential and long terms career success.

CTE programs, unlike traditional high schools, have formalized connections with industry partners incorporated into their curricula. These offerings supplement extensive work-based learning sessions. CTE schools, through these partnerships, are able to bring professional speakers, mentors and career fairs to schools, which facilitate internship opportunities.

Not only does this give students the opportunity to expand their professional networks, but it also allows them to develop professional etiquette – a transferable and life
long skill. Through the lab sessions, students are able to gain hands-on practical skills readying them for careers, which are comparatively lucrative salaries.

**Long-Term Relationship Building Strategy for Industry Engagement:** Industry engagement can take place over many months and even years. This ensures a greater sense of confidence for both parties that the partnership is a mutual match. The DOE, to this end, has made a concerted effort for industry alignment with their CTE tracks rather than tailoring to company specific alignment. In addition, the long courting process also fosters long-term relationships with industry partners, and lessens the potential for transactional relationships, which yield minimal, short-term gains for students. Ultimately, there must be extensive trust between the two parties; clear understanding of capacity and expectations, a mechanism for overcoming differing work cultures, and clear channels for addressing grievances in a constructive manner.

**CTE Programs are Relevant and in Demand:** There is increasing public and political support for CTE. It has been a focal point for the Mayor’s Office for years: it was the subject of a 2008 mayoral commission and major reports in 2012 and 2014. Concurrently, efforts to further improve and expand CTE programs across the nation were publically supported by the Obama Administration. The President has called for a “blueprint for transforming career and technical education.” Public support has grown in tandem with this political support. As CTE gradually replaced vocational education, its increasing public support rested on recognition of the high value of an education that is academically focused but also teaches high value, and high-demand, industry skill sets.

The increase in both public demand and public support are dramatized by the rise in new CTE schools within New York City. More than half of New York City’s 51 CTE designated schools opened between 2003 and 2013. And yet, there are still not enough CTE schools to meet the demand. Each year roughly 800 students are not enrolled in a CTE school despite having selected a CTE school as his or her top choice for high school.
Crucially, CTE schools have a continued and proven relevance for unlocking student achievement. Public high school students are more likely to graduate if they attended a CTE program. This is especially pertinent for Black and Latino students who have an exceptionally high graduation rate from CTE programs. In addition, for students with below average 8th grade test scores, CTE students see the strongest gains.
7 Communicating with Potential and Current Students

Key Findings

- Middle school students are not aware of the CTE programs; DOE should focus marketing on their target group introducing CTE as early as 7th grade
- High school students have limited exposure to their selected trade until Grade 11. Shadowing programs should be organized to allow 9th grade students to observe senior students working in the different trades in order to make more informed decisions.

7.1 Communicating with Potential Students

Recruitment is the most critical success factor for CTE programs across New York City. There are 139 high schools offering CTE programs in New York; 51 are designated CTE schools. This is 12.2% of all 417 high schools in New York City. For students to be able to make an informed decision when it comes to selecting their school, it is crucial that they understand their options. The DOE has made efforts to introduce this set of programs to the students and their parents through their website, but this is not sufficient.

Through interviews with the Success Via Apprenticeship (SVA) alums, we came to understand that almost all interviewed participants were unaware of CTE offerings when they chose their high schools. It seemed that all of them first joined the school and found out about the program second. One individual mentioned being introduced to the program in grade 9 after joining the high school. Another individual stated that they became a part of the CTE high school as a pure coincidence; the school was chosen for its proximity to their home. These individuals were happy. If given the chance to do the program with the benefit of hindsight, students would pursue the option. This said: what if these students
ended up elsewhere? What if they had selected a different school with no CTE offerings? They may not have had a chance to explore these interests.

Middle school students, theoretically, have counselors to advise them on their options for high school. Yet, the feedback we heard from students suggested that the only counseling they received was on application procedures. Students were often handed over a thick book, which listed all of the high schools in New York City. No seventh grader is likely to go through 417 schools to identify the most suitable school based on their interests.

The DOE needs to conduct targeted marketing during the window of decision-making. Seventh and Eighth graders need to be aware of the career and technical education programs. Moreover, students need to understand the implications of these track choices to their future educational plans. The DOE should foster an attitude of experimentation balanced by thoughtfulness amongst prospective students.

Given the quantity of options available to these young students, this attitude is one key to the success of CTE programs. As One DOE staff member told us: “there is no trade that we do not have a high school for”. But if the students are unaware of these offerings or unable to make sense of them, how much impact can your hard work realize?

In order to better reach its target audience, the DOE can do the following:

• Reach middle school students directly through high school fairs, open houses, and talks.
• Provide middle school counselors with relevant material on the CTE program that they are required to share with the students
• Introduce a “High-School Introduction Day” in every middle school where DOE staff members speak about the different programs available to the students in high school, including paths trod through CTE.
• Organize day trips to CTE high schools which introduce the programs [and participating students] to middle school students
• CTE high schools can go to middle schools to introduce their programs to 7th grade students since they make their decisions in 8th grade.

Truth in advertising is the bedrock of aligned student and industry expectations. Messaging must prove accurate. We appreciate that marketing puts the best foot forward but our interviews uncovered cases of misleading or misinterpreted messages. Some students believed that a course in healthcare ensured a job as a nurse. It is important that the NYC DOE designs its messaging to accurately represent the opportunities available following high-school graduation and participation in CTE programming.

7.2 Communicating with Current Students: Success After Enrollment

A lack of understanding of CTE programs has implications, which extend far beyond a student’s experience navigating the high-school admissions process. Since students only start diving into their CTE educations in Grade 11, most students do not have the opportunity to understand the respective courses [trades] offered until that time. This limits student choice and the capacity to reflect within those choices, the learner’s evolving interests. For example, one CTE alum signed up for robotics in Grade 9 only to realize in Grade 11 that she did not enjoy studying robotics, for example. This individual considered herself lucky that she was able to switch courses. As she understood the system, not all high schools allow students to trade once it has been selected.

With limited understanding of CTE offerings in middle school and little to no exposure to the trades until 11th grade, students struggle to understand the requirements and the potential of their selected courses. It is essential that students are exposed to their choices as early as is feasible to foster an understanding of how choices can align with their present and future ambitions.
We offer several suggestions on how the NYCDOE can afford to give students earlier exposure to CTE offerings amidst very real resource constraints:

- Designing shadow programs in which 9th graders are able to shadow Grade 11/12 students to better understand what the different ‘trades’ actually are and how they operate;
- Organizing field trips to companies across industries for students from Grades 9 – 12; to achieve early exposure for younger students and enhanced understanding for the older ones.

It is also important that the DOE communicates regularly with these students about post high school opportunities, including higher education.

The NYCDOE should align their decision-making timeline for the SVA program with college admissions decisions. The DOE should also see to it that juniors and seniors are familiar with the options and resources available to them. This will be talked about in the section on how industry, schools and the DOE can work closer together.
8 Engaging Adult Influencers: Parents, Teachers, and Counselors

Key Findings

- CTE programs need to be marketed as academic “plus” programs that provide a rigorous high school experience

- Expand awareness of CTE programs through adept use of multiple communication channels – i.e. CTE fairs, CTE alumni presentations about the programs in which they participated, marketing CTE programs to top high schools

8.1 Brief Historical Context

Evolving out of vocational programs, CTE has faced the stigma of being regarded as a low-level vocational education track, which leads to a low-skill job with no intermediate postsecondary education. Indeed, vocational education was previously characterized as neither providing students with rigorous, intellectually stimulating material, nor equipping them with the necessary skills to attain future employment. The underlying implication was that “only some students needed this type of preparation and it was distinct and separate from the academic track.”

CTE has set itself apart from traditional vocational education programs by preparing students with skills and training to both attain a job and to advance into postsecondary education.

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education\textsuperscript{11}. However, a persistent negative image continues to dog student and parent perceptions of CTE and to define their decisions concerning high school courses and subsequent career pathways\textsuperscript{12}.

Student career guidance has been hampered by budget cuts, which increased the average student-to-counselor ratio; consequently, the remaining counselors only have time to focus on test scheduling or the college application process, and most have little knowledge about CTE programs. In other words, they do triage.

8.2 Current Situation and Challenges

Overall, parents, students, and colleges continue to view CTE programs as academic “minus” programs that are less academically rigorous than traditional high school curriculums. There remains a general misconception that CTE programs are for students lagging academically, similar to the negative attitude vocational programs received over the past decades\textsuperscript{13}, even within the DOE. Contrary to popular beliefs, CTE students are required to do more work than students who participate in traditional academic high school programs, as CTE students work to attain an academic and a technical training diploma\textsuperscript{14}.

Additionally, some parents prefer for their kids to pursue STEM-careers rather than CTE, even though both essentially offer the same kinds of courses. While the two tracks offer similar experiences, STEM education has seen far more press attention and support from both the government and the private sector than have CTE programs. Parents are thus more inclined to push their kids towards a nationally supported educational program, even as CTE provides the same offerings.

\textsuperscript{11} Interview with DOE staff. Interviewed by Molly Daniell. Phone interview. NYC, New York. 2015.
\textsuperscript{12} Brand & Browning, Ibid
\textsuperscript{13} Interview with DOE staff. Interviewed by Molly Daniell. Phone interview. NYC, New York. 2015; Interview with high school principals. Interviewed by Jing Li. Phone interview. NYC, New York. 2015.
\textsuperscript{14} Interview with high school principals. Interviewed by Jing Li. Phone interview. NYC, New York. 2015; Interview with assistant principal. Interviewed by Richa Maheshwari. Phone interview. NYC, New York. 2015.
Middle school counselors also play an essential role in promoting CTE programs to students entering high school. Yet, many still view CTE as less academically demanding and therefore discourage students from entering the program. Middle school guidance counselors tend to come from an older generation, which still carries misconceptions about vocational education. They, therefore, steer their most successful students towards specialized high schools, rather than CTE schools.

Finally, providing a centralized clearinghouse to spread awareness of CTE programs to parents has also proven to be a challenging task for high schools. While schools have tried to arrange meetings to gather different stakeholders (students and parents), these meetings have been received with middling attendance and interest.

8.3 Recommendations

**Market CTE as an academic “plus” and rigorous high school experience:** All CTE students are held to the same academic requirements or guidelines as any other traditional academic high school program. In fact, CTE students are required to complete 7 additional credits than those attending traditional high schools. Many participants also complete industry certifications. Furthermore, more than half of CTE students go on to higher education after school, especially students in computer science and business tracks.

**Market CTE as providing core STEM education:** CTE should be marketed as an integral component of STEM education. Considering that STEM has received such glowing coverage from nearly all public and private sector actors, CTE programs should capitalize on this opportunity to strengthen its branding.

15 Interview with DOE staff. Interviewed by Molly Daniell. Phone interview. NYC, New York. 2015.
16 Interview with healthcare commission and school chair. Interviewed by Matthew Sawh. Phone interview. NYC, New York. 2015.
17 Interview with DOE staff. Interviewed by Molly Daniell. Phone interview. NYC, New York. 2015; Interview with high school principals. Interviewed by Jing Li. Phone interview. NYC, New York. 2015.
Organize NYC DOE initiated CTE meetings or fairs: While high schools have been unsuccessful in gathering various stakeholders together, a NYC DOE initiated meeting or CTE specific fair would command more attention from the public and help raise awareness of CTE programs.

Expand marketing venues to raise CTE awareness: A big town hall meeting isn’t enough. CTE needs to bring its presentations “on the road” to where families and communities congregate. Community centers and churches are starting points for additional places or ways to reach prospective CTE students. Subway ads featuring student success stories are also an effective tool to spread awareness across the city. The NYC DOE should reach out to contacts at the CUNY System to determine the effectiveness of their ongoing subway advertising campaigns.

Utilize other creative methods to market CTE program: CTE can leverage top high schools’ CTE programs to market their prestige. CTE high schools can also provide after school enrichment programs for middle school students as a way to expose kids to CTE tracks18.

\[18\] Interview with Chicago program director of Manufacturing Connect. Interviewed by Diana Chen. Phone interview. NYC, New York. 2015.
9 Strengthening Partnerships Between Industry, the NYC DOE and School

Key Findings

• Professional Development for Teachers in CTE is ESSENTIAL, If the training falls too far behind, CTE can't work
• Parent Generation-Gap is a Real Problem
• Looking past corporate name, key
• Seeding Systemic Understanding of Next Steps for Students/Pare

9.1 Brief Historical Context: Industry Involvement in New York City and Education

Local Legacy of the Financial Crisis: New York City saw its municipal budget increase from $3.3 billion to $11 billion in the decade between 1965 and 197519. The financial crisis of the mid-1970’s illustrated the import of industry taking a larger role in the city’s policy conversations. David Rockefeller founded the New York City Partnership and affiliated it with the New York City Chamber of Commerce in 1979. The partnership’s was created to facilitate a more pronounced public role20.

Federal Investment: During the early years of vocational education (1917–68) the stress was on expanding vocational programs to provide a trained semiskilled workforce to meet the needs of industry. Between 1968 and 1990, ensuring equal access to vocational education for disadvantaged and special need populations was stressed. Most recently, the

20 The Partnership for New York City: Our History < http://pfnyc.org/our-organization/our-history/>
stress is on improving the academic and technical quality of programs in the form of CTE along with strengthened performance standards to ensure program quality\(^\text{21}\).

### 9.2 Current Situation and Challenges:

The New York City Department of Education presently (April 2015) offers graduating middle-school students, a menu of 50 Career and Technical Education designated-schools\(^\text{22}\). Their choices are distributed across the five boroughs:

- 17 in Manhattan
- 12 in Brooklyn
- 11 in the Bronx
- 9 in Queens
- 1 in Staten Island

Another 88 schools are not CTE-designated, yet they offer CTE programming\(^\text{23}\). Industry partners believe that CTE programs would have enhanced effectiveness if students were exposed to CTE’s varied career tracks sooner. One partner went to a vocational school which offered a time-period called “exposure,” when students were shown the different tracks, thought about them and then made a choice about which one was most appropriate to their interests.

**Relationship management (families):** Family engagement is of course critical to these conversations. Schools Chancellor Carmen Farina has made reaching parents whose first language is not English, a top priority. Yet, industry partners have shared their sense that parents aren’t being reached\(^\text{24}\) – here are a several reasons why that may be true:


\(^{22}\) The New York City Department of Education
<http://schools.nyc.gov/ChoicesEnrollment/SpecialPrograms/CTE/ParentsandStudents/CTE-high schools.htm>

\(^{24}\) Interviews with Industry Partners, Interview by Matthew Sawh, April 2015
A generation gap between students and parents: Students generally get it. Parents are more skeptical. They want their child to be more academically oriented, because CTE was less rigorous during their school days of less global economic competition.

Their impression of Career and Technical Education is not that students will have state-of-the-art opportunities, like to work in any airport in the country after earning certification from the Aviation High school, rather they see it as a second-tiered track for those students who couldn’t cut the academic muster, even though CTE students fulfill the same academic requirements – and go beyond them with professional experience.

Empathy for the guardian/adult's perspective: From a far-sighted perspective, their concerns make sense. The premium employers’ pay for students to pursue higher education has expanded. This message is one which philanthropists, politicians and popular culture has pounded, ever since it was the arc of The Cosby Show’s pilot episode in 1985.

Greater DOE presence in neighborhoods is needed: It was suggested that the NYCDOE needs to be more active in hitting the pavement, heading into the communities they are trying to reach. Community and civic venues like churches and libraries in targeted communities are key-building blocks to an effective outreach strategy across the city’s neighborhoods.

Stipends for CTE students should be considered for broader access: Some students need paid summer work and can’t afford other options. In one industry vertical, high school students had been paid $800 for 6 weeks of work, when funding was available from the organization.

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26 Interview with Commission Chair, Interview by Matthew Sawh, April 2015
Connecting and clarifying linkages between CTE and next steps: Explaining that CTE is an early link in the career chain is essential. Fostering a keen understanding of systemic linkages and next steps amongst students and parents is key to a thriving CTE program. Sometimes, students will want to pursue a health career and not go on to take biology in high school, leaving them too far behind in college. Advisors from CUNY and SUNY should be brought into CTE programs to promote a broader, systemic understanding of career requirements.

Coordination between the NYCDOE, CTE team and the Office of School Enrollment should be considered, as a means to increase the reach and effectiveness of messaging.

Relationship management (industry): Industry partners put a premium on intentionality in their CTE and Tweed dealings: Integrity, accuracy, transparency, mutual respect and clear communication are seen as essential cornerstones.

Partners generally give Sari David and Harini Venkatesh plaudits for their dedication. Industry appreciates the complexity involved in sparking systemic change in the nation’s largest school district. At the same time, corporate partners have found moments of non-communication demotivating, like when General Electric made a several million-dollar commitment for CTE and the industry advisory panel was kept in the dark as the news trickled out.

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27 Interview with Commission Chair, Interview by Matthew Sawh, April 2015
28 Interview with Commission Chair, Interview by Matthew Sawh, April 2015
9.3 Recommendations

**Manage Industry Perceptions:** Tweed needs to be extremely sensitive to the texture of their industry engagement. Industry sees its role in this equation as providing a service to students in New York City. Industry considers mutual respect critical but it is also true that some industry players do not see themselves as an equal partner to the DOE. While these internship opportunities do fill a real need within companies but they are sometimes motivated by the primary desire to perform a community service.

One key to retention which won praise was the October meetings where industry leaders come to Tweed Hall and get to hear remarks from political dignitaries like the Mayor and Chancellor Farina. These aspects of relationship building were singled out as quite effective; the effort is remembered and similar follow-up events might be worthwhile as one part of a broader strategy of retaining and deepening industry engagement.

**Manage Albany Perceptions:** New York City’s Industry Partners believe that advocating for CTE-education at the state-level is essential. Having a presence at the state-level to ensure their perspective is reflected in policy conversations is both critical and lacking.

**The NYCDOE Needs More Staff Working on CTE (particularly, staffers who know industry):** Industry partners are fervent in their belief: to be done at the highest level, CTE requires an ombudsman, whose sole job would be to make the case for industry involvement in CTE. This goes beyond the need for a dedicated staffer for each industry, well versed in that field.

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29 General observations from industry, Interview by Matthew Sawh, 2015
30 One Commission Chair, Interview by Matthew Sawh, April 2015
31 Two Industry Commission Chairs, Interview by Matthew Sawh, April 2015
A more systematic approach of selling the partnerships to industry, connected with DOE-lead trainings would benefit all concerned. The more that partners get to interact with CTE’s young adults, the more invested they will be in CTE.32

9.4 Recommendations for Increasing Industry Engagement: Current Situation and Challenges

*Look Past the Corporate Name in Pursuing Partners*: Companies which tend to be the most responsive are small and medium-sized enterprises (50-200 employees). While it may be tempting to pursue a large, blue chip company for prestige purposes, it may not prove the most advantageous partner for students. SMEs may be more comparatively flexible.

*Well-Trained Teachers Sharing Relevant, Industry Experience is the First Priority*: Remember: students come and go each year. Principal turnover is high. The teachers are the CTE chain’s enduring link. So the linchpin to strengthening CTE programs is strengthening the teacher quality.33

*Tweed Needs to Give CTE Teachers the Time to Re-Engage with Industry via Professional Development Time*: During the 1990’s, CTE had gotten 2 days of Professional Development a year, then when Mayor Bloomberg came in, it was reduced to one day, Election Day, most of which was spent on filing forms, rather than being exposed to contemporary industry practices.

*In several CTE Fields, Offerings and Success Hinge on the Ability of Schools to Remain Fairly Current with Technology*: This is in tension with the accelerating rate of change in

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32 General observations from Industry, Interview by Matthew Sawh, April 2015
33 Industry Commission Chair, Interview by Matthew Sawh, April 2015.
the technology industry, a Moore's Law phenomenon where the carrying capacity of semiconductors doubles every two years, which has characterized computing for nearly fifty years. Jobs like social media manager, analytics management and SEO are relatively new and reflect the velocity of change. Schools won’t be able to lead or keep current with the wave of technology but there is a pivotal point on which schools can’t fall too far behind.

One aspect of CTE, which requires revision, is the validity of the certifications offered to students. Schools offered a Microsoft Word certification, for example, starting in the 1990s, and that was perhaps a useful badge of honor at one point but it is still offered, it’s hard to imagine an employer in 2015 feeling the same way. Generally, partners believed that the certifications made it easier for CTE advocates to push CTE programs within their organizations, they validated and had credibility with HR.34

Promote Technology and Non-Technology Careers with Equal Enthusiasm: The NYCDOE should be careful to send messages to students and parents that careers beyond technology are equally valid CTE tracks. For example, the Queens School of Cosmetology gets 2,000 applications for 25 spots, every year.35

Corporate Partners MUST Be Shielded from Liability Risk: The New York City Department of Education absolutely must absorb the liability risk companies bear by bringing minors to their workplaces. One student was dismissed from their CTE placement and filed a claim with the state on that basis. Companies not shielded from these risks by the NYCDOE will hesitate to engage

34 General Observations from Industry, Interview by Matthew Sawh, April 2015.
35 Industry Commission Chair, Interview by Matthew Sawh, April 2015.
Key Findings

- No CTE-specific state metrics to demonstrate accountability or further legitimacy
- Outdated and clunky data systems within DOE slow, and possibly inhibit knowledge sharing and data-driven decision making
- Thin metrics for measuring “college and career readiness” reflecting hazy values

10.1 Brief Historical Context

In New York State, knowledge sharing, accountability, and data collection on CTE programs have historically been elusive, uneven, unregulated, difficult to interpret, and in some cases, not collected at all.\textsuperscript{36,37}

In New York State, most data collection is completed in accordance with top-down mandates such as the Carl D. Perkins Career and Technical Education Act last reauthorized in 2006 (Perkins IV). This Act has been a driving force behind the transformation of vocational education into CTE. The Perkins Act continues to function as a pivotal federal funding mechanism for CTE programs. Perkins IV requires that any state receiving its funding must report back on specified performance indicators for secondary and postsecondary levels, and typically the State’s data collection systems do not exceed the minimum federal accountability requirements.\textsuperscript{38}

\textsuperscript{36} Department of Education Staff Members, Interview by Molly Daniell, 2015.


\textsuperscript{38} See appendix for full indicators list
During the last two years, nearly half of all states nationwide have updated their accountability, data, or reporting policies. New York State has, by contrast, not made any policy changes to criteria, in this timeframe.39

*Current Innovations in Other States*

Noteworthy and significant changes in public reporting and accountability practices among states willing to innovate, are: (1) a career-focused readiness indicator, (2) college and career readiness valuing systems, and (3) college and career accountability indicators.40 There are 14 states that include CTE course participation or pathway completion data on their school-wide report cards. States have adopted different approaches to measurement:

- Kentucky and Virginia include the earning of industry certifications.
- Missouri and South Carolina emphasize post-graduation placement for CTE students.
- Oregon and Nevada report the graduation rate disaggregated by CTE concentrators.

Concerning the valuing of systems: Kentucky, Virginia, Georgia and Missouri have developed comprehensive approaches to valuing career readiness for all students.

Virginia, for example, includes a comprehensive list of technical and work-ready assessments on the state’s report cards. Their report card also includes the number of students earning the state-developed “Work Readiness certificate,” which incorporates robust measures such as students’ employability skills – distilled into ratings on personal


qualities like work ethic, conflict resolution and customer service and professional qualifications such as state licensures, industry certifications and competency assessments.

In addition, a small number of states do create a CTE specific report card where they collect data either at the school or district level.\textsuperscript{41} For example, Ohio publishes report cards for each career technical planning district with data tracking the percentage of CTE graduates who earned an industry certification, passed a TSA or even successfully earned dual enrollment credit.\textsuperscript{42}

Six states that have a substantive career ready indicator for their accountability formulas that all schools are required to meet. Kentucky has become a national leader for college and career accountability indicators. The state recognizes the distinction between the two aforementioned indicators, which is reflected in their statewide accountability reporting system. Kentucky breaks down its indicators into College Ready\textsuperscript{43} and Career Ready. The Career Ready category is separated into two indicators – “career-ready academic” and “career-ready technical” – and students must demonstrate their readiness in both. Kentucky policy states “career-ready academic indicators measure whether students meet benchmarks on WorkKeys or the Armed Services Vocational Aptitude Battery (ASVAB). The career-ready technical indicators measure whether students earn an industry-recognized credential or meet benchmarks on the state’s technical skills assessment, the Kentucky Occupational State Skills Assessment (KOSSA).” \textsuperscript{44}

The state reports on college-ready, career-ready academic and career-ready technical indicators for school and district report cards. The combined college/career-ready score contributes to the state’s overall high school and district rating system for accountability.\textsuperscript{45}

\textsuperscript{41} This does not include local accountability reports for the Perkins IV
\textsuperscript{43} Based on student achievement on the ACT or a college placement exam
\textsuperscript{44} Achieve and NASDCTEc. \textit{Making Career Readiness Count}. Washington, DC, 2014.
\textsuperscript{45} Ibid
In addition, there are a few states that track indicators of career readiness beyond the Perkins IV federal accountability mandate. Connecticut, North Carolina, Virginia and Washington include *dual enrollment participation*, while Florida, New Mexico, Ohio and Texas report on the number of *dual enrollment credits earned*. Fifteen states include *postsecondary enrollment* obtaining such information either through student-reported plans or by pulling it from high school feedback reports.\(^{46}\) Notably, Missouri is the only state to *disaggregate postsecondary enrollment* data by enrollment at four-year institutions, two-year colleges, and postsecondary technical institutions.\(^{47}\) Vermont is the only state to *disaggregate by institution type* and also include joining the *armed services or entering the workforce*.\(^{48}\)

\(^{46}\) Including Connecticut, Kansas, Massachusetts and Vermont for student reporting and Florida, Idaho, Kentucky, Maryland, Michigan, Missouri, New Jersey, Oklahoma, Oregon, Texas and Washington for pulled from high school feedback reports


\(^{48}\) Ibid
11 Key Challenges for NYC DOE

NYC DOE officials have several important challenges to consider for their public reporting and accountability work. The key challenges are as follows:

CTE Specific Metrics: The New York State Education Department does not require specific reporting data on CTE students in New York State, and there are no repercussions for non-reporting.49 This de-prioritizes career readiness, devaluing its merit.50

Expanding and Defining Key Metrics: New York City does not have a unified and robust system51 of indicators, which appropriately measure “college and career ready,” status52. NYC DOE does not have distinct career readiness indicators.53 One result is that the working definition of the term misses strengths inherent in your CTE programming54. It is important to note, however, that there is no nationally agreed upon standard for valuing systems or indicator creation specific to CTE, a source of frustration for some NYC DOE employees55.

Outdated Data Systems: The data systems within and between NYC DOE departments do not speak to one another, and sometimes are silo-ed between divisions, which is a source of

51 Department of Education Staff Members, Interview by Molly Daniell, 2015.
52 Ibid
54 Department of Education Staff Members, Interview by Molly Daniell, 2015.
55 Ibid
great frustration for NYC DOE employees\textsuperscript{56}. This increases the risk of data getting lost or being under-utilized\textsuperscript{57}.

\textbf{Tracking Student Outcomes}: The NYC DOE does not track student outcomes following graduation. This has real implications for accountability reporting and potential longitudinal studies undertaken\textsuperscript{58}. California, Colorado, and Connecticut have all recently launched policy initiatives that include student outcomes as part of their accountability mandate\textsuperscript{59}.

CTE programs are becoming more rigorous, and are increasingly responsive to 21\textsuperscript{st} century education needs. Public perceptions are also changing in tandem, albeit at a slower pace. In order to enhance public support for their programs, CTE administrators and educators would find it advantageous to invest more time and resources to robust monitoring and evaluation. Using the results to kick-off constructive discussions with stakeholders would likely deepen engagement and pay dividends. This kind of knowledge sharing and public accountability increases program credibility and legitimacy, facilitates stakeholder buy-in, allows for data-driven decision-making, and supports increased funding and resource allocation.

\textbf{11.1 Recommendations}

\textbf{Implement CTE-specific measures} for current school rating and accountability systems that have distinct career readiness and college readiness indicators. As the NYC DOE strives to increase public understanding of CTE as academic-plus programs, including CTE-specific measures will signal that it is seen as an equal to traditional academic programs.

\textsuperscript{56} Ibid
\textsuperscript{57} Ibid
\textsuperscript{58} Ibid
**Update and streamline current data systems** within the NYC DOE to facilitate robust and comprehensive data collection and sharing. No improvements in data, reporting, or accountability reporting will be successful if the underlying operations do not have the capacity to allow for such innovations.

**Create an annual workforce metrics dashboard** with the number and percentage of students who achieve:

- Local Diploma attainment;
- Regents Diploma attainment;
- Regents Diploma with advanced designation;
- Credential attainment;
- Dual enrollment opportunities;
- College enrollment;
- Employment levels in high-demand and high-skill sectors and
- Earnings

**12 Contextual Constraints and Other Challenges**

**12.1 Lack of Qualified and/or Certified CTE Teachers**

There is a shortage of qualified CTE teachers in New York City. This is rooted in the increase in the number of students enrolled in CTE courses. There are two principal causes for this shortage.

First, there are few incentives for professionals with industry exposure to become a CTE teacher. Many opt for the higher salaries of industry. The NYCDOE should probe whether there is a level on the corporate ladder when executives are most open to becoming career-changers and consider pilot programs, which build a bridge between industry professionals and the classroom.
Second, teacher turnover worsens this shortage. Between 1994 and 2004, the nation hired approximately 2.25 million teachers but during that same time frame, 2.7 million teachers left the profession – a majority left before retirement. The national cost of public school teacher turnover could be over $7.3 billion a year, based on the cost generated by teachers who leave their school or district during a given year.

In consideration of these challenges, we suggest that Schools of Education based in New York State consider offering CTE training tracks within their teacher preparation programs. Given the tech-adept history and leaders (Norm Atkins) of the Relay Graduate School of Education, they might prove a good first school to explore the prospect.

Second, we recommend the promotion of CTE recruitment. The fundamental goal is to give those who are interested in teaching at CTE schools all pathways to get the CTE teacher certification. Besides the incentive plan, the CTE program should also increase flexibility in the alternative certification program to give people who worked in business and industry the opportunity to transfer into CTE teachers without having to apply for an education degree or to pass teacher certification exams. This may raise concerns about teachers’ quality, but it could be controlled by a series of occupational testing and work experience checking. Teachers who pass the tests should receive adequate training, professional development workshops and support from senior teachers before assigned to CTE schools. As some industries change rapidly, it is actually helpful to have people with latest technologies and practices to teach.

To lower turnover in CTE schools, we recommend to create a national CTE certification endorsement that rewards teachers’ work at CTE schools for longer years. With the certification, teachers should receive benefits such as loan forgiveness for graduates, tax credits, maternity/paternity leaves, etc. It is also important to give teachers

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61 National Commission on Teaching and America’s Future, estimate based on NCTAF Teacher turnover Cost Calculator applied to the Digest for Education Statistics data for all public school teachers in urban and non-urban public schools and districts.
continuing professional development to keep their skills dynamic and current in the industry they teach.

12.2 Curriculum should align with industry standards and requirements

CTE courses encourage industry practices to give students opportunity to learn directly from experienced employees, to apply what they have learned in class to real-world cases and to develop latest skills. Some CTE programs are not aligned with the needs and changes of job market. Several Computer Science courses had not seen changed curricula in 6 years according to one CTE school principal. One student who interned with a technical company complained that some skills taught in their coursework were no longer useful.\(^2\)

The president of the United Federal Teachers, Michael Mulgrew, wrote about his experience as an English teacher to a group of students who struggled academically. He drew on his background in theater and filmmaking to inspire students’ interest and to get them engaged in academic work. Michael wrote, “The key to high-quality CTE, though we often talk about its strengths in terms of economic opportunity, is that it engages students in meaningful way – it keeps them interested in school and class work.”\(^3\)

To design the curricula meet industry requirements and students’ interest, we suggest to give not only CTE teachers, but also industry partners the capacity to design and structure curricula. Employers can enrich content with first-hand information and real-world examples to ensure both the academic and technical curricula are timely. They can also make students and teachers understand which kind of skill sets and certifications are required for certain jobs.

CTE programs should be bridge connecting school and work, so we also recommend schools to design CTE curricula not just in the trendy, high-tech space but also in the blue-collar professions and trades. CTE programs should work with local workforce

\(^{62}\) CTE School Principal, Interview by Jing Li, April 2015.
development agencies to monitor highly demanded blue-collar industries. The Queens School of Cosmetology receives more than ten applications for each seat, for example\textsuperscript{64}.

12.3 Funding constraints

A CTE school principal told us that his school lost one of its four CTE instructors to cut costs. Schools need more money to plan and implement CTE programming.

The Carl D. Perkins Career and technical education Act (Perkins) is the principal source of federal funding for CTE. However, Perkins funding does not keep pace with the growing demand for CTE programs. On March 4, 2014, the Obama Administration released its budget request for Fiscal Year (FY) 2015. The budget proposes to fund the Perkins Basic State Grant for $1.118 billion in FY 2015, with no increase for CTE National Program funding, either\textsuperscript{65}.

12.4 Human capital

From the interview with CTE school principals, problems raised due to lack of staffs: communication disconnect between stakeholders regarding the amount of support needed to promote CTE programs, low employment rate because students do not have clear career plans, middle school students going to CTE schools do not know about CTE programs, 30% did not have a good understanding of the CTE program even when joining.\textsuperscript{66}

One approach to solve the challenge is for each school to hire a staff to develop and maintain relationships with stakeholders. The staff can design events at middle school level to promote awareness of CTE programs and give parents and students the opportunity to better understand CTE program. A dedicated staff can also communicate with NYC DOE more efficiently and help NYC DOE better understand requests and needs from school. Another important position is career counselor. Many students rely on school counselors for career information instead of on family members; however, a national average student-

\textsuperscript{64} General Observations from Industry

\textsuperscript{65} "CTE Funding" Association for Career & Technical Education. https://www.acteonline.org/funding/#VTShpdlF-zx (accessed Apr 18, 2015).

\textsuperscript{66} CTE Alum, Interview by Richa Maheshwari, 2015.
to-counselor ratio was as low as 459:1 in the 2009–10 school year due to budgetary constraints. The counselor should build relationship with employers to develop more working opportunities for students, be aware of the knowledge and skill requirement of most jobs, as well as guide and plan for students’ career path.

12.5 Outdated systems

Outdated system could inhibit streamlined and efficient partnerships within CTE programs. There are some operational challenges that have harmed relationships with businesses or even with students. The payroll system is outdated and over-burdened. If a company or students has not been paid in a timely manner, this creates undue tensions. The data systems are also outdated, which is exacerbated by not having any kind of larger, nationally understood and/or unified system. According to our interviews, even high school principal felt lack of statistic data to promote CTE programs.

New payroll system and national CTE data system are necessary. With the integrated data system, stakeholders could easily access to statistics with curricula, graduation rates, postsecondary outcomes, employment rate, program capacity, geographical data and teacher certification requirements and so on.

67 A national average student-to-counselor ratio of 459:1 in the 2009–10 school year
13 Conclusion and Final Recommendations

Based on our cumulative findings, there are four key domains that the NYC DOE should seek to strengthen: marketing and communications, exposure, branding, and internal communications. 

First, with respect to marketing and communications strategies, the NYC DOE needs to craft a proactive narrative – rather than simply a reactive one – portraying the relevance and academic rigor of CTE programs.

The NYC DOE has partnerships with prestigious and impactful companies. The story the NYC DOE should tell: Where else will your child learn to get an FAA certification and be sought by airports across the country? This will make your child care more about their academics too, because students will see the relevance of their academic work to their careers (and we can show you this impact is common).

This narrative should also promote CTE as an “academic-plus” program, which reflects authentic incorporation of STEM learning into its DNA. One key to realizing the shift from academic-minus to academic-plus for all CTE programs is the management of unspoken perceptions and beliefs, which animate how stakeholders engage with and react to one another. Most markedly, these unspoken beliefs reveal generational gaps where parents carry on with outdated perceptions while students understand the fundamental value proposition.

CTE is rigorous. Students are not only required to accomplish the same academic requirements as any other school, but they must meet 7 additional CTE specific credits.

The marketing suggestions we offered must also be coupled with a revamped communications strategy. The new proactive narrative must be communicated to stakeholders utilizing formats and techniques which “meets the stakeholders where they are,” empathizing with their experience and time constraints.

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68 Please see appendix for full recommendations matrix
69 See appendix for full list of core messages
The NYC DOE, accordingly, would be well served by putting together comprehensive one-page overviews of their program: one, which targets families and another for industry partners. The former could include course offerings, prerequisites, internship opportunities and career pathways. Industry-focused collateral would include topics such as: different options for engagement, the long and short-term benefits of this partnership, incentives and liability policies.

Secondly, it is of paramount importance that the NYC DOE increase early student exposure to CTE programs specifically with consideration to middle schools. This could be accomplished through career exploration fairs and workshops. In North Carolina, for example, student exposure to industry begins at an earlier stage with both a career exploration course in middle school and career management course in high school. Students are likely more able to pursue paths most appropriate for their interests.

Beyond this, the NYC DOE can help facilitate further opportunities for middle school students, as well as, for new high school students (9th grade students, or those who are new to the school district). For examples, these younger students could shadow high school students and observe their daily course work at school, or perhaps even their internships. This is not only useful for furthering attracting students to the program, but it also provides a more systemic understanding of education and a more nuanced understanding of CTE’s contributions to that system.

Middle school guidance counselors, however, are key influencers for students. Yet, they often reflect the generational perception gap, which continues to stymie early and positive student exposure to CTE. Therefore, it is crucial that middle school counselors become more familiar with the academic-plus model, which defines CTE. These counselors should be guided to the research pointing to enhanced academic performance stemming from CTE programs, too.

Outreach to students and families in their neighborhoods is crucial. The NYC DOE must actively leverage community centric locations, such as churches, community centers, etc., by frequently organizing CTE specific school fairs in these places. Ultimately, the NYC DOE
must engage in more and better marketing with engagement efforts rooted at reaching families in their communities, in their vocabularies, on their terms.

Third, in an effort to revitalize the CTE brand, our team suggests that the web presence of the NYC DOE’s CTE offerings presents a timely opportunity to the Graphics Commission and its students to spruce up the NYC DOE’s web presence. As teens participating in the program, they would likely have a compelling and insightful input regarding the benefits of their CTE experience. Given the knowledge base and expertise within the graphics commission with its emphasis on community-building, private scholarships for students and student competitions, they appear particularly well placed to share the CTE story with prospective participants and advocates.

The NYC DOE must also consider both offline and online platforms, where perhaps, student led YouTube videos championing the value and success of CTE would be especially persuasive for both students and parents alike.

13.1 Suggested core messaging

<table>
<thead>
<tr>
<th>For Student and Parents</th>
<th>For Industry Partners</th>
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<tbody>
<tr>
<td>CTE is an “Academic Plus” program</td>
<td>Strengthen NYC’s economy</td>
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<tr>
<td>CTE brings STEM + practical learning</td>
<td>Identify and develop next-generation leaders</td>
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<tr>
<td>CTE provides students with the tools for 21st century work and learning</td>
<td>Guide skills development for your industry</td>
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<tr>
<td>Increases access to quality jobs and higher education opportunities</td>
<td>Lower staff turnover and cut company costs</td>
</tr>
<tr>
<td>Increases average salaries</td>
<td>Align academic work with real life experience</td>
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</table>
Lastly, we recommend the NYC DOE enhance internal communications between industry, schools, and the NYC DOE through the designation of a point of contact responsible for each CTE track. The NYC DOE needs to be extremely sensitive to the texture of their industry engagement.

Industry sees its role in this equation as providing a service to students in New York City. Industry considers mutual respect critical but it is also true that some industry players do not see themselves as peers to the NYC DOE. By extension, industry partners need increased sensitivity for the already over-burdened teachers attempting to build ties with industry for future student engagement. This appointed contact could thoughtfully and empathetically navigate the differing work cultures, demands and expectations for industry, schools and the NYC DOE. This would alleviate undue stress and miscommunication between stakeholders.

With these key findings and recommendations in mind, we hope to improve the educational experience for students throughout New York City largely by reframing the narrative, streamlining communication, and marketing broadly. As skilled workforces retire and new industries emerge with large demand for workers, CTE is an increasingly crucial component of our 21st century education system. The New York City CTE program is an impressive and expansive system fraught with many complicated challenges, but more importantly, capable of tremendous and meaningful impact for students, families, partners, and schools. It is our dearest hope that this report sheds light on opportunities for further innovations for schools and partners, but also that it will help to better guide students toward a transformative, rigorous, and relevant education experience.
# 14 Appendices

Table 1:

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<tr>
<th>Goal</th>
<th>Strategy</th>
<th>Tactics</th>
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<tbody>
<tr>
<td>Enhance marketing and communications</td>
<td>Target students and parents</td>
<td>Pitch as “academic-plus” and link to STEM</td>
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<td>strategy</td>
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<td>Have a one-pager outlining the benefits of the program</td>
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<td>Career exploration fairs and workshops in middle schools</td>
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<td>Target industry partners</td>
<td>Highlight the soft and hard skills gained by CTE students</td>
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<td>One-page overview outlining the ways to get involved</td>
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<td>Design and market incentives such as tax breaks, compensation, increased</td>
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<td>access to government dignitaries</td>
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<td>Exposure to CTE programs</td>
<td>Current middle school students</td>
<td>Middle school students to shadow high school students</td>
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<td>Train middle school counselors to inform students about CTE</td>
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<td>Timely and frequent CTE specific school fairs in community centric</td>
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<td>locations such as churches, community centers etc.</td>
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<td>New high school students</td>
<td>9th grade students observe 11th and 12th graders</td>
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<td>Clearly communicate track pathways and pre-requisites</td>
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<td>Branding</td>
<td>DOE to focus on creating a strong</td>
<td>Revitalize CTE brand by leveraging Graphic Design Commission and student</td>
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<td>brand name for CTE</td>
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<td>Communicate existing successes beyond just the website and word-of-mouth,</td>
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<td>e.g.: student you-tube videos, promotional material in community centers</td>
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<td>Internal communications</td>
<td>Enhance Alignment Between Industry,</td>
<td>Designated point of contact for each track to effectively manage</td>
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<td>Schools, and DOE</td>
<td>expectations between industry, schools and DOE</td>
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Table 2:

Graduation Rates —— 20% higher graduation rate from CTE than non-CTE schools

Table 3:

**Demographics**  →  African American students showed largest gains from CTE

Table 4:

**Academic Gains** – below average 8th grade ELA scores, CTE sees strongest improvement

<table>
<thead>
<tr>
<th>Level</th>
<th>CTE</th>
<th>Non-CTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELA Level 1</td>
<td>21.60%</td>
<td>29.10%</td>
</tr>
<tr>
<td>ELA Level 2</td>
<td>61.70%</td>
<td>56.90%</td>
</tr>
<tr>
<td>ELA Level 3</td>
<td>87.80%</td>
<td>86.00%</td>
</tr>
<tr>
<td>ELA Level 4</td>
<td>96.60%</td>
<td>96.80%</td>
</tr>
</tbody>
</table>

Table 5:

**Academic Gains** — below average 8th grade math scores, CTE sees strongest improvement

<table>
<thead>
<tr>
<th>Math Level</th>
<th>CTE</th>
<th>Non-CTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1</td>
<td>23.00%</td>
<td>23.30%</td>
</tr>
<tr>
<td>Level 2</td>
<td>52.80%</td>
<td>49.10%</td>
</tr>
<tr>
<td>Level 3</td>
<td>84.40%</td>
<td>79.70%</td>
</tr>
<tr>
<td>Level 4</td>
<td>95.10%</td>
<td>96.60%</td>
</tr>
</tbody>
</table>

Table 6: Percentage of small-business owners with positions they cannot fill.

Source: National Federation of Independent Business | WSJ.com

Table 7: Not-Seasonally Adjusted Unemployment For New York City, New York State and the US (a) and Not Seasonally Adjusted Unemployment by Borough (b).
Table 8: Comparison of CTE versus Non-CTE high school credits earned nationwide between 1990-2009

<table>
<thead>
<tr>
<th>Nationwide credits</th>
<th>1990</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average number of CTE credits earned by U.S. Public High School graduates</td>
<td>4.2</td>
<td>3.6</td>
</tr>
<tr>
<td>Course-taking in occupational areas, such as agriculture and natural resources or business</td>
<td>2.7</td>
<td>2.5</td>
</tr>
<tr>
<td>Non-occupational areas, such as general labor market preparation, consumer and family studies, etc.</td>
<td>1.5</td>
<td>1.1</td>
</tr>
<tr>
<td>Average credits earned in core academic fields, such as</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• English</td>
<td>4.25</td>
<td>4.4</td>
</tr>
<tr>
<td>• Mathematics</td>
<td>3.25</td>
<td>3.75</td>
</tr>
<tr>
<td>• Science</td>
<td>2.75</td>
<td>3.5</td>
</tr>
<tr>
<td>• Social Studies</td>
<td>3.5</td>
<td>4.1</td>
</tr>
<tr>
<td>Percentage of graduates who earned credit in any occupational CTE area</td>
<td>88%</td>
<td>85%</td>
</tr>
</tbody>
</table>

Table 9: Nationwide percentage reflection in CTE program between 2007-08

<table>
<thead>
<tr>
<th>Performance level</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased graduation rates for career and technical education students compared to all students who graduate with a regular diploma or GED</td>
<td>96% (50 of the 52 states*)</td>
</tr>
<tr>
<td>Secondary career and technical education student enrollment</td>
<td>12% increase</td>
</tr>
<tr>
<td>Postsecondary career and technical education student enrollment</td>
<td>10% increase</td>
</tr>
<tr>
<td>Adult career and technical education student enrollment</td>
<td>8% increase</td>
</tr>
<tr>
<td>Meeting or exceeding performance level after CTE</td>
<td>93% (50 of the 54 states**)</td>
</tr>
<tr>
<td>Meeting or exceeding all secondary and postsecondary performance level</td>
<td>80% (42 of the 53 states)</td>
</tr>
<tr>
<td>Meeting or exceeding postsecondary student placement performance level</td>
<td>87% (47 of the 54 states)</td>
</tr>
</tbody>
</table>


* 50 states, District of Columbia and Commonwealth of Puerto Rico are required to report on academic achievement and general statewide graduation rates under ESEA to the Office of Elementary and Secondary Education in the Education Data Exchange Network (EDEN).

** 50 states, District of Columbia, Commonwealth of Puerto Rico and three of the outlying areas – The Unites States Virgin Islands, Guam and the Republic of Palau.
Table 10: Federal Performance Indicators Stipulated in Perkins IV

<table>
<thead>
<tr>
<th>Secondary Level:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• 1S1: Academic Attainment in Reading/Language Arts</td>
</tr>
<tr>
<td>• 1S2: Academic Attainment in Mathematics</td>
</tr>
<tr>
<td>• 2S1: Technical Skill Attainment</td>
</tr>
<tr>
<td>• 3S1: Secondary School Completion</td>
</tr>
<tr>
<td>• 4S1: Student Graduation Rate</td>
</tr>
<tr>
<td>• 5S1: Secondary Placement</td>
</tr>
<tr>
<td>• 6S1: Nontraditional Participation</td>
</tr>
<tr>
<td>• 6S2: Nontraditional Completion</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Postsecondary Level:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• 1P1: Technical Skill Attainment</td>
</tr>
<tr>
<td>• 2P1: Credential, Certificate or Diploma</td>
</tr>
<tr>
<td>• 3P1: Student Retention or Transfer</td>
</tr>
<tr>
<td>• 4P1: Student Placement</td>
</tr>
<tr>
<td>• 5P1: Nontraditional Participation</td>
</tr>
<tr>
<td>• 5P2: Nontraditional Completion</td>
</tr>
</tbody>
</table>
Table 11: Indicators found in other states’ report cards

<table>
<thead>
<tr>
<th>Indicators Found in Report Cards</th>
</tr>
</thead>
<tbody>
<tr>
<td>• CTE participation</td>
</tr>
<tr>
<td>• CTE completion (pathway completion, concentrators)</td>
</tr>
<tr>
<td>• CTE diploma/endorsement</td>
</tr>
<tr>
<td>• Industry credentials</td>
</tr>
<tr>
<td>• Skills assessment</td>
</tr>
<tr>
<td>• Academic career-ready assessment</td>
</tr>
<tr>
<td>• Employability assessment</td>
</tr>
<tr>
<td>• Dual enrollment participation</td>
</tr>
<tr>
<td>• Dual enrollment credits earned</td>
</tr>
<tr>
<td>• Work-based learning</td>
</tr>
<tr>
<td>• CTSO participation</td>
</tr>
<tr>
<td>• Postsecondary enrollment rates</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Some of the Other Indicators Found</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Students in college and career readiness planning</td>
</tr>
<tr>
<td>• Graduation rate/attainment of advanced diploma by CTE concentrators</td>
</tr>
<tr>
<td>• Placement rate for CTE completers</td>
</tr>
<tr>
<td>• Percentage of students enrolled in CTE courses who earn a 2.0 or above on the final course grade</td>
</tr>
</tbody>
</table>
15 List of abbreviations

New York City Department of Education (NYCDOE)

Career and Technical Education (CTE)

Vocational and Technical Education (VTE)

New York City Labor Market Information Service (NYCLMIS)

Success Via Apprenticeship (SVA)

Institutional Review Board (IRB)
16 Bibliography


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A progressive Vision for a Thriving New York City Tech Industry

NYC Labor Market Information Service

Vocational Students Graduate at Higher Rates
http://www.cranisnewyork.com/article/20140224/BLOGS04/140229933/vocational-students-graduate-at-higher-rates