**The School District of Philadelphia**

**The Office of Research and Evaluation**

# Career and Technical Education (CTE) Program Evaluation

## Mid-Year Report

**2014**

# The School District of Philadelphia
# Career and Technical Education (CTE)
# Mid-Year Evaluation Report

Prepared for:
***The Office of Career and Technical Education***

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# Introduction

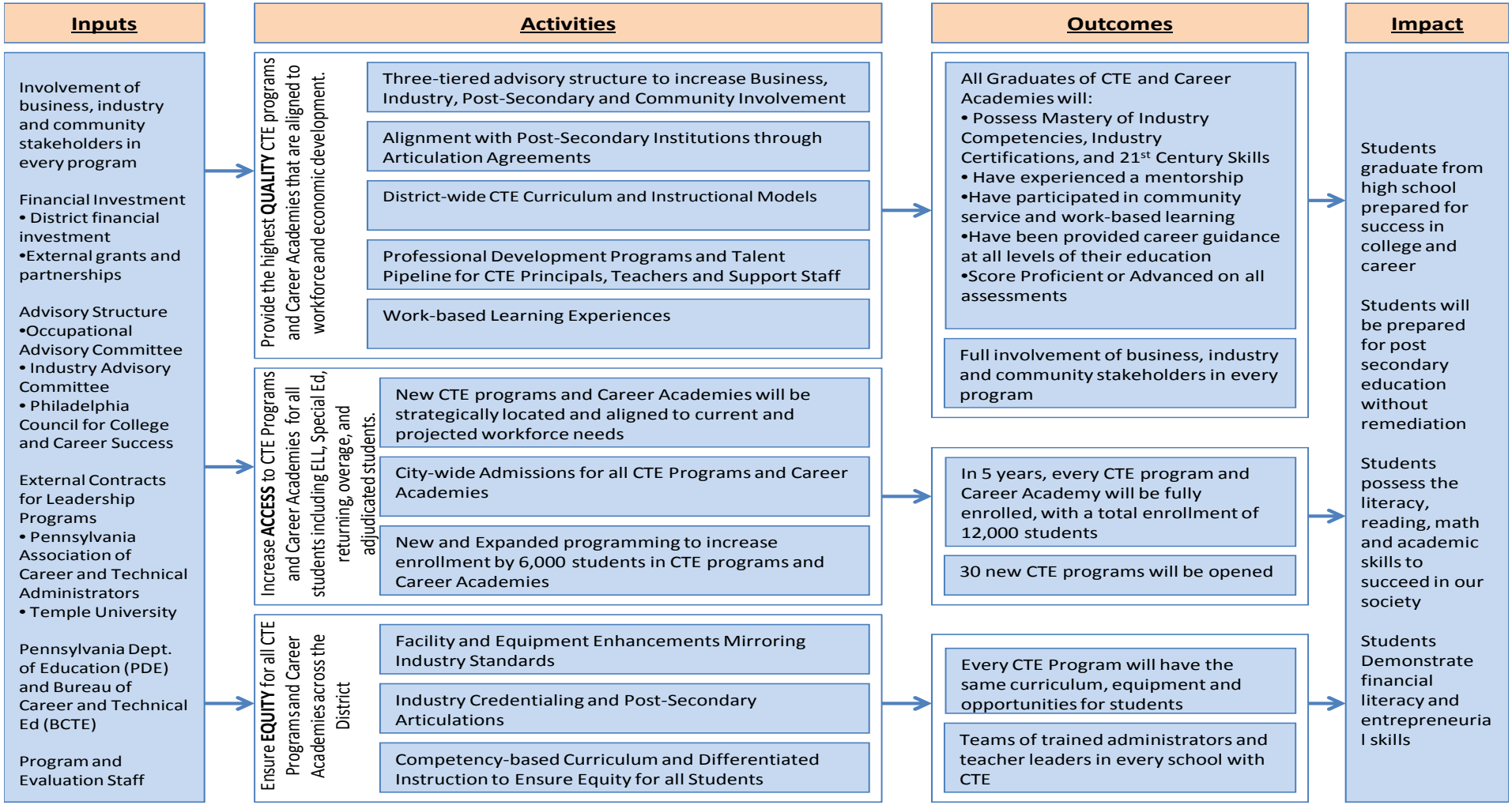
Career and Technical Education (CTE) programs are designed to equip high school students with the technical skills needed to enter the job market upon graduation. Nationally, 14 million students are enrolled in CTE programs in approximately 1,300 high schools and 1,700 two-year colleges. CTE evolved from vocational programs, and in recent years there has been an effort on the part of CTE educators and leaders to not only prepare students for jobs, but also equip them with academic skills necessary for pursuing post-secondary education (National Center for Career and Technical Education 2005).

A career-related education provides a means for acquiring skills that are valued by employers: academic skills, computer skills, and basic work behaviors. Teaching these skills in a vocational context is an effective means of engaging some students in learning who would not otherwise be so engaged (Cohen and Besharov, 2002). In the past decade, there has been a push within the CTE community to create coursework geared toward "career clusters" (e.g. agriculture, architecture, and health science). Many believe that providing such focused programs of study is a critical lever for student success (National Association of State Directors of Career Technical Education Consortium, 2012). CTE programs have also been seen as a viable means of preventing high school drop-out and promoting attendance, especially for high-risk youth.

CTE programs are primarily funded by the *Carl D. Perkins Career and Technical Education Improvement Act* (Perkins IV), a federal mandate. Ninety percent of these funds are appropriated to basic grants with which states can make spending decisions according to their unique needs. The existing body of research on CTE programming focuses on job readiness, accountability measures, teacher preparedness, and curricula's ability to prepare students to be competitive in the global economy. Over the last decade, federal legislation has mandated greater accountability requirements for local CTE programs (Castellano and Stringfield 2003). Such requirements include rigorous academic standards and curricula aligned to the skills needed in today's economy.

The mission of the School District of Philadelphia's (SDP) Career and Technical Education (CTE) office is to deliver high quality CTE programs that provide students with the opportunity to acquire the appropriate academic and technical skills to be prepared for the high-skill, high-wage, and high-priority occupations of a competitive 21$^{st}$ century global economy. SDP's *Five-Year Strategic Plan for Career and Technical Education* aligns with the broader District goal of improving academic outcomes for students in all public and charter schools, and aims to "improve the quality, access and equity for Career and Technical Education Programs and Career Academies across the entire district." The logic model in Figure 1, below, represents the inputs, activities, outcomes, and desired impacts of SDP's CTE programs.

## Career and Technical Education (CTE) Logic Model
## The School District of Philadelphia



Through the CTE office, SDP offers 111[1] CTE programs in 37 occupational areas. These programs are offered in 28[2] high schools across the District and are organized as part of 16 Career Clusters© in order to provide students with relevant contexts for studying and learning. Each Career Cluster© represents a distinct grouping of occupations and industries based on the knowledge and skills they require. In 2013-2014, SDP maintained programs in the following Career Clusters©:

- **Agriculture, Food & Natural Resources -** The production, processing, marketing, distribution, financing, and development of agricultural commodities and resources including food, fiber, wood products, natural resources, horticulture, and other plant and animal products/resources.

- **Architecture & Construction-** Careers in designing, planning, managing, building and maintaining the built environment.

- **Arts, A/V Technology & Communications -** Designing, producing, exhibiting, performing, writing, and publishing multimedia content including visual and performing arts and design, journalism, and entertainment services.

- **Education & Training (Not currently offered at SDP) -** Planning, managing and providing education and training services, and related learning support services such as administration, teaching/training, administrative support, and professional support services.

- **Finance -** Planning and related services for financial and investment planning, banking, insurance, and business financial management.

- **Government & Public Administration (Not currently offered at SDP) -** Planning and executing government functions at the local, state and federal levels, including governance, national security, foreign service, planning, revenue and taxation, and regulations.

- **Health Science -** Planning, managing, and providing therapeutic services, diagnostic services, health informatics, support services, and biotechnology research and development.

- **Hospitality & Tourism -** Preparing individuals for employment in career pathways that relate to families and human needs such as restaurant and food/beverage services, lodging, travel and tourism, recreation, amusement and attractions.

[1] This count DOES NOT include the following programs: Automotive Mechanics at Martin Luther King HS, which is a state-approved program, but is not offered in 2013-2014 due to staffing changes; Welding at Swenson High School, which was state-approved mid-way through the 2013-2014 school year, and does not have any students currently enrolled; and programs that are being offered in 2013-2014 but are not yet state-approved (Cinematography at Science Leadership Academy, Culinary Arts at Ben Franklin HS, Engineering at Workshop School, and Biotechnology at Roxborough HS). The count DOES include Business Technology and Health Related Technology Programs offered at Franklin Learning Center, which are not captured in the District's Data Warehouse system due to FLC's use of a different central data system.

[2] Count does not include SLA or Ben Franklin HS, which are offering new programs that are not yet state-approved.

- **Human Services -** Preparing individuals for employment in career pathways that relate to families and human needs such as counseling and mental health services, family and community services, personal care, and consumer services.

- **Information Technology -** Building linkages in IT occupations for entry level, technical, and professional careers related to the design, development, support and management of hardware, software, multimedia and systems integration services.

- **Law, Public Safety, Corrections & Security -** Planning, managing, and providing legal, public safety, protective services and homeland security, including professional and technical support services.

- **Manufacturing -** Planning, managing and performing the processing of materials into intermediate or final products and related professional and technical support activities such as production planning and control, maintenance and manufacturing/process engineering.

- **Marketing -** Planning, managing, and performing marketing activities to reach organizational objectives such as brand management, professional sales, merchandising, marketing communications and market research.

- **Science, Technology, Engineering & Mathematics -** Planning, managing, and providing scientific research and professional and technical services (e.g., physical science, social science, engineering) including laboratory and testing services, and research and development services

- **Transportation, Distribution & Logistics -** The planning, management, and movement of people, materials, and goods by road, pipeline, air, rail and water and related professional and technical support services such as transportation infrastructure planning and management, logistics services, mobile equipment and facility maintenance.

Source: National Association of State Directors of Career and Technical Education Consortium (NASDCTEc)

The School District of Philadelphia's state-approved CTE programs are typically three-year programs of study that provide 1,080 hours of instruction and afford students the opportunity to earn recognized industry certifications. Programs typically begin in grade 10 and continue through grade 12, with an end-of-program assessment (NOCTI) that is administered in grade 12.[3] Most of SDP's CTE programs follow a similar course sequence over three years.[4] For example, the *Commercial and Advertising Art Program* consists of the following courses:

| Grade | Course |
|---|---|
| 10 | Commercial and Advertising Art 1 |
| 11 | Commercial and Advertising Art 2 |
| 12 | Commercial and Advertising Art 3 |

The grid in Figure 2 is a visual display of CTE course sequencing and contains spaces displaying '123,' '23, '2' or '1,' depending on the requirements of the particular program. Programs coded with a '123' indicate that the program at a particular school offers Course 1, Course 2, and Course 3, as described in the previous paragraph. The spaces displaying '12' indicate a school is only offering Course 1 and Course 2 of a program during the 2013-2014 school year. This may occur if the program was new at the school in 2012-2013, and therefore does not yet have any students who have reached Course 3. Programs coded '23' only offer Course 2 and Course 3 of a program this year. This is the case for the *Cinematography and Film/Video Production* program at Kensington CAPA. The entire program was transferred from a school that was closed at the end of 2012-2013. The programs coded '1' indicate a school is only offering Course 1 of a program during the 2013-2014 school year. This is generally the case for programs that are new this year, such as the *Accounting* program at Furness and the *Building/Property Maintenance* program at Overbrook.

[3] Some programs do not have a NOCTI exam aligned with the program and SDP receives a waiver exempting students from the end of program assessment. The state is still developing new NOCTI exams for those programs for which they currently issue waivers.

[4] Northeast High School's *Communications Technology* program is an exception to this sequence; students take a cluster of six, one-credit courses.

**Figure 2. CTE Program Offerings in 2013-2014 School Year**

| | 1.0401 AGRICULTURAL FOODS PRODUCTS & FOO | 1.0601 APPLIED HORTICULTURE & HORTICULTUR | 1.0901 ANIMAL SCIENCES | 3.0299 Natural Resources Management | 10.9999 COMMUNICATIONS TECHNOLOGY | 11.0801 WEB DESIGN | 11.0901 COMPUTER NETWORKING | 12.0401 COSMETOLOGY | 12.0402 BARBERING | 12.0501 BAKER/PASTRY CHEF | 12.0503 CULINARY ARTS | 15.1202 COMPUTER SYSTEMS TECHNOLOGY | 15.1501 DRAFTING AND DESIGN TECHNOLOGY | 15.1303 ARCHITECTURAL DRAFTING | 15.9999 ENGINEERING RELATED TECH | 19.0708 CHILD CARE MANAGEMENT | 19.0905 APPAREL & TEXTILE MARKETING MGMT. | 46.0201 CARPENTER | 46.0599 ELECTRICAL POWER INSTALLER | 46.0401 BUILDING/PROPERTY MAINTENANCE | 46.0503 PLUMBING TECHNOLOGY | 46.9999 CONSTRUCTION TRADES | 47.0106 APPLIANCE INSTALLATION & REPAIR TECH | 47.0201 HEATING, AIR COND. & REFRIG. MAINTEN | 47.0603 AUTO BODY/COLLISION REPAIR TECH | 47.0604 AUTOMOTIVE MECHANICS TECHNOLOGY | 48.0508 WELDING TECHNOLOGY | 50.0402 COMMERCIAL & ADVERTISING ART | 50.0602 CINEMATOGRAPHY & FILM/VIDEO PRODU | 51.0601 DENTAL ASSISTING | 51.0707 MEDICAL RECORDS TECHNOLOGY | 51.0904 FIRE SCIENCE/FIRE FIGHTING | 51.9999 HEALTH CARE TECHNOLOGY | 52.0203 LOGISTICS & MATERIALS MANAGEMENT | 52.0302 ACCOUNTING | 52.0401 BUSINESS TECHNOLOGY | 52.1801 SPORTS MARKETING AND MANAGEMENT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CREATIVE AND PERFORMING ARTS HIGH SCHOOL | | | | | | | | | | | | | | | | | | | | | | | | | | | 123 | 123 | | | | | | | | |
| DOBBINS, MURRELL HIGH SCHOOL | | | | | | | | 123 | 123 | | 123 | | | | | | 123 | | | | 123 | | | | | | 123 | | | | | | | | 123 | |
| EDISON, THOMAS A. HIGH SCHOOL | | | | | | | | 123 | | | 123 | 123 | | | | 123 | | | 123 | | 12 | | 123 | 123 | 123 | 123 | 123 | 123 | | | | 123 | 123 | | | |
| FELS, SAMUEL SR. HIGH | | | | | | | | | | | | | | | | | | | | | | | | | | | 123 | 123 | | | | | | | | |
| FRANKFORD HIGH SCHOOL | | | | | | | | | | | 123 | | | | | | | | | 123* | | | | | | | | | | | | | | | | |
| FRANKLIN LEARNING CENTER** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 123 | | | 123 | |
| FURNESS, HORACE HIGH SCHOOL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | |
| H.S. OF ENGINEERING & SCIENCE ENGINEERING & SCIENCE | | | | | | | | | | | | | | | 123 | | | | | | | | | | | | | | | | | | | | |
| JOHN BARTRAM HIGH SCHOOL | | | | | | 123 | | | | | | | | | | | | | | | | | | | | | 123 | 123 | | | | 12 | | | | |
| KENSINGTON BUS, FIN & ENT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 12 | | 1 |
| KENSINGTON CAPA | | | | | | | | | | | | | | | | | | | | | | | | | | | 123 | 23 | | | | | | | | |
| KENSINGTON HEALTH SCIENCES ACADEMY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 12 | | | 123 | | | | |
| KING, MARTIN LUTHER HIGH SCH. | | | | | | | | | | | 123 | | | | | | | | | | | | | | + | | 123 | | | | | 123 | | | 123 | |
| LINCOLN,ABRAHAM HIGH SCHOOL | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 123 | | 13 | 123 | |
| MASTBAUM, JULES E. HIGH SCHOOL | | | | | | | | | | | 123 | | | | | | | 123 | 123 | | | | | | | | 123 | | | 123 | | 123 | | | 123 | |
| NORTHEAST HIGH SCHOOL | | | | | ^ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| OVERBROOK HIGH SCHOOL | | | | | | | | | | | | | 123 | | | | | | | 1 | | | | | | | | | | | | 123 | | | | |
| PENN TREATY HIGH SCHOOL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 123 | | 123 |
| RANDOLPH TECH HIGH SCHOOL | | | | | | | | | | | 123 | | | | | | | | | | 123 | 123 | | | 123 | 123 | 12 | | | 123 | | 123 | 123 | | | | |
| ROBESON - HUMAN SERV HS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 123 | | | | |
| ROXBOROUGH HIGH SCHOOL | | | | | | 123 | | | | | | | | | | | | | | | | | | | | | | | | | 123 | | | | 123 | |
| SAUL, WALTER B. HIGH SCHOOL | 123 | 23 | 123 | 23 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOUTH PHILADELPHIA HIGH SCHOOL | | | | | | | | | | | 123 | 123 | | | 123 | 1 | | 123 | | | | | | | | | 123 | | | | | 123 | | 13 | 123 | |
| STRAWBERRY MANSION HIGH SCHOOL | | | | | | | | | | | 1 | | | 1 | | | | | | | | | | | | | | | | | | | | | | |
| SWENSON ARTS & TECHNOLOGY H.S. | | | | | 123 | | 123 | | | 123 | 123 | | | | 123 | | | 123 | 123 | | 123 | | | | 123 | 123 | ++ | | | | | 123 | | | | |
| THE WORKSHOP SCHOOL | | | | | | | | | | | | | | | | | | | | | | | | | 123 | 123 | | | | | | | | | | |
| WASHINGTON, GEORGE HIGH SCHOOL | | | | | | | | | | | 123 | | | | | | | | | | | | | | | | | | | | | | | 9 | 1 | 123 |
| WEST PHILADELPHIA HIGH SCHOOL | | | | | 1 | | 12 | | | | | | | 123 | | | | | | | | | | | | | | | | | | | | | | |

*Frankford's data reflects only one course offered in this sequence, however this was determined to be a rostering error that will be corrected moving forward.

**Franklin Learning Center currently does not use the District's central data system, and therefore none of their students are coded as being in CTE courses in the EDS.

^Northeast's program sequence is structured differently, offering a cluter of 6 courses, rather than 3.

+ King has a state-approved Automotive Mechanic Program, but it is not offered in 2013-2014 due to staffing changes

++ Swenson has a new Welding program that was state-approved mid-way through the 2013-2014 school year, and does not have students enrolled in 2013-2014.

## Cohort Definitions and Comparisons

This report will analyze preliminary student-level outcomes related to CTE participation, focusing on students' progress through high school and factors impacting levels of CTE participation.

This analysis focuses solely on the District's 2010-2011 first-time 9th grade cohort of students. These are students in District K-12 schools who were in grade 9 for the first time in 2010-2011, and should be enrolled in grade 12 during the 2013-2014 school year.[5] Any reference in this report to 'students,' 'cohort students,' or any iteration thereof, only refers to students in this 2010-2011 cohort. For the purpose of this analysis, all students were attributed to their last school of record as of February 2014.[6]

The typical academic trajectory for a CTE student in the cohort studied is as follows:

| School Year | CTE Participation |
|---|---|
| 2010-2011 | First time 9th Grade Cohort (No CTE Course) |
| 2011-2012 | CTE Course #1 |
| 2012-2013 | CTE Course #2 |
| 2013-2014 | CTE Course #3 and graduation |

The first section of this report differentiates between two groups of students who started out in 9th grade together in 2010-2011: **CTE students** and **non-CTE students**. For the purpose of this report, a student was categorized as a CTE student if:

- The student was enrolled in a CTE program in 2012-2013, 2013-2014, or in both school years;[7] or
- The student's last school of record was one of the District's five all-CTE high schools.[8]

A student was categorized as a non-CTE student if:

- The student was not enrolled in any CTE program during 2012-2013 or 2013-2014; and
- The student's last school of record was not one of the District's five all-CTE high schools.

[6] The date of February 2014 is significant only in that it is the most recent information available at the time of this analysis. By attributing students to their last school of record, we identify where the student is currently enrolled (if they are still enrolled) or the school from which they left (if they are not currently enrolled).

[7] Ideally, this analysis would have identified students who participated in CTE 2011-2012, however the District's Education Data Warehouse (EDW) only began flagging CTE courses beginning in 2012-2013.

[8] Dobbins, Mastbaum, Randolph, Saul, Swenson

## CTE Students Compared to Non-CTE Students

### District-Level Comparison

***Current Enrollment Status***

The 2010-2011 first-time 9th grade cohort consists of 12,314 students who were enrolled in a District school in 9th grade for the first time in the 2010-2011 school year. Of this cohort, 1,940 students (15.8%) are CTE students, and 10,374 students (84.2%) are non-CTE students.

As of February 2014, 70% of cohort students were currently enrolled in a Philadelphia District, Charter or Alternative school, as opposed to having dropped-out of school or otherwise left the District. Figure 3 shows the percentage of CTE students and non-CTE students from the cohort who are currently enrolled, compared with the cohort overall. CTE students are significantly more likely to be currently enrolled than non-CTE students (p<.001). This relationship (*p*<.001) between CTE status and 'currently enrolled' status suggests that fewer CTE students are dropping out of school or leaving the District compared to their non-CTE counterparts.

**Figure 3. Percentage of 2010-2011 First-Time 9th Grade Cohort Enrolled as of February 2014, by Student Type**

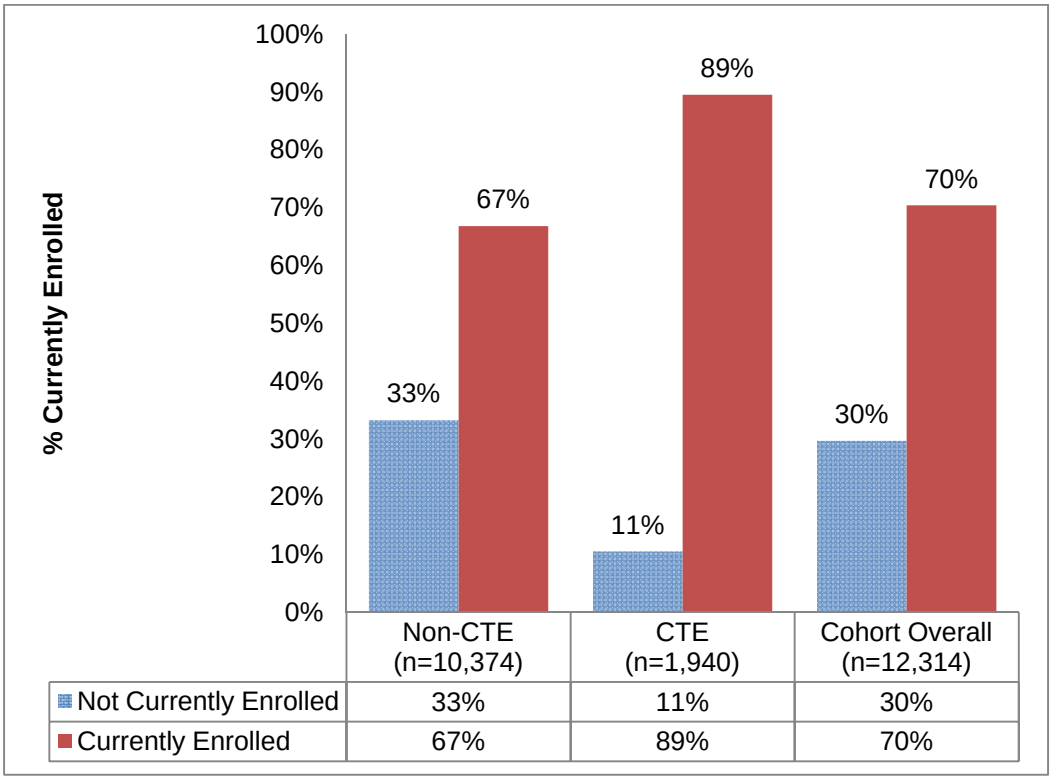
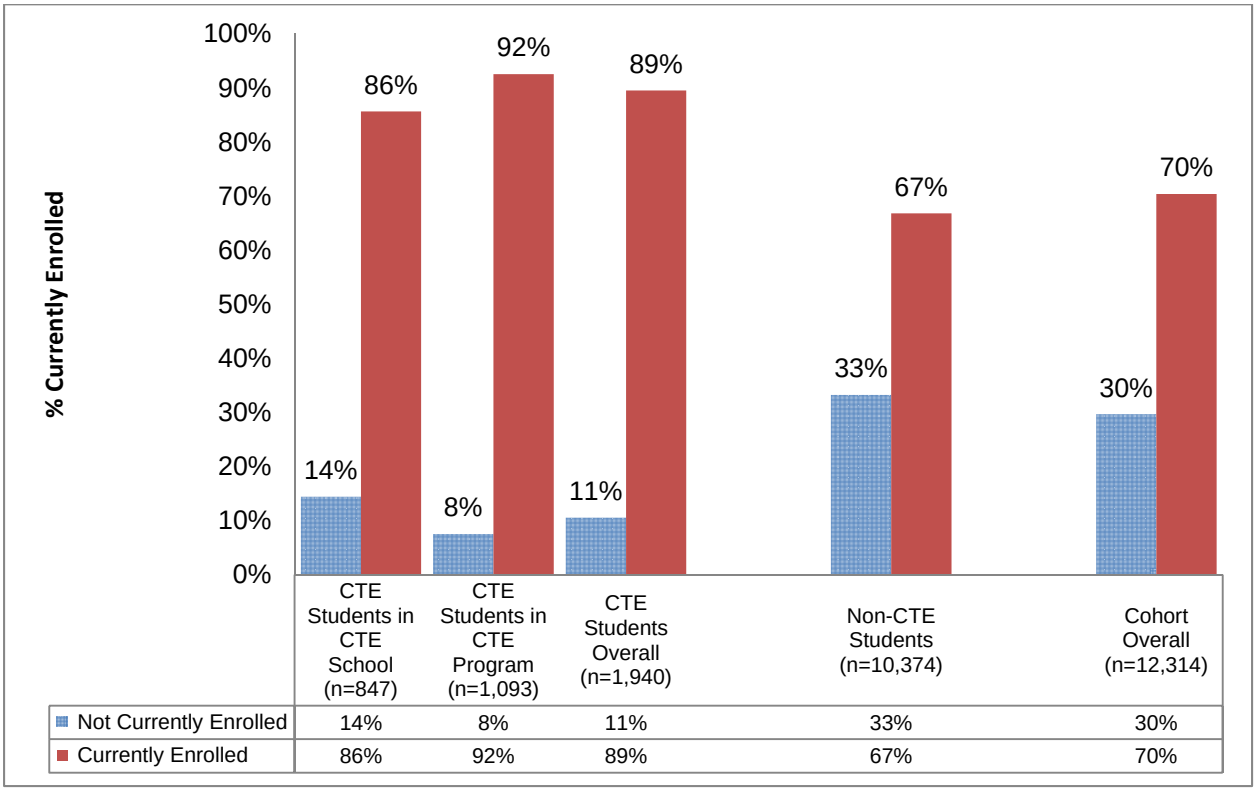



Figure 4 displays similar data but distinguishes between students who attended an all- CTE school and those who participate in a CTE program at a school other than the five all-CTE schools.

**Figure 4. Percentage of 2010-2011 First-Time 9th Grade Cohort Currently Enrolled as of February 2014, by CTE Student Type and School**




As shown in Figure 4, CTE programs have a significantly ($p<.001$) higher percentage of students currently enrolled than all-CTE schools (92% and 86%, respectively). One hypothesis about what may contribute to this difference is that some students in the first time 9th grade cohort may have left the District of otherwise dropped out before entering the 10th grade, which is when they would begin taking CTE courses. Since our methodology flagged students as 'CTE students' if their last school of record was an all-CTE school, students who enrolled in an all-CTE school in 9th grade but left the District or otherwise dropped out before the beginning of the CTE course sequence could be included in these percentages, even if they never took a CTE course.

To explore this possibility, we identified the cohort students who were still enrolled as of the 2011-2012 school year (students who had "made it through" 9th grade, so to speak). As shown in Figure 5, this accounted for some of the discrepancy between all-CTE schools and CTE programs, as the percentage of students who are currently enrolled shifted to 89% and 92%, respectively. However the difference is still significant ($p$=.011).

**Figure 5. Current Enrollment Status of the Subset of 2010-2011 First-Time 9th Grade Cohort who were Still Enrolled in 2011-2012**

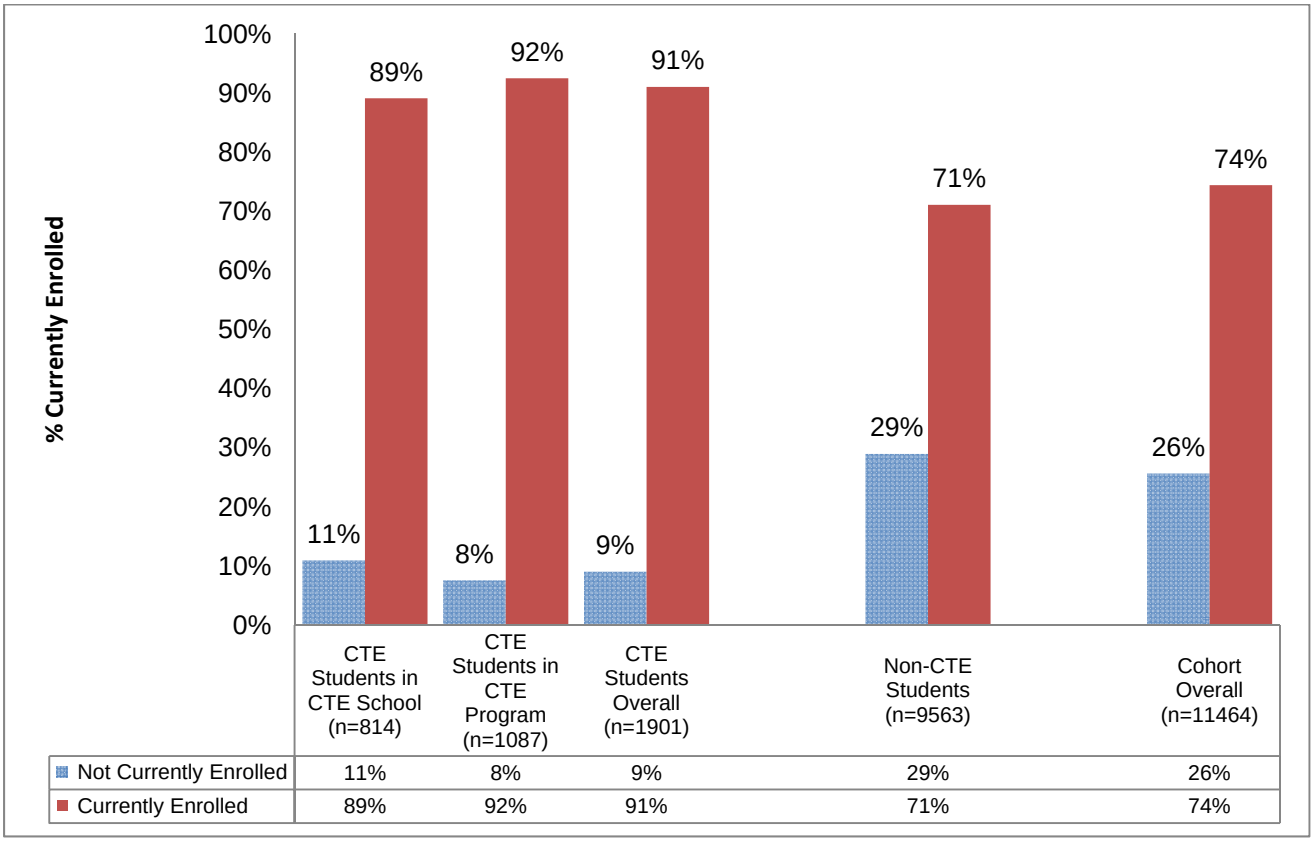



Figure 6 shows the breakdown of CTE, non-CTE and all cohort students and their final or most recent exit reason, if they are no longer enrolled. CTE students appear to have dropped out at half the rate of non-CTE students, as 4% of CTE students have dropped out, compared with 9% of non-CTE students. CTE students have left the District at one third of the rate of non-CTE students, with 4% of CTE students having moved from the District, compared with 12% of non-CTE students. One percent of CTE students have transferred to a charter, non-public, cyber charter or home school, compared with 5% of non-CTE students, indicating that non-CTE students are leaving the District for these alternative school types at five times the rate of non-CTE students.

These data suggest that not only do CTE programs appear to have an impact on individual students remaining in school rather than dropping out, but from a systems perspective, CTE programs appear to be helping to keep students enrolled in District-run schools, rather than exercising alternative school options by leaving the District or enrolling in charter, private or home schools.

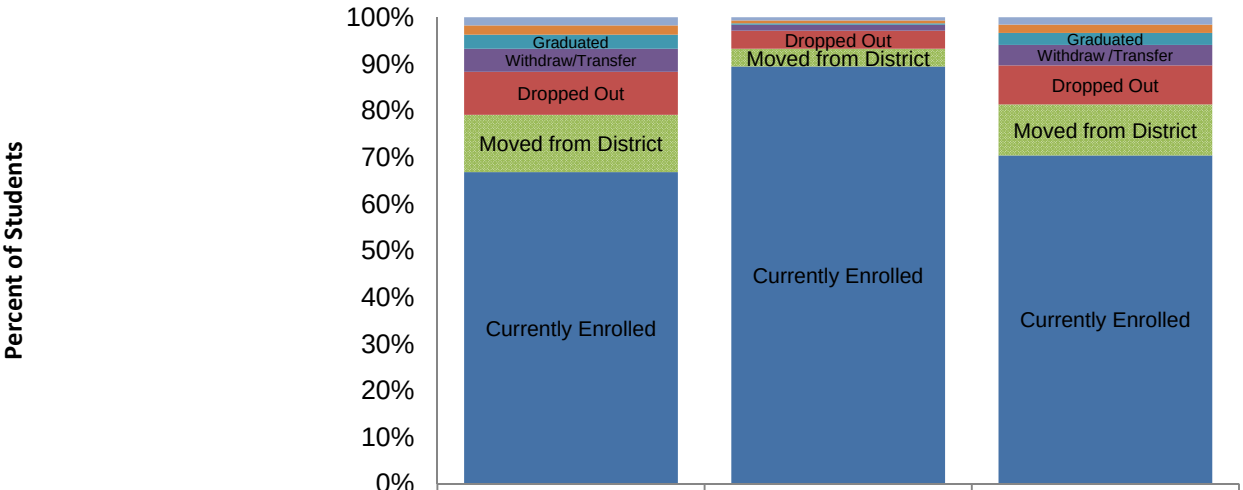
To further explore these findings, similar analyses were conducted at the individual school level. Only schools with at least ten CTE students from the 2010-2011 cohort are included in this analysis. This yielded a list of 25 schools. As shown in Table 1, a higher proportion of CTE students are still enrolled as of February 2014 compared to non-CTE students, regardless of the school attended.

**Table 1. Percentage of 2010-2011 First Time 9th Grade Students Still Enrolled as of February 2014**

| School Name | CTE Student Count | Non-CTE Student Count | Total Student Count | % CTE Currently Enrolled | % Non-CTE Currently Enrolled | % Total Currently Enrolled |
|---|---|---|---|---|---|---|
| CREATIVE AND PERFORMING ARTS H.S. | 36 | 151 | 187 | 97% | 87% | 89% |
| DOBBINS, MURRELL HIGH SCHOOL | 175 | 0* | 175 | 76% | N/A | 76% |
| EDISON, THOMAS A. HIGH SCHOOL | 160 | 213 | 373 | 86% | 31% | 55% |
| FELS, SAMUEL SR. HIGH | 25 | 323 | 348 | 100% | 68% | 70% |
| FRANKFORD HIGH SCHOOL | 15 | 412 | 427 | 87% | 59% | 60% |
| FURNESS, HORACE HIGH SCHOOL | 14 | 144 | 158 | 86% | 66% | 68% |
| H.S. OF ENGINEERING & SCIENCE | 16 | 173 | 189 | 100% | 87% | 88% |
| JOHN BARTRAM HIGH SCHOOL | 64 | 208 | 272 | 94% | 69% | 75% |
| KENSINGTON CAPA | 18 | 108 | 126 | 100% | 54% | 60% |
| KENSINGTON HEALTH SCIENCES | 12 | 71 | 83 | 92% | 69% | 72% |
| KING, MARTIN LUTHER HIGH SCH. | 65 | 240 | 305 | 88% | 59% | 65% |
| LINCOLN,ABRAHAM HIGH SCHOOL | 62 | 441 | 503 | 94% | 55% | 59% |
| MASTBAUM, JULES E. HIGH SCHOOL | 232 | 0* | 232 | 88% | N/A | 88% |
| NORTHEAST HIGH SCHOOL | 82 | 699 | 781 | 95% | 75% | 77% |
| OVERBROOK HIGH SCHOOL | 30 | 285 | 315 | 93% | 67% | 69% |
| PENN TREATY HIGH SCHOOL | 31 | 20 | 51 | 94% | 80% | 88% |
| RANDOLPH TECH HIGH SCHOOL | 119 | 0* | 119 | 86% | N/A | 86% |
| ROBESON - HUMAN SERV HS | 14 | 48 | 62 | 93% | 83% | 85% |
| ROXBOROUGH HIGH SCHOOL | 70 | 111 | 181 | 96% | 60% | 74% |
| SAUL, WALTER B. HIGH SCHOOL | 138 | 0* | 138 | 91% | N/A | 91% |
| SOUTH PHILADELPHIA H.S. | 157 | 170 | 327 | 94% | 46% | 69% |
| SWENSON ARTS & TECHNOLOGY H.S. | 183 | 0* | 183 | 87% | N/A | 87% |
| THE WORKSHOP SCHOOL | 10 | 0* | 10 | 100% | N/A | 100% |
| WASHINGTON, GEORGE H.S. | 55 | 435 | 490 | 100% | 70% | 74% |
| WEST PHILADELPHIA HIGH SCHOOL | 36 | 120 | 156 | 89% | 56% | 63% |

*These are All-CTE schools, and therefore do not have a 'Non-CTE' population, according to the criteria.

**Figure 6. Student Final or Most Recent Exit Status as of February 2014, by CTE Student Type**



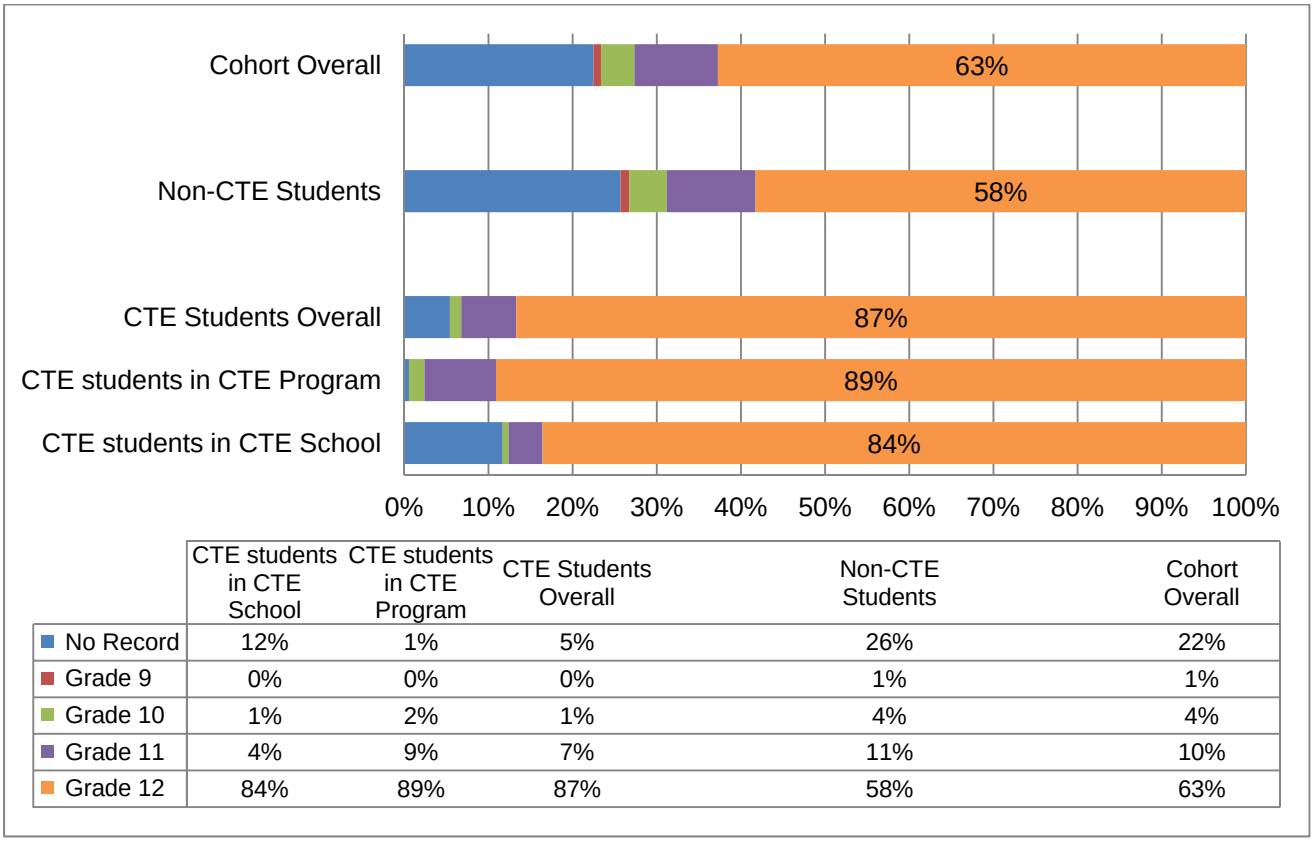

| | Non-CTE | CTE | Cohort Overall |
|---|---|---|---|
| Deceased, Incapacitated, LT Hospitalization, Foster Care, Other, No Data | 2% | 1% | 2% |
| Incarceration, Involuntary Withdrawal from Charter, Withdrawn to APS or ASES | 2% | 1% | 2% |
| Graduated- 12th grade only | 3% | 0% | 3% |
| Transfer to Charter, NP, Home School, Cyber Charter | 5% | 1% | 4% |
| Dropped Out | 9% | 4% | 8% |
| Moved from District | 12% | 4% | 11% |
| Currently Enrolled | 67% | 89% | 70% |

### *Grade Level in 2013-2014*

A similar analysis was conducted to identify whether CTE students were more likely than non-CTE students to be in grade 12 during the 2013-2014 school year, as expected based on their enrollment in the 2010-2011 first time 9th grade cohort. As shown in Figure 7, CTE students are significantly more likely than non-CTE students to be in grade 12 as of the 2013-2014 school year. Eighty-seven percent of all CTE students were enrolled in grade 12 in 2013-2014 compared to only 58% of non-CTE students, and 63% of the cohort overall.[9] According to a report from the Consortium on Chicago School Research, students who were on track at the end of 9th grade – defined as having accumulated enough credits to be promoted to 10th grade and having received no more than one semester F in a core subject – were more than three and one-half times more likely to graduate in four years than off-track students.

[9] The number and percentage of students categorized as 'No Record' in Figure 7 may not necessarily match the number and percentage of students categorized as 'Not Currently Enrolled' in Figure 3,4 and 5. This is because Figure 7 captures any data available for a student for 2013-2014, while Figures 3, 4 and 5 capture current enrollment status as of February 2014. A student may have begun the 2013-2014 school year as a 12th grader, and so is captured as such in Figure 7, but may have dropped out or left the District since the beginning of the school year, and therefore is captured as 'Not Currently Enrolled' in Figures 3, 4 and 5.

**Figure 7. Grade Levels in 2013-2014 of Students in 2010-2011 First-Time 9th Grade Cohort, by Specific CTE Student Type**




| | CTE students in CTE School | CTE students in CTE Program | CTE Students Overall | Non-CTE Students | Cohort Overall |
|---|---|---|---|---|---|
| No Record | 12% | 1% | 5% | 26% | 22% |
| Grade 9 | 0% | 0% | 0% | 1% | 1% |
| Grade 10 | 1% | 2% | 1% | 4% | 4% |
| Grade 11 | 4% | 9% | 7% | 11% | 10% |
| Grade 12 | 84% | 89% | 87% | 58% | 63% |

***Demographic and Performance Factors***

Based on the significant differences shown thus far between CTE students and non-CTE students, additional analyses were conducted to determine whether other student-level differences may be contributing to the outcomes associated with CTE participation.

First, we wanted to explore whether CTE students appeared to be achieving positive outcomes because of programmatic impacts, or if CTE students were higher performing students to begin with. To address the possibly that higher achieving students were being enrolled into CTE programs, a Mann-Whitney U test was run to determine if there were differences in 8$^{th}$ Grade PSSA Scaled Score for CTE and non-CTE students.

The results show that there was no statistically significant difference in 8$^{th}$ Grade PSSA Math Scaled Scores between CTE and non-CTE students ($U$=7,184,216, $z$=-1.745, $p$=.081), and that 8$^{th}$ Grade PSSA Reading Scaled Scores were significantly higher for non-CTE students than CTE students ($U$=6,919,829, $z$=-3.27, $p$=.001). Descriptive data for 8$^{th}$ Grade PSSA outcomes are shown in Figure 8 and Table 2.

**Figure 8. 8th Grade PSSA Scale Scores for CTE and non-CTE Students**

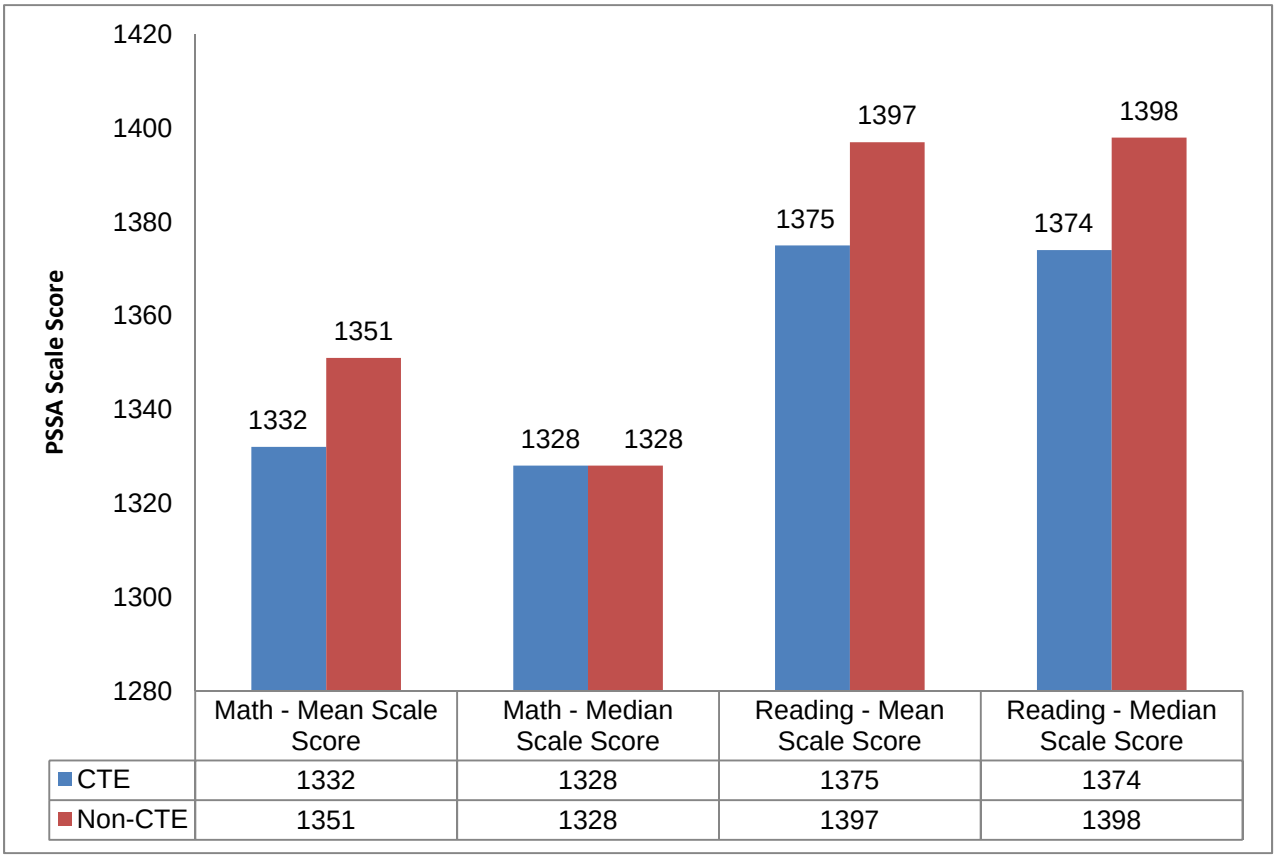



**Table 2. 8th Grade PSSA Proficiency Levels for CTE and non-CTE Students**

| Indicator | Proficiency Level | CTE | | Non-CTE | |
|---|---|---|---|---|---|
| 8th Grade PSSA Math+^ | Below Basic | 21% | 43% | 27% | 44% |
| | Basic | 22% | | 17% | |
| | Proficient | 29% | 57% | 21% | 56% |
| | Advanced | 28% | | 35% | |
| 8th Grade PSSA Reading+^ | Below Basic | 15% | 31% | 18% | 33% |
| | Basic | 16% | | 15% | |
| | Proficient | 36% | 69% | 30% | 68% |
| | Advanced | 33% | | 38% | |

+ Percentages include only students for whom 8th grade PSSA data are available.

^ The 2009-2010 school year was categorized by particularly high PSSA scores.

In addition to academic data, demographic data were analyzed to identify indicators correlated with CTE enrollment for this cohort. A chi-square test for association was conducted for gender, disability status, ELL status, ethnicity and CTE enrollment.

There was a statistically significant relationship between gender and CTE participation, with male students more likely to be in CTE than female students, ϕ=-.033, *p*=.000.

There was a statistically significant relationship between disability status and CTE participation, ϕ=-.025, *p*=.005. Students without an IEP were more likely to be in CTE than students with an IEP.

No significant relationship was found between ELL status and CTE participation ϕ=-.012, *p*=.168. ELL students were no more or less likely to participate in CTE than non-ELL students.

There was a statistically significant relationship between all ethnicity types and CTE participation. African American students and Latino students were more likely to participate in CTE than non-African American and Latino students, ϕ=.045, *p*=.000 and ϕ=.022, *p*=.014, respectively. White students and Asian students were less likely to participate in CTE than non-White and non-Asian students, ϕ=-.037, *p*=.000 and ϕ=-.053, *p*=.000.

These results, as well as descriptive statistics are shown in Table 3.

**Table 3. Demographics of CTE and non-CTE Students**

| Indicator | Proficiency Level | CTE | Non-CTE | ϕ[10] | *p*[11] |
|---|---|---|---|---|---|
| Gender | Male | 55% | 50% | -.033* | .000 |
| | Female | 45% | 50% | | |
| IEP | IEP | 14% | 16% | -.025* | .005 |
| | No IEP | 86% | 84% | | |
| ELL | ELL | 9% | 8% | -.012 | .168 |
| | Non-ELL | 91% | 92% | | |
| Ethnicity | African American | 63% | 57% | .045* | .000 |
| | Latino | 20% | 18% | .022* | .014 |
| | White | 11% | 15% | -.037* | .000 |
| | Asian | 5% | 9% | -.053* | .000 |

*Correlation is significant at the 0.05 level (2-tailed).

[10] Indicates strength and direction of the correlation, giving a value between +1 and −1, where 1 is a perfect positive correlation, 0 is no correlation, and −1 is a perfect negative correlation.

[11] The p-value estimates the probability of seeing the corresponding r-value of this size just by chance.

In Table 4, students were aggregated based on the Career Cluster© aligned with their 2013-2014 CTE course[12]. The percentage of female students ranges from a low of 8% in the *Transportation, Distribution and Logistics* cluster to a high of 80% in the *Health Science* cluster. The percentage of students with disabilities ranges from a low of 5% in the *Finance* cluster to a high of 34% in the *Transportation, Distribution and Logistics* cluster. The percentage of Black/African American and Hispanic/Latino students ranges from a low of 64% in the *Finance* cluster to a high of 98% in the *Human Services* cluster.[13]

**Table 4. Student Demographics by Career Cluster©**

| Career Cluster | Total Students | Female | | Disability | | Black or Latino | | Cluster % of all CTE |
|---|---|---|---|---|---|---|---|---|
| | | # | % | # | % | # | % | |
| Agriculture, Food & Natural Resources | 125 | 75 | 60% | 23 | 18% | 98 | 78% | 9% |
| Architecture & Construction | 122 | 13 | 11% | 24 | 20% | 110 | 90% | 9% |
| Arts, A/V Technology & Communications | 284 | 110 | 39% | 54 | 19% | 226 | 80% | 20% |
| Business Management & Administration | 98 | 48 | 49% | 16 | 16% | 90 | 92% | 7% |
| Education & Training | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Finance | 39 | 13 | 33% | 2 | 5% | 25 | 64% | 3% |
| Government and Public Administration | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Health Science | 188 | 151 | 80% | 20 | 11% | 169 | 90% | 13% |
| Hospitality & Tourism | 205 | 138 | 67% | 45 | 22% | 180 | 88% | 14% |
| Human Services | 55 | 43 | 78% | 10 | 18% | 54 | 98% | 4% |
| Information Technology | 42 | 13 | 31% | 6 | 14% | 29 | 69% | 3% |
| Law, Public Safety, Corrections & Security | 1 | 0 | 0% | 0 | 0% | 1 | 100% | 0% |
| Manufacturing | 65 | 9 | 14% | 14 | 22% | 55 | 85% | 5% |
| Marketing | 61 | 32 | 52% | 6 | 10% | 43 | 70% | 4% |
| Science, Technology, Engineering & Math | 45 | 5 | 11% | 4 | 9% | 35 | 78% | 3% |
| Transportation, Distribution & Logistics | 100 | 8 | 8% | 34 | 34% | 79 | 79% | 7% |
| **Grand Total** | **1430** | **658** | **46%** | **258** | **18%** | **1194** | **83%** | **100%** |

[12] Because of this, the Total Students column will be less than the overall count of CTE students in the cohort, since it only includes those who were enrolled in a course in 2013-2014 (and excludes those who previously dropped or left the District).

[13] Excluding the *Law, Public Safety, Corrections and Security* cluster, due to small sample size.

***Attendance***

A Mann-Whitney U test was run to determine if there were differences in Average Daily Attendance (ADA) between CTE students and non-CTE students in 2010-2011, 2011-2012, 2012-2013, and 2013-2014. Across all years, CTE students had a significantly higher ADA than non-CTE students.[14][15] This may be due to the fact that students in CTE programs are more engaged, connected, and focused in school, which may contribute to higher rates of attendance.

These results are shown in Table 5.

**Table 5. Comparison of ADA between CTE and non-CTE Students from 2010-2011 through 2013-2014**

| Year | Student Type | N | Mean Average Daily Attendance (ADA) |
|---|---|---|---|
| 2010-2011 | Non-CTE | 10374 | 83.70% |
| | CTE | 1940 | 90.40% |
| 2011-2012 | Non-CTE | 8481 | 84.40% |
| | CTE | 1888 | 89.30% |
| 2012-2013 | Non-CTE | 6722 | 83.40% |
| | CTE | 1874 | 85.50% |
| 2013-2014 | Non-CTE | 5848 | 84.60% |
| | CTE | 1750 | 85.40% |

[14] 2010-2011 *U*=11,621,764, z=10.850, p<.001; 2011-2012 *U*=8,291,291, z=2.426, p=.015; 2012-2013 *U*=5,862,491 z=-4.591, p<.001; 2013-2014 *U*=4,838,540. z=-3.462, p=.001

[15] Does not include attendance data for Charter and Alternative schools, which is not reliably available. i

## Cohort Comparison of CTE Student Types

This portion of the report explores the academic profiles of different types of CTE students from the cohort. For this analysis, CTE students were characterized and labeled according to the criteria in Table 6 and a breakdown of these CTE student types is shown in Table 7. A breakdown of these students by school is shown in Table 8.[16]

**Table 6. Types of CTE Students**

| CTE Classifications | Definition |
|---|---|
| On-Track CTE | Student enrolled in CTE course in SYs 2012-2013 and 2013-2014 |
| Drop CTE | Student enrolled in CTE course in SY 2012-2013, but not 2013-2014 |
| Late-Start CTE | Student enrolled in CTE course in SY 2013-2014, but not 2012-2013 |
| Non-Start CTE | Student not enrolled in CTE course in either SY 2012-2013 or 2013-2014, but last school of record was an all-CTE School. |

**Table 7. Breakdown of CTE students in cohort by type**

| CTE Student Type | # in Cohort | % of CTE Students in Cohort |
|---|---|---|
| On-Track | 1330 | 68.6% |
| Drop | 411 | 21.2% |
| Late-Start | 91 | 4.7% |
| Non-Start | 108 | 5.6% |
| **Total CTE Students** | **1940** | **100%** |

### Non-Start CTE Students

Of the 1,940 CTE students in the cohort, 108 are considered Non-Start CTE. This includes students who were not enrolled in a CTE course in 2012-2013 or 2013-2014, but were classified as a CTE student by virtue of enrollment in a CTE school as their last school of record. Of the 108 students in the cohort classified as Non-Start CTE, the vast majority are not currently enrolled in a District high school. This would suggest that the students attended a CTE high school as their last school of record and left the school or the District before completing any CTE courses in 2012-2013 or 2013-2014. Table 9 shows Non-Start CTE students at each school as a percentage of the school's CTE population, and of the cohort population overall.

[16] Includes schools with ten or more CTE students in the cohort.

**Table 8. Breakdown of Cohort CTE Students by Type and by School**

| School Name | On-Track | Drop | Late-Start | Non-Start | Total CTE Students |
|---|---|---|---|---|---|
| CREATIVE AND PERFORMING ARTS H.S. | 36% | 3% | 61% | 0% | 36 |
| DOBBINS, MURRELL HIGH SCHOOL | 76% | 4% | 0% | 20% | 175 |
| EDISON, THOMAS A. HIGH SCHOOL | 78% | 22% | 1% | 0% | 160 |
| FELS, SAMUEL SR. HIGH | 40% | 60% | 0% | 0% | 25 |
| FRANKFORD HIGH SCHOOL | 27% | 40% | 33% | 0% | 15 |
| FURNESS, HORACE HIGH SCHOOL | 0% | 86% | 14% | 0% | 14 |
| H.S. OF ENGINEERING & SCIENCE | 0% | 0% | 100% | 0% | 16 |
| JOHN BARTRAM HIGH SCHOOL | 75% | 25% | 0% | 0% | 64 |
| KENSINGTON CAPA | 83% | 11% | 6% | 0% | 18 |
| KENSINGTON HEALTH SCIENCES | 50% | 50% | 0% | 0% | 12 |
| KING, MARTIN LUTHER HIGH SCH. | 45% | 43% | 12% | 0% | 65 |
| LINCOLN,ABRAHAM HIGH SCHOOL | 81% | 16% | 3% | 0% | 62 |
| MASTBAUM, JULES E. HIGH SCHOOL | 87% | 3% | 0% | 10% | 232 |
| NORTHEAST HIGH SCHOOL | 88% | 12% | 0% | 0% | 82 |
| OVERBROOK HIGH SCHOOL | 43% | 53% | 3% | 0% | 30 |
| PENN TREATY HIGH SCHOOL | 48% | 52% | 0% | 0% | 31 |
| RANDOLPH TECH HIGH SCHOOL | 80% | 5% | 3% | 13% | 119 |
| ROBESON - HUMAN SERV HS | 71% | 29% | 0% | 0% | 14 |
| ROXBOROUGH HIGH SCHOOL | 71% | 27% | 1% | 0% | 70 |
| SAUL, WALTER B. HIGH SCHOOL | 78% | 1% | 13% | 9% | 138 |
| SOUTH PHILADELPHIA H.S. | 71% | 27% | 1% | 0% | 157 |
| SWENSON ARTS & TECHNOLOGY H.S. | 86% | 1% | 1% | 13% | 183 |
| THE WORKSHOP SCHOOL | 70% | 0% | 30% | 0% | 10 |
| WASHINGTON, GEORGE H.S. | 53% | 42% | 5% | 0% | 55 |
| WEST PHILADELPHIA HIGH SCHOOL | 44% | 56% | 0% | 0% | 36 |

**Table 9. Non-Start CTE Students as Percentage of All CTE Students, by School and Overall**

| CTE School | Total Non-Start Students | Total CTE Students | Non-Start Students as Percentage of Total CTE Students |
|---|---|---|---|
| Dobbins | 35 | 175 | 20% |
| Mastbaum | 23 | 232 | 10% |
| Randolph | 15 | 119 | 13% |
| Saul | 12 | 138 | 9% |
| Swenson | 23 | 183 | 13% |
| **Cohort Overall** | **108** | **1,940** | **5.6%** |

The majority of Non-Start CTE students moved out of the District (52%) or transferred to a charter or non-public school (12%). Exit reasons for Non-Start CTE students are shown in Table 10 below.

**Table 10. Exit Reasons for Non-Start CTE Students**

| Exit Reason | Student Count | Student Percent |
|---|---|---|
| Moved from District | 56 | 52% |
| Transferred to Charter or non-public | 13 | 12% |
| Dropped-out of School | 18 | 17% |
| Juvenile Residential Facility | 5 | 5% |
| Withdrawn to APS or ASES | 3 | 3% |
| No Information | 10 | 9% |
| Other | 3 | 3% |
| **All Non-Start CTE Students** | **108** | **100%** |

### Drop CTE Students

Of the 1,940 CTE students in the cohort, 411 are considered Drop CTE. Students were considered Drop CTE if they were enrolled in CTE in 2012-2013 but not in 2013-2014, suggesting that they began a CTE trajectory in grade 10 or 11, but for one reason or another did not continue on that trajectory into grade 12. Some schools had an unusually high percentage of Drop CTE students, such as Furness (86% Drop), Fels (60% Drop), and West Philadelphia (56% Drop). Additional analyses were conducted to explore potential reasons for such high percentages of Drop students at some high schools.

There was one particular scenario that was found to contribute to a school's high percentage of Drop students. At the end of the 2012-2013 school year, the District closed eight high schools (including two CTE high schools) as part of its Facilities Master Plan. No CTE programs were eliminated during this school closing process, as all CTE programs were moved into new building locations, and students were guaranteed their ability to continue in their CTE program of study. However, our analyses revealed that of the 411 students identified as Drop CTE, 46% went to a new school in 2013-2014 from a school that closed in 2012-2013. Students who were forced to transfer as a result of a school closing may not necessarily have selected to transfer to the school offering their CTE program.

For example, in 2012-2013, Furness High School had zero CTE students enrolled. As of February 2013-2014, Furness has 14 CTE students enrolled. Twelve of these 14 students are considered CTE Drop as they have no 2013-2014 CTE participation but do in the previous year. All twelve of these students attended Bok High School in 2012-2013, and transferred to Furness in 2013-2014 when Bok was closed. Because these students selected to attend Furness, which does not offer their previous CTE program, and because students – for the purpose of this analysis – are attributed to their last school of record, Furness is shown as having many Drop students; however this is not a result of students leaving a program at Furness. Table 11 shows the number of students by school who transferred into the school in 2013-2014 due to a 2012-2013 closure.

**Table 11. School Closure Transfers Resulting in CTE (Drop) Students, by School**

| School | Total # CTE | Drop CTE | % Drop CTE | # Drop CTE Students Transferred in from Closed School in 2013-2014 | |
|---|---|---|---|---|---|
| | | | | # CTE Drop | % CTE Drop |
| FURNESS, HORACE HIGH SCHOOL | 14 | 12 | 86% | 12 | 100% |
| FELS, SAMUEL SR. HIGH | 25 | 15 | 60% | 2 | 13% |
| WEST PHILADELPHIA HIGH SCHOOL | 36 | 20 | 56% | 3 | 15% |
| OVERBROOK HIGH SCHOOL | 30 | 16 | 53% | 2 | 13% |
| PENN TREATY HIGH SCHOOL | 31 | 16 | 52% | 16 | 100% |
| KENSINGTON HEALTH SCIENCES | 12 | 6 | 50% | 4 | 67% |
| KING, MARTIN LUTHER HIGH SCH. | 65 | 28 | 43% | 19 | 68% |
| WASHINGTON, GEORGE H.S. | 55 | 23 | 42% | 1 | 4% |
| FRANKFORD HIGH SCHOOL | 15 | 6 | 40% | 2 | 33% |
| ROBESON - HUMAN SERV HS | 14 | 4 | 29% | 2 | 50% |
| SOUTH PHILADELPHIA H.S. | 157 | 43 | 27% | 40 | 93% |
| ROXBOROUGH HIGH SCHOOL | 70 | 19 | 27% | 15 | 79% |
| JOHN BARTRAM HIGH SCHOOL | 64 | 16 | 25% | 7 | 44% |
| EDISON, THOMAS A. HIGH SCHOOL | 160 | 35 | 22% | 0 | 0% |
| LINCOLN,ABRAHAM HIGH SCHOOL | 62 | 10 | 16% | 1 | 10% |
| NORTHEAST HIGH SCHOOL | 82 | 10 | 12% | 1 | 10% |
| KENSINGTON CAPA | 18 | 2 | 11% | 0 | 0% |
| RANDOLPH TECH HIGH SCHOOL | 119 | 6 | 5% | 1 | 17% |
| DOBBINS, MURRELL HIGH SCHOOL | 175 | 7 | 4% | 0 | 0% |
| MASTBAUM, JULES E. HIGH SCHOOL | 232 | 7 | 3% | 0 | 0% |
| CREATIVE AND PERFORMING ARTS H.S. | 36 | 1 | 3% | 0 | 0% |
| SWENSON ARTS & TECHNOLOGY H.S. | 183 | 2 | 1% | 0 | 0% |
| SAUL, WALTER B. HIGH SCHOOL | 138 | 1 | 1% | 0 | 0% |
| H.S. OF ENGINEERING & SCIENCE | 16 | 0 | 0% | 0 | 0% |
| THE WORKSHOP SCHOOL | 10 | 0 | 0% | 0 | 0% |

Table 12 lists the schools where more than 10% of the CTE students are categorized as Drop AFTER removing Drop students who enrolled in the school in 2013-2014 as a result of a school closure transfer.

It is not immediately clear why schools such as Fels, West Philadelphia, Overbrook, and George Washington have such a high percentage of students who participated in CTE in 2012-2013 but not in 2013-2014. It is possible that the students enrolled in CTE and discontinued due to lack of interest, or due to a need to make-up credits in other core subjects. Additional research is needed to explore school-level factors that may have contributed to this situation.

**Table 12. Schools with High Percentages of Drop CTE Students, After Adjusting for Transfers**

| School | Total CTE Students | # Drop CTE | # Drop CTE Transfers | % CTE Drop after Removing Transfers |
|---|---|---|---|---|
| FELS, SAMUEL SR. HIGH | 25 | 15 | 2 | 52% |
| WEST PHILADELPHIA HS | 36 | 20 | 3 | 47% |
| OVERBROOK HIGH SCHOOL | 30 | 16 | 2 | 47% |
| WASHINGTON, GEORGE H.S. | 55 | 23 | 1 | 40% |
| FRANKFORD HIGH SCHOOL | 15 | 6 | 2 | 27% |
| EDISON, THOMAS A. HS | 160 | 35 | 0 | 22% |
| KENSINGTON HEALTH SCIENCES | 12 | 6 | 4 | 17% |
| LINCOLN,ABRAHAM HS | 62 | 10 | 1 | 15% |
| ROBESON - HUMAN SERV HS | 14 | 4 | 2 | 14% |
| JOHN BARTRAM HIGH SCHOOL | 64 | 16 | 7 | 14% |
| KING, MARTIN LUTHER HIGH SCH. | 65 | 28 | 19 | 14% |
| KENSINGTON CAPA | 18 | 2 | 0 | 11% |
| NORTHEAST HIGH SCHOOL | 82 | 10 | 1 | 11% |

### On-Track CTE Students

Of the 1,940 CTE students in the 2010-2011 cohort, 68.6% have been classified as On-Track, as they have participated in CTE in 2012-2013 and 2013-2014. Of the 25 schools with ten or more CTE students, ten schools have at least 75% of their CTE students categorized as On-Track, as shown in Table 13.

### Late-Start CTE Students

Of the 1,940 CTE students in the cohort, 4.7% have been classified as Late-Start CTE. These students have participated in CTE in 2013-2014, but not 2012-2013. It is possible that students in this category attend a school that rosters students differently than normal CTE programs. It is also possible that some schools are allowing students to enroll in CTE programs in the $11^{th}$ or $12^{th}$ grade (rather than in $10^{th}$ grade, as designed). This may put those students at risk of not completing the program course requirements in time to graduate, not acquiring enough subject knowledge to perform well on the NOCTI exam, or not experiencing all of the intended benefits of CTE involvement (such as mentorship, community service and workplace learning activities, career guidance, etc.). Schools with a high percentage of students categorized as Late-Start are shown in Table 14.

**Table 13. On-Track CTE Students by School**

| School Name | Total CTE Students | Students in Cohort | |
|---|---|---|---|
| | | # CTE On Track | % CTE (On Track) |
| NORTHEAST HIGH SCHOOL | 82 | 72 | 88% |
| MASTBAUM, JULES E. HIGH SCHOOL | 232 | 201 | 87% |
| SWENSON ARTS & TECHNOLOGY H.S. | 183 | 157 | 86% |
| KENSINGTON CAPA | 18 | 15 | 83% |
| LINCOLN,ABRAHAM HIGH SCHOOL | 62 | 50 | 81% |
| RANDOLPH TECH HIGH SCHOOL | 119 | 95 | 80% |
| EDISON, THOMAS A. HIGH SCHOOL | 160 | 124 | 78% |
| SAUL, WALTER B. HIGH SCHOOL | 138 | 107 | 78% |
| DOBBINS, MURRELL HIGH SCHOOL | 175 | 133 | 76% |
| JOHN BARTRAM HIGH SCHOOL | 64 | 48 | 75% |
| ROBESON - HUMAN SERV HS | 14 | 10 | 71% |
| ROXBOROUGH HIGH SCHOOL | 70 | 50 | 71% |
| SOUTH PHILADELPHIA H.S. | 157 | 112 | 71% |
| THE WORKSHOP SCHOOL | 10 | 7 | 70% |
| WASHINGTON, GEORGE H.S. | 55 | 29 | 53% |
| KENSINGTON HEALTH SCIENCES | 12 | 6 | 50% |
| PENN TREATY HIGH SCHOOL | 31 | 15 | 48% |
| KING, MARTIN LUTHER HIGH SCH. | 65 | 29 | 45% |
| WEST PHILADELPHIA HIGH SCHOOL | 36 | 16 | 44% |
| OVERBROOK HIGH SCHOOL | 30 | 13 | 43% |
| FELS, SAMUEL SR. HIGH | 25 | 10 | 40% |
| CREATIVE AND PERFORMING ARTS H.S. | 36 | 13 | 36% |
| FRANKFORD HIGH SCHOOL | 15 | 4 | 27% |
| FURNESS, HORACE HIGH SCHOOL | 14 | 0 | 0% |
| H.S. OF ENGINEERING & SCIENCE | 16 | 0 | 0% |

**Table 14. Late-Start CTE Students by School**

| School | Total CTE Students | Students in Cohort | |
|---|---|---|---|
| | | # CTE Late-Start | % CTE Late-Start |
| H.S. OF ENGINEERING & SCIENCE | 16 | 16 | 100% |
| CREATIVE AND PERFORMING ARTS H.S. | 36 | 22 | 61% |
| FRANKFORD HIGH SCHOOL | 15 | 5 | 33% |
| THE WORKSHOP SCHOOL | 10 | 3 | 30% |
| FURNESS, HORACE HIGH SCHOOL | 14 | 2 | 14% |
| SAUL, WALTER B. HIGH SCHOOL | 138 | 18 | 13% |
| KING, MARTIN LUTHER HIGH SCH. | 65 | 8 | 12% |
| WEST PHILADELPHIA HIGH SCHOOL | 36 | 3 | 8% |
| KENSINGTON CAPA | 18 | 1 | 6% |
| OVERBROOK HIGH SCHOOL | 30 | 1 | 3% |
| LINCOLN,ABRAHAM HIGH SCHOOL | 62 | 2 | 3% |
| RANDOLPH TECH HIGH SCHOOL | 119 | 3 | 3% |
| ROXBOROUGH HIGH SCHOOL | 70 | 1 | 1% |
| SOUTH PHILADELPHIA H.S. | 157 | 2 | 1% |
| EDISON, THOMAS A. HIGH SCHOOL | 160 | 1 | 1% |
| SWENSON ARTS & TECHNOLOGY H.S. | 183 | 1 | 1% |
| MASTBAUM, JULES E. HIGH SCHOOL | 232 | 1 | 0% |
| DOBBINS, MURRELL HIGH SCHOOL | 175 | 0 | 0% |
| FELS, SAMUEL SR. HIGH | 25 | 0 | 0% |
| JOHN BARTRAM HIGH SCHOOL | 64 | 0 | 0% |
| KENSINGTON HEALTH SCIENCES | 12 | 0 | 0% |
| NORTHEAST HIGH SCHOOL | 82 | 0 | 0% |
| PENN TREATY HIGH SCHOOL | 31 | 0 | 0% |
| ROBESON - HUMAN SERV HS | 14 | 0 | 0% |
| WASHINGTON, GEORGE H.S. | 55 | 0 | 0% |

It is not immediately clear why schools such as Engineering & Science High and CAPA have such a high percentage of Late-Start students. Additional research is needed to explore school-level factors that may have contributed to the data shown above.

# Recommendations and Conclusions

CTE's strategies of engagement through rigorous and relevant coursework, positive relationships and clear pathways for education and careers can make a difference for urban students, who often struggle against economic and social disadvantages (Association for Career and Technical Education, 2012). The findings from this preliminary report suggest that investments in CTE programs in Philadelphia are on-track to contribute to higher graduation rates and improved academic performance. The following takeaways are offered based on preliminary findings from this report:

1. **There is evidence that CTE programs are contributing to higher attendance, promotion, and on-track-to-graduation rates for students in CTE programs compared to students not in CTE programs.** These contributions do not appear to be attributed to higher achieving students being tracked or phased into CTE programs, as no such relationship was found between 8th Grade PSSA data and high school CTE participation.

2. **There is evidence that CTE programs may contribute to students remaining in District-run schools, rather than transferring to charter or non-public schools, or moving out of the District.** In the cohort studied, CTE students moved from the District at one third of the rate of non-CTE students, and transferred to charter or non-public schools at one fifth of the rate of non-CTE students.

3. **Male students are overrepresented in CTE programs.** This analysis found a statistically significant relationship between CTE enrollment and gender, with females making up only 45% of the CTE population in the cohort studied. More important than the overall gender breakdown in CTE programs, however, is the distribution of men and women in 'nontraditional' career paths (defined by law as those in which less than 25% of the workforce is their gender, such as plumbing for females and child care for males). Nationally, male students continue to predominate in courses that lead to many high-skill, high-wage jobs, while female students make up the majority in the low-wage, low-skill programs. The descriptive data introduced in this report (see Table 3) suggests that this trend may exist in Philadelphia. In the cohorts studied, women made up only 11% of the *Science, Technology, Engineering and Math* cluster, which tends to connect to careers that are male-dominated and high-wage. In addition, 80% of students in the *Health Science* cluster were female, a content area that tends to connect to lower-wage careers such as Medical Assistants. Additional research is needed to explore areas where gender equity can be improved and to identity possible contributing factors within the system.

4. **Students with disabilities are underrepresented in CTE programs.** Studies have shown that students with disabilities who participate in CTE greatly increase their chances for postsecondary success (Harvey, Cotton, and Koch, 2007). However, it can be challenging for CTE staff who may not have been taught effective ways to assist students with disabilities, and may not be fully aware of a students' needs and how best to accommodate them. Special education teachers may not always understand the context and requirements of the CTE program for which a student is recommended. Additional ongoing research is needed to identify CTE programs that show positive outcomes for students with various types of disabilities and to identify areas where students with disabilities can be better accommodated.

5. **Black/African American and Hispanic/Latino students are overrepresented in CTE programs and White and Asian students are underrepresented.** This report shows a higher percentage of Black/African American and Hispanic/Latino students in CTE programs than in the general cohort population, and a lower percentage of White and Asian students. This may represent a positive finding that CTE programs have the potential to improve outcomes for these students, who traditionally have the lowest high school graduation rates and are often the target for funded interventions and programming. Additional ongoing research is needed to identify if Black/African American and Hispanic/Latino students are showing not just higher levels of enrollment in CTE, but greater gains in graduation and post-secondary outcomes.

6. **The school closure process was disruptive to CTE students.** Based on the results of this analysis, 10% of all CTE students in the cohort discontinued their CTE program in connection with a school closing in 2012-2013. These students, who make-up nearly half of all students in the cohort who dropped from their CTE program for any reason, chose not to attend a school where their 2012-2013 CTE program was relocated. Schools, and CTE programs in particular, had minimal, if any time to work individually with students and parents to help them decide where to attend in 2013-2014.The information in this report reinforces the need for more time to plan and implement school, program or building changes before changes go into effect.

7. **Data quality is critical to accurate and meaningful tracking of CTE students.** An ongoing cross-functional effort has improved the identification and flagging of CTE courses and students in the District's data systems, as well as the consistency with which CTE students are rostered at the school level. As that effort continues and evolves, ORE will refine and expand on its analyses with more robust and more reliable datasets. The CTE office needs to remain vigilant in terms of reducing the variability in the schools' interpretation and use of CTE course codes and trajectories.

The next step in this analysis will be to track the graduation outcomes of the students in this cohort, which will be available in the Fall of 2014, as well as to report on the outcomes of cohorts in subsequent years. Future analyses will also include more robust qualitative and quantitative survey data, such as student-level responses from the District-wide Student and Parent surveys, and will triangulate survey data with student and school-level performance data. ORE is in the process of designing and establishing a $12^{th}$ grade student exit survey, which will be used to help implement educational initiatives and track their success in high school. The survey will ask students about their educational experiences in SDP and their plans following graduation, as well as assess their perceptions of the extent to which they are college- and career-ready. These tools will be instrumental in evaluating students' experiences in CTE programs.

Moving forward, the results of this analysis will be combined with observational and programmatic information to help identify best practices in CTE that are occurring within the District, and shed light on areas for potential improvement in reaching the goals of increased access, quality and equity of CTE programs.

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