

Strengthening Career and Technical Education and 21st Century Skills in Philadelphia

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I. Overview

In Spring 2007, the John S. and James L. Knight Foundation awarded funds to the Philadelphia Youth Network (PYN) to undertake an analysis of Career and Technical Education (CTE) in Philadelphia, and to make recommendations on how CTE and other forms of career-connected education could better align with Philadelphia standards for college and career success. This analysis was performed with guidance from the Philadelphia Youth Council's¹ Workforce Preparation subcommittee, and with the support of the School Reform Commission and the School District of Philadelphia. PYN worked with the Philadelphia Workforce Investment Board (PWIB) to perform extensive analyses of local, regional and state-level labor market data and how they were reflected in CTE offerings; scanned the literature to learn about effective practices in CTE and other forms of career-connected education; and convened employers, school representatives and government officials from the City and the Commonwealth of

Pennsylvania to review the data, draw conclusions and formulate recommendations. This report provides an overview of that process, reviews relevant research, and presents a series of findings, analyses and recommendations designed to improve CTE and career-connected education in the School District of Philadelphia.

The scope of this report relates predominately to the city's eight CTE High Schools. Some additional analysis is presented as it relates to the career-connected offerings outside of the eight CTE schools. However, a complete analysis and comprehensive recommendations related to the entire system of career connected educational offerings is beyond the scope of this paper.

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¹ The Youth Council is a statutorily-mandated subgroup of the Philadelphia Workforce Investment Board, which is charged with recommending policies, funding and best practices that promote youth workforce development. As of December 2008, the Youth Council is now known as the Philadelphia Council for College and Career Success.

II. Why Do We Need to Address these Issues?

Historically, Vocational and Technical Education programs were seen as an alternative to academic track programs and too often became the dumping ground for the unmotivated or non-college bound student. Today's CTE offers more than the "Voc Ed" of past generations (Association for Career and Technical Education). With the passage of the 2006 Perkins Act, postsecondary education connections became a new priority for CTE practitioners prompting significant national interest in CTE's relationship with, and transition to, postsecondary education. The new Act provides an increased focus on the academic achievement of career and technical education students, strengthens the connections between secondary and postsecondary education, and improves state and local level accountability. Under the Perkins Act, federal funds are made available to help provide career and technical education programs and services to youth and adults (www.ed.gov). The majority of Perkins funds for the state of Pennsylvania are awarded as grants directly to the Commonwealth's Department of Education.

Recently, the Commonwealth of Pennsylvania also began to study CTE's role in meeting state-wide labor and industry needs. The Perkins Reauthorization coupled with the Commonwealth's push toward alignment with labor market needs has required all Pennsylvania's CTE schools to move from merely technical skills training schools with little emphasis on college to academically integrated technical centers that simultaneously prepare its students for both postsecondary education and the workplace.

Research suggests that CTE and other forms of career-connected education, if well-designed and delivered, have the potential to address a number of related problems that challenge Philadelphia's regional economy. For example:

- Greater Philadelphia employers continue to stress the need for skilled individuals to occupy the high-wage/high-demand positions essential to continued economic well-being. But data indicate that Philadelphians' skill levels and labor market participation rates are well below those of other major cities. Educational programming that is fully aligned with regional employment needs can help to address these critical economic development issues.
- Employers also report that, while solid occupational knowledge and academics are essential, there are other applied skills – like professionalism and work ethic, creativity and innovation, leadership and self-direction – that are equally important for success in 21st century workplaces. With their contextual pedagogies and connections to real-world environments, CTE and career-connected education can help students practice and develop these skills.
- Philadelphia is plagued by an unacceptably high dropout rate, with no more than 60% of students on average graduating within six years of ninth grade entry (Balfanz and Neild, 2006). The National Dropout Prevention Center reports that a mix of CTE and academic coursework helps to lower dropout rates by illuminating pathways to success.

Furthermore, career-connected education, particularly as practiced by high school academies and other career-themed small learning communities, has the demonstrated potential to improve high school graduation rates and significantly increase longer-term earnings and employment for at-risk students.

- Lower-income youth in Philadelphia and other cities have much less access than their suburban peers to jobs and work experience that can promote educational attainment, higher employment rates and increases in future earnings. CTE and career-connected education help to overcome these experience gaps, and offer students opportunities to build work experience and professional networks.

Thus, CTE and career-connected education have the clear potential to boost regional economic growth by significantly improving the preparation and readiness of Philadelphia public school students for high school graduation, postsecondary education and training and career success. The challenge is to ensure that these offerings are, in fact, rigorous and relevant to regional employment needs and accessible to as many youth as possible. The goals of the recommendations addressed in this report seek to meet this challenge while providing an academically sound option for students that facilitates and supports their movement toward successful graduation, postsecondary readiness and gainful employment.

III. A Brief Review of Relevant Research

A. 21st Century Skills

There have been several employer-informed prescriptions of the skills needed to prepare all youth for workplace success -- what we now know as “21st Century Skills” – dating back to the Secretary’s Commission on Achieving Necessary Skills (SCANS) in the early 1990’s. SCANS posited five essential competencies that workers need for job success: (1) Resources – i.e. allocating time, money and materials; (2) Interpersonal Skills; (3) Information; (4) Systems; and (5) Technology; along with a three-part foundation of (a) Basic Skills, (b) Thinking Skills and (c) Personal Qualities like responsibility, self-management and integrity (U.S. Department of Labor, 1991). Another influential early argument for 21st Century Skills advocated a mix of hard skills (math and reading); soft skills (communication and working in groups); and the ability to use personal computers (Murnane and Levy, 1997). Perhaps the most complete recent discussion of the topic can be found in the work of the Partnership for 21st Century Skills, which, based on employer survey responses, identified the most valuable traits for workplace success as: Professionalism/ Work Ethic; Oral and Written Communications; Teamwork/ Collaboration and Critical Thinking/Problem Solving. While basic academic knowledge is considered fundamental, employers indicate that applied skills are also “very important” to employment success. (Partnership for 21st Century Skills, et al., 2006)

B. Career and Technical Education

There is a strong consensus in current analyses about the importance of ensuring that CTE programs have a rigorous academic core that prepares students for careers and post-secondary education (Brand, 2003; Kazis, 2005, Bottoms, 2006). The National Assessment of Vocational Education (NAVE) reports that “CTE students have increased their academic course-taking relative to non-CTE peers,” but CTE concentrators are far less likely to be proficient in reading and math than other students and “much more needs to be done to close achievement gaps.” This is especially true in light of the NAVE finding that “CTE courses and programs do not, in and of themselves, improve academic achievement.” (Silverberg, et.al, 2004)

CTE appears to have efficacy in reducing dropout rates. For example, increases in CTE student enrollment are related to higher high school graduation rates and to the percentage of 15- to 19-year-olds enrolled in school (Bishop and Mane, 2004). Furthermore, students who entered high school had a decreased risk of dropping out as they added CTE courses to their curriculum (Plank, DeLuca and Estacion, 2005). Based on these and other related findings, the National Dropout Prevention Center/Network has identified CTE as one of 15 strategies that have a positive impact on the dropout rate.

NAVE reaches strong, positive conclusions about CTE and its effects on earnings, stating that “CTE has positive impacts on short- and medium-term earnings” (\$450/year per CTE course) and CTE students who also take an academic curriculum earn more than similar students who complete either the academic or the CTE curriculum alone. These benefits extend to a broad range of students, e.g. those who are disabled, educationally or economically disadvantaged, and to both men and women.

In *Rigor and Relevance* (2003), Betsy Brand, Director of the American Youth Policy Forum, a DC-based youth advocacy organization that has emphasized the importance of high-quality Career and Technical Education, recommends specific steps for local areas to build high-quality CTE programs:

- Rigorous, integrated, and sequenced CTE curriculum aligned with state academic standards;
- Professional development based on the needs of the teachers to provide high quality, academically rigorous, integrated curricula and contextualized teaching and learning;
- Presence of qualified teachers in both academic and technical fields;
- Creation of various career-themed programs of study, small schools, or early or middle college high school, integrating local needs with national pathway models and state frameworks;
- Career guidance and counseling by school officials and/or supplemented by employer/community partnerships ... to ensure the attainment of a certificate or degree at the postsecondary level;

- Partnerships with employers and community organizations to allow access to work-based learning, service learning ... and to ensure relevancy and validity of the program of study to the labor market and labor market needs;
- Pathways that help students transition and move from high school to postsecondary education; and
- Data collection, disaggregated by race and income, and program evaluation based on solid accountability measures.

C. CTE and Postsecondary Education

According to NAVE, “CTE courses appear to be neutral” with regard to students’ chances of participating in postsecondary education. While increasing percentages of CTE concentrators are enrolling in postsecondary education and training, these effects are not necessarily attributable to CTE programs, and the overall postsecondary rates of CTE students remain less than for other students. Furthermore, among all students who enroll in postsecondary education, CTE students are less likely to complete a bachelor’s degree and more likely to complete an associate’s degree.

Several studies document the relationship between postsecondary education and long-term earnings, and underscore that a postsecondary credential is critical to economic self-sufficiency (Center for Labor Market Studies, 2008; Philadelphia Workforce Investment Board, 2008). In fact, the WIB notes that “more than two-thirds of the students completing career and technical education programs will need a post-secondary certificate or an academic degree to pursue fulltime work.” Dual enrollment is one example of a practice that appears to help students, including those participating in CTE, to earn postsecondary credentials. For example, dual enrollment participants at the City University of New York and in the State of Florida, including the full sample as well as CTE students, “had more positive outcomes on a range of short- and long-term measures than similar non-participants.” Furthermore, students from groups typically underrepresented in higher education “appeared to benefit from dual enrollment participation to a greater degree than other participants” (Community College Research Center, Columbia Teachers College, 2008).

D. Other Forms of Career-Connected Education

- Career Academies. MDRC (formerly the Manpower Demonstration Research Corporation) is conducting an ongoing longitudinal analysis of student performance in career academies using a random assignment research design in a diverse group of nine high schools. Findings suggest that at-risk students who participate in academies are more likely to stay through the 12th grade and show improved attendance and increased credit accumulation toward graduation. Furthermore, career academies produced sustained earnings gains that averaged 11% (or \$2,088) more per year for

Academy group members than for individuals in the non-Academy group — a \$16,704 boost in total earnings over the eight years of follow-up. These impacts were particularly strong for young men, whose real earnings increased by \$3,731 (17%) per year — or nearly \$30,000 over eight years (Kemple et. al. 2008)

- Work-Based Learning. Students participating in paid after-school internships in some of Chicago’s most economically disadvantaged schools missed fewer days of school, failed fewer core academic courses and had higher graduation and lower dropout rates than similar students who did not participate (Goerge, 2006). Further, contextual learning strategies like work-based learning may be effective in improving students’ grades, attendance and graduation rates, and holds promise for increasing student engagement and promoting access to postsecondary education. (Husbands and Breese, 2004).

Evidence also suggests that work-based learning improves self-confidence and self-concept, and expands students’ ideas about their possible futures (Bailey and Hughes, 2004). School-linked internships are particularly powerful for at-risk youth, providing a context that gives meaning to academics, promotes confidence in abilities and provides access to networks and informal channels for employment (Lerman, 1996).

For at- risk youth, there is a strong link between working while in high school and obtaining a job after graduation, and a positive correlation between work during high school and earnings 8-11 years later (Chapin and Hathaway, 1996). At the same time, teens in low-income households have the least access to employment opportunities (Lerman, 2000), and young African Americans begin to fall behind young whites in the accumulation of work experience at very early ages, which contributes to slower wage growth over time. (Holzer, 2000).

The research and components listed above are considered in findings and recommendations throughout this paper.

IV. Report Methodology

Interested in helping Greater Philadelphia leaders more fully understand and improve the relationships between CTE programming and regional employer needs, in Spring 2007 the John S. and James L. Knight Foundation awarded funding to the Philadelphia Youth Network to lead a collaborative process to analyze data, survey research and generate recommendations towards that end. To ensure that this process was linked to related work in the City, PYN, which also staffs the Philadelphia Youth Council (currently named the Philadelphia Council for College and Career Success), recommended that this work be undertaken under the auspices of the Council’s Workforce Preparation subcommittee. As a result, the Council charged the subcommittee with facilitating the process to better understand and make recommendations to improve Career and Technical Education and career-connected education in the School District of Philadelphia. The School Reform Commission and the School District of Philadelphia were also enlisted as partners in the effort.

The subcommittee, which is comprised of representatives from the School District, business, the workforce system, the city and state, teachers, parents, and Philadelphia CTE students, met on a monthly basis as a collaborative work team to inform and direct the planning grant, with PYN serving as managing partner of the work. The subcommittee reviewed all available research regarding effective practices in CTE and career-connected education; arranged interviews and focus groups with a wide range of stakeholders; and collected and analyzed state, regional and local data to illuminate the relationships among CTE programs and regional economic needs.

Key partners and highlights of their roles and contributions include:

- *PA Department of Education's Bureau of Career and Technical Education* - provided data and helped to identify policy barriers.
- *The Philadelphia Federation of Teachers* - organized teacher focus groups and helped to create a plan for a CTE Teacher Professional Development Center.
- *The School District of Philadelphia* - provided data and helped to develop and support principal professional development opportunities.
- *Philadelphia Academies, Inc.* - provided data and tapped the knowledge and experience of its Industry Advisory Groups, which offered invaluable support for the planning process and recommendations.
- *Area employers and business leaders* - participated in focus groups and a series of lectures and workshops on CTE.
- *Students and parents* - participated in focus groups that provided an important community perspective, including discussion and surveys around perceptions of CTE, youth workforce preparedness, workforce development strategies, social and educational barriers, and data collection.
- *The Philadelphia Workforce Investment Board* - provided regional workforce data and undertook an in-depth analysis of the School District's programs of study and their alignment with regional high-priority occupations.

Based on its extensive analyses and discussions, the subcommittee identified the following key principles that should guide a high-quality CTE system:

1. CTE Programs of Study are an important part of high school reform.
2. CTE Programs of Study prepare students for post-secondary success and career control.
3. CTE Programs of Study are connected to regional economic and workforce development.
4. CTE programs of study are based in academic rigor and have curricula, facilities, and equipment that are state-of-the-art and meet or exceed industry standards.

5. CTE programs of study lead to students earning industry-recognized certifications and have post-secondary connections.
6. CTE instructors are field-recognized experts and skilled teachers.
7. CTE maintains high levels of excellence supported through the measurement of performance (accountability).
8. CTE sets high expectations for students' academic and social success.
9. CTE state-of-the-art facilities provide multiple uses for industry and the community at large including incumbent worker training and adult continuing education opportunities.

Findings and recommendations found later in the report are organized with these core principles in mind.

V. Findings, Analysis and Discussion

A. CTE Schools and Programs

Career and Technical Education is organized and offered by the School District of Philadelphia via three approaches: (1) Programs of Study, (2) Programs of Concentration and (3) individual CTE courses. The following description of these approaches includes an analogy to postsecondary nomenclature to help further understanding of this organization:

- Programs of Study are course sequences that meet state content and hour requirements (at least 720 hours of CTE instruction for one- and two-year programs; 1,080 hours for a three-year program and 1,320 for a four-year program) and are eligible for state and federal funding. Programs of Study are similar to a college “major,” with the typical Philadelphia CTE student taking two occupation-focused courses each year in grades 10-12.

Philadelphia's CTE offerings:

- (1) Programs of Study
- (2) Programs of Concentration
- (3) Individual courses

In January 2008, there was a total enrollment in all CTE schools of 7,418 students. Of that total number, 4,351 students in grades 10 to 12 were enrolled in 34 Programs of Study in Philadelphia's CTE high schools offering training for 128 related occupations with successful completers having access to 45 certification opportunities, 34 of which are identified by the Commonwealth as industry-recognized.

Programs of Study, representing 10 Philadelphia local industry groupings or “clusters” (identified by the Pennsylvania Department of Labor and Industry), are typically offered in four, five or six different CTE high schools. Most schools offer programs that relate

to more than one (and in some cases up to eight clusters. In only one instance, Saul, does a CTE high school focus on a single cluster.

While there are five Programs of Study still offered in five neighborhood high schools, with 629 students enrolled, the overwhelming majority of Programs of Study are provided in the School District's eight full-time CTE schools.

Unlike much of the Commonwealth, where students learn occupational skills at part-time area CTE schools and take academic coursework at their home high schools, Philadelphia's CTE schools offer both CTE programming and all required academic courses needed for graduation in one facility. In the ninth grade, all students in these schools participate in a "career exploration" course and cycle through each of the programs on site prior to committing to a particular program.

Seats in Philadelphia's eight CTE high schools are highly sought after, with demand approaching that for academically elite public high schools in the city such as Central, Masterman, and Girls High. In fact, almost half (46%) of all 8th graders in the city apply to at least one CTE school. In 2006, a total of 6,797 rising 9th graders applied to one or more of the eight CTE high schools, but only one in four (27%) was admitted.

Philadelphia's CTE high schools:

1. Edward Bok High School
2. Communications Technology High School
3. Murrell Dobbins High School
4. Thomas A. Edison High School
5. Jules E. Mastbaum High School
6. A. Phillip Randolph Career Academy
7. Walter B. Saul High School
8. Swenson Arts and Technology High School

With the exception of Edison High School, admission into CTE high schools is based on a city-wide competitive process, with all prospective students required to apply for admission. Criteria for acceptance include:

- marks of A, B or C;
- no more than ten absences;
- no more than five instances of lateness; and
- no negative disciplinary reports.

Students who meet three of four criteria are considered for admission. They must also attend an interview at the school of their choice, and then are entered into a lottery, from which successful applicants are selected.

According to research currently being conducted by Johns Hopkins University, beginning with the Class of 2004, the CTE schools began to screen out higher percentages of

applicants with weak test scores, grades, attendance, etc., and then conducted a lottery among the remaining youth. The chart below shows the percentage of youth, in five of the schools*, who applied but were not entered into the lottery.

**Percentage of Applicants Not Entered into the Lottery,
By School and Cohort**

	Class of 2004	Class of 2005
Bok	37.30%	42.56%
Dobbins	53.80%	54.95%
Mastbaum	43.35%	65.07%
Saul	52.44%	55.49%
Swenson	n/a	60.15%

In real numbers, in 2004, over 5,321 students applied to one of the four CTE schools listed above and did not meet criteria sufficient to be entered into the lottery. In 2005, for the five CTE schools listed 7,199 applicants applied but were not entered into the lottery.

It should also be noted that Edison High School remains an outlier throughout this analysis as it is both a neighborhood high school and a CTE school. This hybrid structure has a subset of the student population enrolled in CTE programs of study. Students are not identified as distinct and separate groups within the school and it was therefore difficult to evaluate CTE related data for Edison. The hybrid structure makes Edison High School the largest school in the CTE cohort with a total enrollment of 2,321 in 2007-2008 school year. Mastbaum is the next largest CTE school with half the enrollment (1,149) of Edison. The sheer size of Edison as a CTE school, the CTE programs of study not being clearly defined as separate and distinct from the general education program and the lack of CTE trained leadership intimately familiar with Perkins funding requirements creates both administrative difficulties and impedes the implementation of academically rigorous CTE pedagogical practices throughout the CTE programs.

In the seven other CTE high schools, the selectivity of admissions helps to ensure that students who participate in CTE programs are able to meet strict academic and behavioral standards and therefore should be prepared to make the most of their educational experiences. However, it is also possible that the rigors of the selection process might serve to exclude students who have not been well-served by traditional schooling, and for whom the contextual pedagogies practiced at CTE schools might actually be much more effective than regular classroom instruction.

* Randolph High School and Communications Technology High School came into existence during the 2003-2004 school year. No separate data is available for these schools until 2005. Edison, because of its hybrid structure, does not have a lottery process.

- Programs of Concentration are emerging course groupings that provide less intensive CTE instruction (e.g. 540 hours) than Programs of Study and are not necessarily organized into a coherent curricular sequence. If effectively developed, Programs of Concentration may offer an opportunity to explore CTE coursework within a career pathway. This career exploration option has become increasingly important as career programs in non-CTE schools have been eliminated in order to meet stricter state requirements for Programs of Study. If properly developed, Programs of Concentration could be considered a career “minor” available in the traditional neighborhood high schools for non-CTE students. Seventeen Programs of Concentration have been identified at 19 high schools that consist of CTE course sequences that enable students to explore careers based on their interests. However, these sequences are not yet considered sufficiently intensive to make them eligible for state or federal CTE funding support and are not yet fully developed.
- Depending on their interests and course requirements, students in neighborhood high schools may enroll in individual CTE courses within elective programs that enable students to experience hands-on, contextual learning within an area of career interest. While some of these programs will be developed into the emerging Programs of Concentration they are not necessarily part of a broader career-focused sequence.

Most Programs of Study and the newly developing Programs of Concentration are offered at multiple locations in CTE and non-CTE schools across the School District. Resources, facilities, equipment, partnerships and other supports for these CTE offerings, particularly Programs of Study, vary considerably from school-to-school. This creates competition for more desirable Programs of Study as qualified students vie for admission, with more than 40% of students denied their first choice. As a result, some students have greater access than others to the best equipment, facilities and faculty, and to Programs of Study that are more likely to provide pathways to the region’s high wage/high demand careers.

Interestingly, while there are some obvious advantages for students to attend school in or near their neighborhoods, only 27% of CTE students who participated in a focus group for this study identified geographic proximity as a reason for choosing their schools. Furthermore, 69% of students in the focus group indicated that they would travel in order to get their first choice of school and Program of Study, and CTE parents who participated in a different focus group indicated that they would allow their children to travel to a CTE school if they were guaranteed their first choice. However, parents were very concerned about the “double negative” – i.e. their children having to travel and still not receiving their first choice.

The District receives a total Perkins allocation of \$6,326,473 directly from the Commonwealth’s Department of Education which is applied towards the CTE system total cost. This Perkins allocation is then divided into two categories by the District’s CTE office: \$1,911,962 moves directly to the CTE schools; the remaining \$4,414,511 goes to the CTE office in the District. The CTE Office then redistributes the remaining \$4.4 million Perkins allocation: \$1,674,769 is allocated by the CTE office to both CTE and non-CTE schools to help offset the costs of equipment, personnel and additional student services that the schools could not otherwise afford. The \$2,739,742 remaining in central office is used to cover the costs of

non-school based personnel, professional development, contracts with partners and business services. In total, students in the CTE high schools receive an additional \$933 per student comprised of Operating funds, Special Education Voc Ed/other Vocational Ed funds. The total amount of vocational related supplemental funds the CTE schools receive total just over \$7 million. Overall, the CTE schools receive approximately 11% more operating funds than the comprehensive high schools in Philadelphia.

Summary

- Most of Philadelphia’s state-approved CTE course sequences – known as Programs of Study –are offered at eight full-time CTE high schools.
- There are over 4,300 students, grades 10 through 12, in Program of Study across the city.
- CTE high schools are highly competitive and admit less than one-quarter of applicants.
- Many Programs of Study and their related occupations are offered at several different CTE high schools across the City.
- Other less-intensive forms of CTE also exist throughout the School District, including Programs of Concentration and individual courses taken as electives.
- The hybrid structure at Edison High School requires both short-term and long-term remedies.
- Quality and resources across Programs of Study vary from school to school.

B. Other Forms of Career-Connected Education and their Benefits

Other types of career-connected educational programs are offered in the School District of Philadelphia, providing the benefits of contextual learning but not necessarily including formal CTE coursework.

- High School Academies. Philadelphia’s career academies operate in 16 high schools, including both CTE and neighborhood schools. These “schools-within-schools” feature active learning through internships and direct exposure to the business community. Typically serving between 150 and 200 students from grades 10 through grade 12, career academies combine academic and technical curricula organized around a career theme, and establish partnerships with local employers to provide work-based learning opportunities that prepare students for employment and postsecondary education.

Philadelphia Academies, Inc. (PAI) supports a majority of the career academies in the School District. In 2008, PAI served approximately 6,000 students in educational

programs organized around nine industry themes used to facilitate career exposure and integrate academic and career-related instruction. Communities in Schools of Philadelphia, associated with the National Academy Foundation, also offers an academy focused on finance and provides support to all of the Culinary programs in the District.

Additionally, PAI provides supplemental support to Programs of Study and Programs of Concentration. PAI also offers technical assistance to several neighborhood high schools to bolster the effectiveness of their CTE course work through professional development, curriculum alignment with relevant career pathways and access to workplace internships.

- Industry Pipeline Programs. There are a number of well-established and articulated pathways from Philadelphia public high schools to careers and/or postsecondary education. While relatively small in scale, these “pipeline programs” are showing promise as vehicles for preparing students for careers in high-demand occupations in the regional economy. In general, pipeline programs are characterized by:
 - Employer involvement in and feedback on curriculum elements;
 - Career exploration and discussion directly with employer representatives;
 - Opportunities for work after graduation;
 - Sustained student involvement, preferably including summers and spanning more than one school year;
 - Opportunities for financial support for post-secondary education; and
 - A tight focus on academic standards and occupational competencies.

Examples of current Philadelphia industry pipeline programs include:

- Sunoco and the Process Control Pipeline Program. The Philadelphia Academies, Inc. created a process control program working directly with Sunoco at the Philadelphia-based oil refinery. Sunoco partners with the process control technology academy at Bok High School, helping to develop curriculum and providing up to 20 job opportunities each year for students. Young people who successfully complete the program but choose to go on to college are eligible to compete for one of two four-year scholarships if they major in engineering, science or technology related program.
- Philadelphia City Water Department. The water department draws potential employees from students in the electrical, environmental, and process control academies which are supported by Philadelphia Academies, Inc. In the second half of their senior year, students can choose an internship with the water department, arranged to combine school attendance and 20 hours of work each

week. Mentors help young workers adjust to the expectations of the workplace and provide on-the-job training. After graduation, students can move into full-time employment if they pass the civil service exam. The water department also pays 100% of the costs for students to attend Community College of Philadelphia to meet specific goals in math, reading and comprehension over the summer to prepare for the civil service exam.

- Lockheed Martin Integrated Systems and Solutions Registered IT Apprenticeship. The 3 year-long IT apprentice program begins in 11th grade and works with cohorts of 22 students drawn from both neighborhood and CTE high schools. PYN helped to establish and sustain this apprenticeship program which provides mentoring, job shadowing, projects, and hands-on training. During their senior year, the apprentices work as interns two days per week on-site at Lockheed, with the final year comprised of full-time training on-site after high school graduation. At completion of the three years of training, students are awarded Pennsylvania Department of Labor and Industry certification as an information technology technician. Graduates of the three year program may opt to remain as full-time Lockheed employees or search for other employment. Since 2002, four student cohorts have participated in the Registered IT Apprenticeship, with the next group of students expected to be brought into the program in Fall 2009.

Urban Education Academy. In 2003, Philadelphia Academies, Inc. created the Urban Education Academy as a vehicle to meet the need for more qualified teachers in Philadelphia. The Academy is designed to serve as an introduction to the teaching profession and other educational careers for students in the Philadelphia School District. Seven hundred and thirty nine (739) students from the participating schools have the opportunity to take courses in career specific areas, participate in an instructional internship and in programs designed to enhance leadership skills, attend summer skill enhancement programs and gain dual enrollment credit for college while still in high school. The Academy's Industry Advisory Board and other partners support the program by providing practice interviews, speakers, tours and internships for students and by working with Academies staff to develop curriculum and train teachers. On September 22, 2008, the Philadelphia Academies Inc., the School District of Philadelphia and the Philadelphia Federation of Teachers announced an historic agreement guaranteeing a teaching job to every graduate of the Urban Education Academy at Parkway West, Overbrook and Furness High Schools when they complete college and receive Pennsylvania certification.

- Pipeline programs managed by organized labor. Organized labor also works with the Philadelphia School District to provide pipeline programs. For example:
 - SEIU 1201 provides a summer internship in maintenance trades for twenty students completing their 11th grade year. After successful completion of the

program and graduation, students are eligible for the Building Engineer Trainee Program or the Trades Apprenticeship Program.

- District I 199C Training & Upgrading Fund works with the Philadelphia Academies, Inc. and the Philadelphia School District to train students as nurse aides.
 - The International Union of Painters and Allied Trades District Council 21 offers a summer co-op program in which students attend training one day a week while also attending regular high school classes. After graduation, students may apply to the union with credit towards completion of an apprenticeship.
 - The Philadelphia Building Trades Council and the School District of Philadelphia entered into a four-year agreement beginning in 2006 with the intention of providing a minimum number of apprenticeship opportunities to School District graduates over the life of the agreement. The agreement calls for the Building Trades Council to work closely with the School District to create a curriculum that will prepare public school students for apprenticeships with the electricians, carpenters, plumbers and other skilled trade unions.
- WorkReady Philadelphia – The WorkReady Philadelphia system of year-round and summer-only programs offers another opportunity for District students to gain career exposure, develop work readiness skills and receive on-the-job training. These programs have varying levels of connection to schools, ranging from year-round pipeline programs partnered with specific schools (e.g. St. Christopher’s Hospital for Children with Bok, Furness, Robeson, and School of the Future and Children’s Hospital of Philadelphia with Olney) to summer-only internships that provide opportunities for youth to earn school credit based on evaluations of projects and portfolios by certified teachers. Also part of WorkReady is Shadowing Day, which provides career-exposure and worksite visits to more than 1,000 ninth graders each year.

The Philadelphia Youth Network manages the WorkReady system, contracting with several dozen community-based organizations to operate these programs on behalf of the PWIB/Philadelphia Council for College and Career Success. More than 8,000 youth receive work-based learning opportunities through this system of programs each year. There are 3,000 more youth who seek to participate in these programs each year but cannot be placed due to insufficient funding.

- Accessibility of Career-Connected Education. CTE high schools and career academies combined serve more than 10,000 students each year. If you consider students who take any type of CTE course, the total student participant count jumps to over 14,200 students including several hundred participants in pipeline programs. Therefore, almost

28% of Philadelphia high school students have access to some type of career and technical offerings.

While it is outside the scope of this paper, consideration should be given to the core career-related activities available to all young people with particular attention on how to scale 21st Century skill building throughout the District.

Summary

- High school academies provide career-connected learning opportunities – in some cases including CTE Programs of Concentration – for approximately 6,000 students.
- With technical assistance provided by Philadelphia Academies, neighborhood high schools are developing Programs of Concentration.
- Although relative small in number and in enrollment, industry pipeline programs are well-established in Philadelphia and provide “evidence proofs” for an important new model for career preparation.
- Thousands of additional youth are provided career-connected learning experiences through WorkReady Philadelphia programs, managed by the Philadelphia Youth Network, with several thousand more placed on waiting lists each year.
- While outside the scope of this paper, work-based learning opportunities have a number of benefits for students, particularly those at-risk of high school dropout. More attention needs to be given to the District-wide strategy for 21st Century Skill building and career-connected education.

C. Enrollment and Academic Achievement in Philadelphia’s CTE Schools

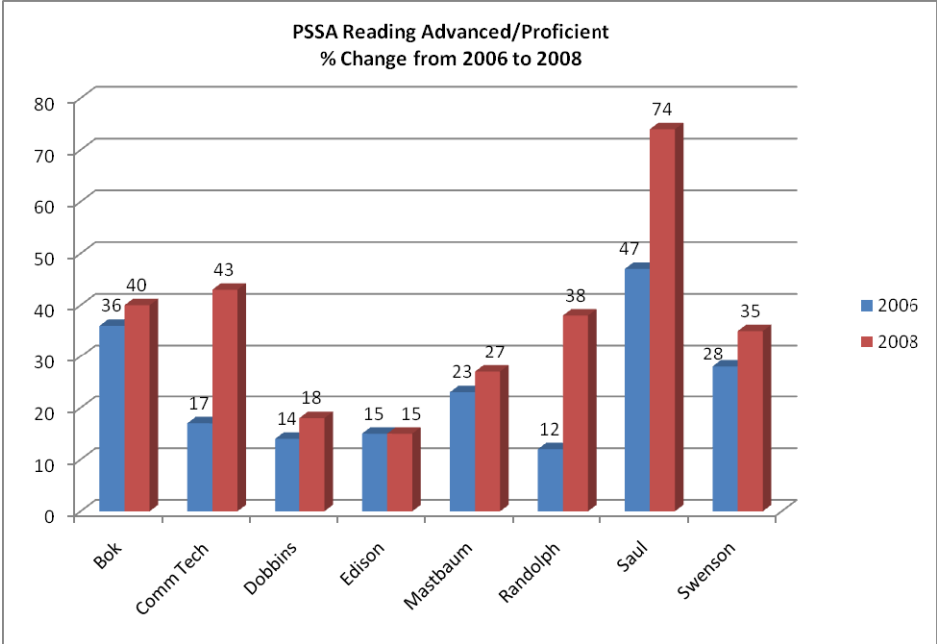
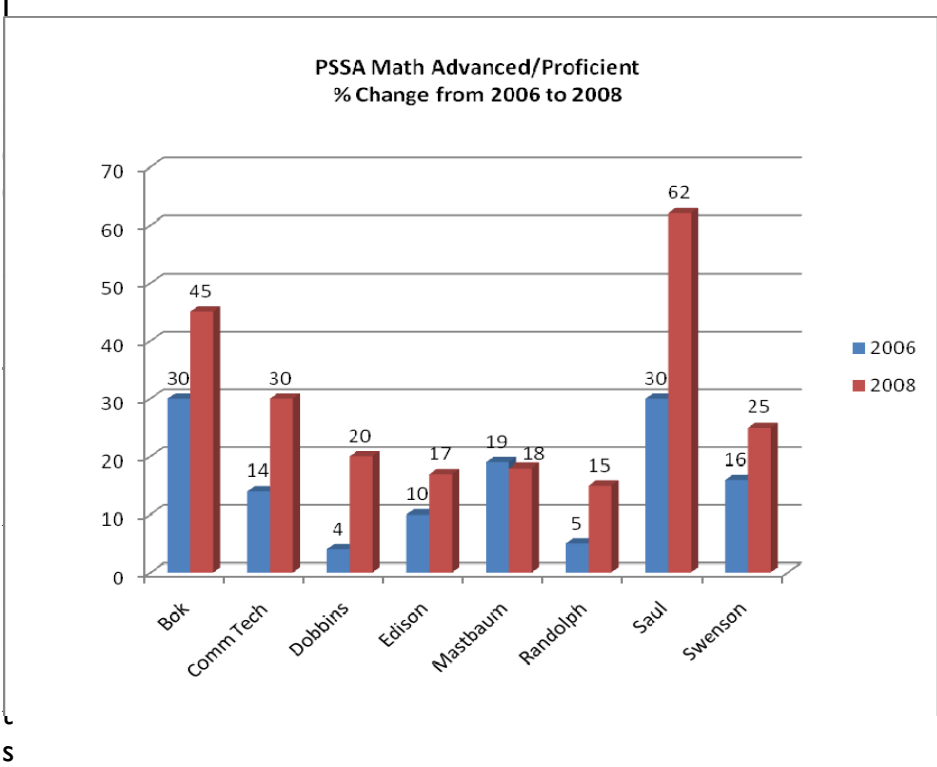
- Enrollment. In January 2008, more than 4,000 students were enrolled in 34 different Programs of Study in Philadelphia’s CTE high schools, covering 10 industry clusters. Training for 128 related occupations is available within these Programs of Study, with successful completers having access to 34 state-recognized industry certifications.
- Promotion and Retention. Ninth grade is a critical year for Philadelphia students. Simply put, those who earn enough credits during their first year of high school to be promoted to 10th grade are likely to graduate; those who do not are likely to drop out. The following table, based on recent work by Hopkins research scientist Ruth Curran Neild, uses two approaches to calculating promotion rates. In either case, it is clear that ninth grade promotion rates have increased over the past few years at CTE schools.

9th to 10th grade promotion rates for CTE Schools

	2001-02	2002-03	2003-04	2004-05
<i>Method 1: Promotion rate among all with grade indicators in subsequent year</i>	79%	88%	90%	95%
<i>Method 2: Minimum on-time promotion rate</i>	76%	79%	81%	88%

These data show two ways of looking at promotion from 9th to 10th grade. Method 1 shows promotion among those for whom any grade indicator can be found in the subsequent school year (i.e. these are students still enrolled in the District). It is a less conservative estimate because it does not take into account students who may have dropped out of the District. In contrast, Method 2 is a very conservative estimate of promotion. It counts all students who do not have grade indicators in the subsequent year as “not promoted.” Method 2 shows the minimum percentage of ninth graders who were promoted.

- Academic Achievement Based on Statewide Assessments. The Pennsylvania System of Statewide Assessment (PSSA) is the Commonwealth’s mandatory standardized test, established by the State Board of Education and used for accountability purposes under the federal No Child Left Behind Act. Between 2005 and 2008, CTE students and schools exhibited the following trends:
 - Each of the CTE schools saw decreases in students scoring below basic in math (ranging from 9.7%-35.3%) and reading (7.7%-60.1%);
 - Seven of the eight CTE school saw increases in the proficient and advanced categories in math (10.5%-40.3%) and in reading (6.7%-32.7%); and
 - sat for, and scored higher on the SAT in verbal and math at rates higher than or comparable to neighborhood high schools with similar demographics.



Despite the fact that CTE students scored higher on state assessments than the average of all students in the School District of Philadelphia, it is evident much work remains to be done when these results are compared to statewide scores. For example, in the 2006-07 school year, Saul High School was the only one of the eight schools to equal statewide average scores on 11th grade reading, and the only school to meet the state’s actual targets for PSSA performance. None of the eight equaled statewide average scores on mathematics assessments. Furthermore, four of the eight schools are in “Corrective Action 2” in 2008, meaning that they have failed for five years to make Adequately Yearly Progress under the federal No Child Left Behind Act. One of the four in Corrective Action 2 met standards to qualify as “making progress” and only two of the eight met Adequate Yearly Progress standards under the Act. Edison High School’s 2008 Pennsylvania State Assessment reading scores shows the lowest number of proficient readers among the CTE cohort schools.

- **Graduation.** Graduation rates at CTE schools exceed the average District graduation rate, ranging from 10 to 25 percentage points higher, depending on the cohort (Balfanz and Neild, *Unfulfilled Promise*).² Furthermore, graduation rates have risen over time. This is evident when comparing the four year graduation rates of the Class of 2005 with the six year rates for the Classes of 2001 and 2003.

	Class of 2001 (six year rate)	Class of 2003 (six year rate)	Class of 2005 (four year rate)
Percent graduated	74%	73%	77%

These findings are consistent with research cited above which indicates that CTE and other forms of career-connected education have important dropout prevention benefits, particularly for low-income students. However, while the graduation rates of all but one of the 6 CTE schools with available data indeed measured higher than other high schools in Philadelphia in 2005, only 3 achieved the Commonwealth’s graduation rate benchmark of 80%. More research is necessary to determine the role that selectivity plays in the overall graduation rates.

- **Additional Graduation Requirements for CTE Students.** The increases in the School District’s high school graduation credit requirements in combination with the coursework needed for CTE Programs of Study have led District officials to determine that, effective in the 2009 school year, CTE students must take more credits than other students to graduate (e.g. 26.5 vs. 23.5). This conclusion was reached based on the belief that CTE students could not meet both requirements within a 23.5 course load. However, evidence suggests that there are effective ways to integrate coursework so that students are able to earn both academic and career-focused credit within a single, well-designed course.

² This comparison does not include data for Edison High School. While Edison enrollment includes both CTE and non-CTE students, the data set used for this analysis does not identify students accordingly. Therefore the entire school was excluded in this particular case by the researchers.

Summary

- Students in CTE high schools have performed better over time on state assessments and graduate at higher rates than students in non-CTE schools. While national data indicates that CTE pedagogy correlates with student performance, research is needed to determine whether the stronger performance in Philadelphia results from CTE schools' selectivity or other factors.
- For the most part, while they outperform their non-CTE (non-magnet school) peers in the City, Philadelphia CTE students and CTE high schools are below statewide averages on assessments of reading and mathematics. In fact, four CTE high schools are in "Corrective Action 2" status.
- Effective in the 2009-10 school year, CTE students will have to accumulate 26.5 credits to graduate, compared to 23.5 for non-CTE students, in order to accommodate academic and CTE course requirements.

D. Alignment of CTE Schools with Regional Workforce and Economic Development Needs.

The apparent ability of CTE schools to produce stronger academic outcomes than non-CTE high schools has important benefits for students. But beyond their academic mission, CTE schools are also intended to equip students with skills needed to enter employment and/postsecondary education and training aligned with the region's economic development needs. To assess and understand the extent of this alignment, the Philadelphia Workforce Investment Board undertook a study to examine:

- The connection between the skill sets offered through CTE programs in the public high schools and available occupations – especially Commonwealth designated high priority occupations
- Possible gaps in the CTE programs for large or growth occupations that require specific skill sets that can be learned in several years and provide opportunities for advancement
- Emerging occupations that might provide specific skill sets that can be learned in several years and provide opportunities for advancement

The Growing Need for a Skilled Workforce. The WIB notes the steady increases in skill levels of occupations found in the Greater Philadelphia labor market. These changes are primarily attributable to two factors: the job content – i.e. the skill requirements of individual

occupations – has changed to favor greater educational attainment; and the staffing structures of employers – i.e. the mix of employment within firms, has also changed to reflect the need for increasing numbers of skilled employees.

As an important pipeline of talent for regional employers, CTE schools must understand and address these trends. The WIB report notes, “skills, knowledge, and abilities for jobs today require strong core competencies in math, reading, comprehension, writing, critical thinking, problem-solving, and communication.” As the labor market in Philadelphia shifts to occupations requiring higher levels of knowledge and skills than in the past, even for entry-level opportunities, the WIB states that “more than two-thirds of the students completing career and technical education programs will need a post-secondary certificate or an academic degree to pursue fulltime work.”

CTE Alignment with Regional Economic Needs. Several of Philadelphia’s CTE Clusters and Programs of Study align with in-demand occupations that pay well and involve advanced levels of education and skills development as prerequisites to career success. For example, Programs of Study and related occupations in four of Philadelphia’s nine CTE clusters – Communications, Health, Information Technology and Transportation – are in great demand in the regional economy. In most cases, students in these programs will need to continue their education well beyond high school in order to gain and keep high-wage/high-demand positions.

In other instances, Programs of Study and related occupations in several CTE clusters – e.g. Hospitality and Cosmetology & Fashion Design – offer training for job entry immediately after high school, without the need for additional post-high school education. But while job opportunities are numerous for students in these programs after high school graduation, wages and opportunities for advancement are often poor. Particularly in these instances, the WIB notes “there is a clear need to articulate secondary coursework and Programs of Study with post secondary credentials in order to equip students with skills needed to earn family sustaining wages and move beyond entry-level jobs to careers with potential for growth and advancement.”

Specific Connections to Commonwealth-Established High Priority Occupations. Each year, the Commonwealth’s Department of Labor & Industry determines High Priority Occupations (HPO) for the Commonwealth and approves additional occupational titles for local workforce areas and regions. High Priority Occupations are defined as job categories that are in demand by employers, have higher skill needs, and are most likely to provide family sustaining wages. Therefore, the High Priority Occupations list should be an important factor in developing Programs of Study at the school level. Once included on the HPO list, the state and school can provide additional resources for the development of programs of study related to an emerging regional workforce need. Early identification of these developing occupations can help schools keep pace with industry needs while allowing the region to better prepare for the workforce needs on the horizon.

Any new program for which Commonwealth workforce-related funding is sought must be consistent with the HPO list. Philadelphia’s regional list includes occupations generated by the Commonwealth as well as those occupations successfully petitioned for HPO inclusion within

the SE region of Bucks, Chester, Delaware, Montgomery, and Philadelphia counties. With the exception of Hospitality, at least one HPO is included within each CTE cluster, but only one quarter of CTE programs are directly aligned with HPOs. As noted above, Health, Communications, Information Technology and Transportation occupations are well-aligned with HPOs, while Agriculture Science, Cosmetology & Fashion, and Hospitality Clusters are the least aligned.

The process for impacting the HPO list involves completing an application through the local Workforce Investment Board that ultimately gets submitted to the Economic Development Cabinet through the Department of Labor and Industry. This application requires significant levels of data.

To date, this process has occurred on an “as-needed” basis and has met with limited success on applications submitted by the local education agency through the WIB.

Because schools are not typically partners in high-level discussions of regional workforce projections, they are dependent on their industry or community partners if they wish to impact the HPO list. The HPO is one of a several criterion that must be considered when determining alignment that includes the local job market and industry partner involvement.

There is currently no systemic mechanism for planning and incubating programs in emerging industry areas such as “green jobs.” Developing systemic processes and supports for such efforts would also help schools in their efforts to keep up with industry trends and prepare for future HPO’s.

Summarizing the Labor Market Data. In the table on the following two pages, the WIB lists Philadelphia’s CTE clusters, Programs of Study and students enrolled, and characterizes them in relation to employment opportunities after high school, the need for postsecondary education and competencies essential to workplace success.

Cluster	No. of Students Enrolled	No. of POS	Program of Study Listing	Associated w/ High Priority Occupation	No. of Industry Certs. Offered	No. of Schools offering POS	Strong employment opportunities w/ a diploma	Requires post-secondary education to be successful	Competencies that must be present for success
Agricultural Science	342	4	Agr. Bus & Prod	No	2	1	Low wages in food processing; poor articulation with opportunities for veterinary technicians	Natural resource occupations; farm management	Stronger science and math
			Agr. Prod Workers & Managers	No					
			Agr. and Food Processing	Yes					
			Agr. Production Operations	No					
Business/Finance	441	2	Business Technology	Yes	8	4	Good wages and many opportunities	Not necessary for many entry-level positions	Strong budget and writing skills
			Business/Accounting, Finance	Yes					
Communications/ Graphic Arts	629	4	Graphic Communication	No	2	4	No	In most cases a Bachelor's degree	Logic and creative visual skills
			Graphic Design	No					
			Commercial Photography	No					
			Cinematography/Television & Radio	Yes					
Construction	723	9	Carpentry	Yes	5	6	Yes- barriers for entry exist because of union apprenticeship programs	Necessary for engineering and electromechanical occupations	Strong measurement skills, ability to read schematics
			Construction	Yes					
			Appliance Installation Repair/ Heating & Ventilation	Yes					
			Electrical Construction and Maintenance	Yes					
			Electromechanical Technology	Yes					
			Engineering Related Technology	Yes					
			Plumbing Technology	Yes					
			Welding Technology	Yes					

Cluster	No. of Students Enrolled	No. of POS	Program of Study Listing	Associated w/ High Priority Occupation	No. of Industry Certs. Offered	No. of Schools offering POS	Strong employment opportunities w/ a diploma	Requires post-secondary education to be successful	Competencies that must be present for success
Cosmetology/ Fashion Design	304	3	Cosmetology	No	2	2	With certification, but wages low	No	Budget and accounting
			Barbering	Yes					
			Fashion Design	No					
Health	537	3	Child Care	Yes	11	5	Jobs available with a diploma pay very poorly and do not offer advancement	Yes, a vocational or associates degree is necessary	Academic skills to succeed in post secondary education – lab techniques
			Health Information Management	Yes					
			Health Related Technology/Cert Nursing Asst	Yes					
Hospitality	707	2	Baking	Yes	1	6	Yes, but low wages	Some specialized training may improve career opportunities	Timeliness, good communication
			Culinary Arts	Yes					
Information Technology	259	2	Web/Multimedia Design	Yes	6	4	No	Yes, most occupations require a Bachelor's degree for career growth	Logic and math, good communication
			Computer Systems	Yes					
Law and Public Safety (new)	39	1	Criminal Justice	No	0	1	Yes- requires on-the-job training	No	Good communication skills; writing
Transportation	370	3	Automotive Collision Repair	No	8	4	Yes- requires on-the-job training	No	Measurement; math and organizational skills for logistics and warehousing

POS – Program of Study

Chart adapted from the Philadelphia Workforce Investment Board's "Research Brief: Career and Technical Education Programs in the Philadelphia School System"

Training for the Jobs of the Future. The WIB's report on CTE alignment notes the challenges of forecasting future growth in existing occupations, let alone for those that are just beginning to emerge or do not yet exist: The report states: "while formal data sources inform on trends of growth and decline in occupational opportunities, these data cannot predict emerging opportunities or sudden growth in established occupations." As a result, CTE, like most workforce development strategies, designs and constructs its program offerings based on the perceived realities of the recent past – on projections of what has been rather than what might be. Yet, accelerating technological innovation will surely create demands for an ever-expanding pool of skilled individuals who can step into these new positions – or for a pipeline that can deliver them in a timely manner. As a result, a focus on 21st century skills across the board is essential. These programs cannot possibly provide technical training for all the opportunities that might be available to students in the future, but they can focus on problem-solving, global awareness, literacy comprehension, interpersonal skills, etc. – skills that are transferrable across industries and that best position students for the unknown economy.

Based on its access to a wide variety of labor market trends and economic data, the Philadelphia WIB is well positioned to provide such information on emerging industries and rapid shifts in the demand for occupations because of new requirements for credentials, changes in the realm of workplace knowledge, or unexpected investment by government or private sector groups.

Ensuring Alignment Through Assessment. In order to further align programs with postsecondary employment opportunities, the School District of Philadelphia offers two assessment types for students engaged in CTE coursework: industry-related certification and end of course assessments. There are 45 CTE industry-related certifications (34 of which are state recognized) available to students across the School District.

In the 2007-08 school year, 5,313 students across the School District of Philadelphia were eligible to take any of these industry certification exams. Of those, 14% received certification. Of the 5,313 students, 1,850 were eligible in the 8 CTE schools where greater emphasis is placed on work preparation. Of those CTE school students, 29% received industry certification.

These certifications are not directly aligned to any specific program or curriculum, and are only considered to be "associated with" an industry cluster. They also vary in depth of knowledge and skill necessary to pass. As a result, the level of value added to a student's marketability is uncertain for each of the available certifications.

A second, more inclusive mode of assessment is the end of program assessments that measure a range of occupational competencies necessary to a particular occupation. The Bureau of Career and Technical Education in Pennsylvania requires the use of state approved tests, which, in Philadelphia's case, leaves the National Occupational Competency Testing Institute (NOCTI) the only option for nearly all available programs.

The 2007-2008 school year was the first in which the School District of Philadelphia mandated the use of the NOCTI for its graduating seniors in CTE Programs of Study. Of 48 programs tested citywide, only three had average student scores above state and national averages for the written portion, and 11 for performance. Reasons for this include late notice for teachers and students that resulted in a lack of alignment in local curricula and therefore student preparation was minimal.

Plans to improve upon this are being implemented this year including the scheduling of a “NOCTI Week” (April 20-24, 2009) in the CTE high schools where the schools will schedule time during the school day for students to take end of program assessments that are connected to their Program of Study. Questions remain as to how aligned the NOCTI is with occupational needs and standards, although it remains the only state approved assessment tool for nearly all of the programs in Philadelphia. Unfortunately, NOCTI is not an assessment that is recognized by regional employers, a fact that was revealed through employer focus groups conducted during this study. Further research should be conducted to determine the most industry relevant assessment tools available, including an in depth analysis of NOCTI, to ensure alignment with industry standards.

Summary

- CTE offerings that provide employment opportunities immediately after high school are typically characterized by low wages and little chance for career advancement.
- CTE offerings that align well with high-wage/high-demand occupations typically require significant education or training beyond the secondary level.
- Only one-quarter of CTE programs are directly aligned with state-identified High Priority Occupations.
- According to the Philadelphia Workforce Investment Board, two-thirds of CTE students will need postsecondary credentials for career success. These and other credentials that are integral to career success, such as industry certification, can potentially be obtained while still in high school.
- The WIB is positioned to make annual labor market projections that can help to guide and shape CTE occupation training programs.
- High quality assessment tools can be effective in the process of aligning programs and curricula to high-wage/high-demand occupations. More research must be conducted to determine the most effective assessment tools.

E. Connections Between Industry and CTE Programs of Study

The current structure for providing guidance, governance and industry support to CTE schools and programs in Philadelphia consists of Industry Advisory Boards and Occupational Advisory Committees. Both are overseen by the School District’s Office of High School Reform: College, Career and Technical Education Division.

The State Board of Education published final revisions to Chapter 4 in February, 2008. The Vocational-Technical Education section on advisory committees for area vocational technical schools (§33) requires the following three CTE committees for the District as a whole:

Local Advisory Committee: committee of business and industry representatives, public sector employees, agriculture, labor organizations, community organizations, postsecondary institutions and the general public that give advice to the board and the administration on the program of the school.

Administrative Committee: composed of chief school administrators.

Occupational Advisory Committee: composed of a majority of employees/employers in the occupation for which training is provided and to be established for each approved vocational-technical education program or cluster of related programs to advise the board, administration and staff on curriculum, equipment, instructional materials, safety requirements, program evaluation and to ensure that the program meets industry standards.

These committees are required based on Pennsylvania state codes. The Federal Perkins Reauthorization requires an additional Perkins Participatory Planning Committee. The Participatory Planning Committee makes decisions on all aspects of the Perkins Local Plan. The Participatory Planning Committee (PPC) is required to work with the local education agency. This committee must be active during the development, implementation, and evaluation of the Perkins Local Plan. The Committee must be made up of community and business leaders that can contribute to improvement of programs. In Philadelphia, the School District and the Community College of Philadelphia are considered local educational agencies as they both receive Perkins funds for CTE related activities. Therefore, there are two local Planning Committees that essentially serve the same purpose.

For the past two years, the School District of Philadelphia has contracted with Philadelphia Academies, Inc. (PAI) to develop the city-wide Industry Advisory Boards and provide for their on-going support in the form of recruitment, coordination, and management. These boards are intended to support all CTE high schools, non-CTE schools that have career themed academies, and central District offices in: developing curriculum; providing guidance and up-to-date information regarding industry needs, changes and trends; and offering resources and expertise to programs of study. PAI is currently responsible for Industry Advisory Boards in the following areas:

- Automotive and Mechanical Science
- Business and Technology
- Communications
- Electrical Science
- Environmental Sciences
- Health and Life Sciences
- Hotel, Restaurant, Travel and Tourism
- Process Technology
- Urban Education

In addition, the District coordinates Occupational Advisory Committees (OAC) that serve each approved program in the eight CTE schools. These OAC's meet at the CTE schools with the school principals and designated staff with the purpose of strengthening the career and technical education program of a school by making recommendations for program improvement and providing technical assistance to assure the most up-to-date curriculum content, appropriate applications of technology, and the implementation of new teaching strategies.

In meetings conducted for this report, CTE principals raised concerns about having to “compete” for OAC members with other schools that offer programs in the same industry cluster and about potential duplication of effort. Although the OAC’s are more focused on individual school needs compared to the city-wide focus of the Industry Advisory Board, essentially there are two committees designed to meet virtually the same needs for schools and their respective programs of study. Even with two separate committees in place, teachers in CTE schools have also expressed a lack of clarity about how to access internship opportunities and other industry support. While the Academies provides this service for the academies they support in CTE schools (i.e., at Bok, Mastbaum, and Swenson), in many other cases school leadership and staff feel that their only recourse is to organize this support on their own which adds yet another replication of industry outreach efforts.

The following chart correlates the District’s current structure to the federal and state regulations and other existing efforts:

Federal Requirements	District	Other efforts
Perkins Participatory Planning Committee	SDP Perkins Participatory Planning Committee	Community College of Philadelphia Perkins Participatory Planning Committee
State requirements	District	Other Efforts
Local Advisory Committee	Industry Advisory Boards	Philadelphia Council for Career and College Success (formerly, the Youth Council) Subcommittee on Workforce Preparation
Administrative Committee	SDP Office of High School Reform: College, Career and Technical Education Division	---
Occupational Advisory Committee	Occupational Advisory Committees <i>and</i> Industry Advisory Boards	Industry Partnerships (funded through Department of Labor & Industry; coordinated through local WIB)

Summary:

- The current structure to provide industry guidance to programs is duplicative in certain schools and industry areas.
- School-based staff are confused about how and where to access supports and in some cases create their own support mechanisms, further duplicating efforts.
- Stronger connections are needed between the current District structures and broader cross-sector city-wide efforts.
- There is an opportunity to provide more consistent, coordinated and intensive industry input and to better coordinate efforts across the District and with other stakeholders by connecting to existing or emerging citywide efforts.

- Participants on boards need more clarity as to expectations, roles and functions.

F. Alignment of CTE with Post-Secondary Education

Despite the opportunities that exist in the current economy for high school graduates, the Philadelphia Workforce Investment Board strongly recommends that students continue on to a post secondary institution and complete a degree or, at a minimum, move into employment that includes training leading to a professional certificate. The WIB notes that the prospects for labor market success for residents without some training or education beyond high school “continues to be grim.” Therefore, it seems clear that Philadelphia CTE students – like their non-CTE counterparts – should be preparing for additional education and training rather than viewing their high school diploma as a final credential.

Unfortunately, there is still a strong perception evidenced in focus groups with students and interviews with diverse groups of stakeholders, including teachers and elected officials, that CTE is a pathway for youth who don’t want to or are not “able” to go on to college. Even CTE students, in the main, do not believe that they need postsecondary education or training to succeed in their chosen career fields. This is particularly ironic, given the selective nature of CTE schools and the fact that the academic performance of CTE students significantly outstrips that of their non-participating peers.

In fact, data collected from the National Student Clearinghouse over several years show college-going rates for CTE schools are significantly lower than those of special admission schools and close to those of neighborhood high schools. The figures that illustrate this, on the chart below, also show slightly declining numbers of students entering postsecondary institutions from neighborhood high schools and CTE schools while rates from special admission schools remained relatively steady.

Students ever enrolled in a 2 or 4 year institution of higher education*

	Graduated 2001	Graduated 2002	Graduated 2003	Graduated 2005
Special Admission Schools	83%	82%	84%	82%
CTE Schools	49%	41%	48%	43%
Neighborhood Schools	53%	50%	45%	39%

Focus groups and surveys of 79 CTE students provide some additional information on attitudes and expectations related to post-secondary education. Students in focus groups were asked to identify what they felt they needed to be successful after high school graduation. Only thirty-one percent (31%) indicated that college degrees and/or certifications are needed in order to succeed after high school. Overall, among students interviewed in these focus groups, college degrees and certifications were seen as “door-openers” for opportunities while interpersonal

* Issues with data preclude analysis of students that graduated in 2004.

skills and the ability to chart your own path are what students' viewed as "necessary" for future success.

More youth in the survey seemed to value higher education (with 60% indicating that they planned on attending a two- or four-year educational institution after high school) but it is still by no means a universally held belief. When asked how far they believed they would actually get in school, 34% believe they will obtain a two- or four-year degree, while an additional 20% expressed their interest in going beyond a four-year degree.

There are increasing opportunities for postsecondary participation among Philadelphia students, even while still in high school. For example, Pennsylvania offers one of the most innovative **Dual Enrollment** programs in the nation. The School District of Philadelphia participates in this state-supported initiative, but CTE students participate at rates far less than the average of all Philadelphia high school students. For example, in the 2006-07 school year and fall semester of 2007, CTE students met criteria for participation at the same rates (83%) as the overall District population of those who applied for dual enrollment. However, in 2006 CTE students were 12% less likely to actually participate and in 2007, CTE students were 23% less likely to participate. In 2006 CTE students made up less than 7% of the dual enrollment participants, dropping to 3% in 2007.

In addition to dual enrollment opportunities, **Tech Prep** – a program authorized by the federal Perkins Act – is intended to strengthen connections between secondary and postsecondary education by supporting the development and operation of career-focused programs involving the last two years of secondary education and at least two years of postsecondary education. Successful Tech Prep programs help provide services to high school students leading them to an associate degree or a two-year certificate.

Tech Prep programs are offered in five of the eight CTE schools, three neighborhood high schools and one charter school. Services offered include college ready workshops. The current Tech Prep funding is administered by Community College of Philadelphia which is a partner in the Philadelphia Tech Prep Consortium. The consortium is a partnership among Community College of Philadelphia, the School District of Philadelphia and representatives from regional business and industry that work together to plan Tech Prep activities, articulate programs and build relationships between high schools and Community College of Philadelphia, and facilitate the alignment of curriculum with that of industry standards.

According to the School District of Philadelphia, there are 15 programs of study across five industry clusters that are connected to Tech Prep. There was a total of **1,134** students in grades 10, 11 and 12 in those particular programs of study. During the 2007-2008 school year, Community College of Philadelphia reported that 24% or 278 students participated in Tech Prep: 61 students in 10th grade, 124 in 11th grade, and 93 in the 12th grade.

One expected outcome for students participating in Tech Prep is an easier transition from high school to a postsecondary institution, in this case, Community College of Philadelphia. Of the 93 12th grade participants in 2007-2008 school year, 31 students (33%) enrolled in CCP for the fall of 2008.

To date, Tech Prep curricula have been developed in four occupational areas: Health, Culinary, Business Technology and Computer Technology. In addition, while articulation agreements are planned in a number of Programs of Study, no articulation agreements are currently in place, and no college level courses are provided for Tech Prep students. One expressed concern involves the academic skills of students in these programs and their readiness to benefit from this college level work. Furthermore, although easing the transition to postsecondary education is one of the goals of Tech Prep, only one-third of tech prep participants in the Class of 2008 actually enrolled in Community College for the fall semester following graduation.

Summary

- The economic prospects for Philadelphia residents without some postsecondary education are “grim.”
- Philadelphia CTE students attend postsecondary education at higher rates than students in the comprehensive high schools, but lower rates than students in other special admission high schools, and only one-third of the CTE students interviewed believe that they need postsecondary education for career success.
- CTE students are significantly under-represented among Philadelphia students participating in Commonwealth-funded dual enrollment programs.
- Only about one-third of Tech Prep students enroll in CCP following graduation.
- The number of student participating in Tech Prep is small as compared to the total number of students in Tech Prep related Programs of Study.

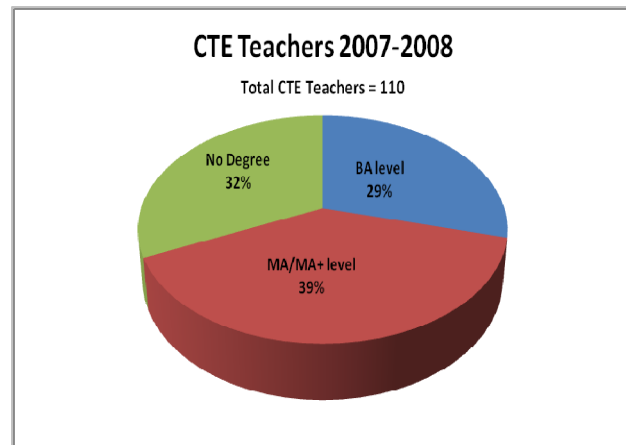
G. Teacher Data and Professional Development

During the 2007-2008 school year the District had 110 industry specialized CTE teachers in classrooms. CTE teachers may have sufficient field experience but lack professional training as high school instructors. In fact, one-third of CTE teachers do not have four-year degrees, and 34% were working with an emergency teaching certificate and/or intern teacher status. CTE teachers are not required to hold four-year degrees because of a state policy that only requires incoming CTE teachers to take and pass an occupational skill exam. If the occupational exam is passed, the degree requirement is waived. The candidates that pass the occupational exam must then take state-required courses at Temple University’s Professional Personnel Development center. A total of 72 credits must be taken over a 10 year period.

Essentially, one third of all CTE teachers came to the classroom with little to no formal teaching experience and/or no educational background in classroom instruction. Until 2008 these new CTE teachers were not included in the School District’s New Teacher Induction

professional development session, so they received little to no instructional support during their transition into a classroom setting.

Currently, the District has no system for providing unified, CTE-specific professional development to teachers. As a result, teachers are left to learn CTE pedagogy from their school leadership or from a certification program. Of the eight CTE high schools, only two are led by administrators who are state-certified CTE Directors. Non-certified principals have received little to no training on the differences inherent in running a CTE high school; therefore their ability to provide additional specialized support to their staff is severely limited.



Teachers without permanent Vocational Teacher certifications are required to attend courses at a CTE-specific, state-certifying college or university (Temple University is the state's university partner in Philadelphia). Due to the gaps in monitoring and compliance and structural loop holes, many emergency certified teachers can remain in the system for up to 10 years before ever obtaining their formal certification. Furthermore, because of the lack of an established pipeline for CTE teachers (both full-time and substitute), extended teacher absences and vacancies can have a catastrophic effect on a Program of Study. In certain cases, Program of Study have stopped being offered at schools because of such staffing issues. Further, there is no streamlined or efficient process to effectively integrate and use industry volunteers as adjunct staff in these cases.

Principals and their leadership teams are calling for additional professional development on subjects such as contextual learning and CTE pedagogy, Perkins budget and finance administration, and on the development and utilization of business partnerships. Moreover, CTE teachers interviewed have emphasized the need for support on academic integration activities and opportunities to upgrade their own industry specific skills. Currently the District has no way of distinguishing which teachers need industry skills upgrades from those who are on pace with industry standards. Only teacher credentials and certifications are collected and monitored. There is no oversight for industry-related professional development and much of it is left up to the discretion of the individual teacher. In addition, there is no state requirement for CTE teachers to acquire industry-validated certifications.

Finally, the lack of appropriate certifications in both vocational and academic areas also impacts the District's ability to offer credit for blended occupational and academic courses. In the past, academic credit was awarded for CTE coursework. However, with No Child Left Behind's Highly Qualified Teacher requirement, academic courses and academic credit must come from teachers with the appropriate certification.

Summary

- Over one-third of CTE teachers do not have four-year degrees.
- CTE Teachers may have sufficient field experience but lack professional training as high school instructors. In fact, over one-third of CTE teachers do not have four-year degrees, and a similar fraction is new to the field of teaching, holding only emergency certification or intern status.
- There is no organized system for professional development specific to the needs of CTE teachers.
- Teacher vacancies and extended absences coupled with the lack of a solid teacher pipeline can cause the closing of an entire program.
- Of the eight CTE schools only two schools currently have an administrator who is state certified as a CTE Director.
- The District currently lacks a system for collecting information on CTE teachers' industry-specific skills beyond their initial occupational skills assessment.

H. School District CTE Administrative Structure

The CTE schools currently have administrative needs that differ in significant ways from their comprehensive high school counterparts around the city. Lack of understanding about pedagogical differences, equipment needs, professional development needs, data collection and additional state compliance issues are among the various concerns raised by CTE leadership at both the school and central office levels. The CTE schools sit within the different geographic regions in the School District, therefore the Regional Superintendents are the direct supervisors of CTE principals in the city. None of the Regional Superintendents currently have state required CTE credentials, which means that their knowledge about the unique needs of CTE schools is limited at best. The leader of Philadelphia's CTE office sits in the central offices of the District and, although he is CTE certified, only provides support and compliance monitoring for the programs of study. The following section describes some of the key areas in which CTE schools and programs are unique and/or their logistical and structural needs vary significantly from other schools.

Equipment - With the speed of technological innovation, equipment needs in CTE schools change frequently and often dramatically. However, in an organization as large as the School District of Philadelphia, there is a lengthy procurement process. In addition, there are numerous steps before a school can order equipment, as there is no system-wide process for determining what equipment purchases are needed. Principals and teachers must first research the need, identify the correct equipment and then begin the process of ordering. The entire process often takes an entire school year or more to complete. In the interim, students are

working on equipment that is outdated by industry standards, and therefore are not being appropriately prepared for the workplace.

Staffing – CTE Central Office

Currently the CTE office has budgeted for the following positions:

- 10 Career Coordinators (with three positions currently vacant);
- 15 Education to Career Coordinators (ETCs);
- 1 Field Coordinator; and
- 1 Career and Technical Education Coach.

Career Coordinators are intended to be the District's industry experts, responsible for city-wide industry alignment with programs of study. To accomplish these goals, their job descriptions include: building relationships with industry partners to assist them in identifying industry trends, reviewing curriculum and engaging other industry partners. The Career Coordinators are also intended to help direct the work of the ETCs at the school level.

The ETCs are school-based liaisons who have responsibility and oversight of Perkins funds expenditures at the school level, assist teachers with equipment purchases, help teachers implement curriculum, develop internship opportunities for students, recruit students and prepare them for internships, work on scheduling issues with roster chairs and ensure alignment of programs of study with Perkins IV and Chapter 339 requirements.

In practice, there is much overlap between the two positions and additional overlap with the goals of the Occupational Advisory Committees, the Industry Advisory Boards and the support services offered by Philadelphia Academies, Inc. and Communities in Schools. A deeper analysis of the committees/boards' goals and outcomes and the functions of these two positions is necessary to better align the services and opportunities that reach the schools.

Staffing – CTE Schools and Programs of Study

Currently, no pipeline exists for new CTE teachers. Although the CTE office has recently collaborated with the District's Office of Human Resources to address this issue, no formal system for recruiting, training, and hiring new industry experts into the ranks of the CTE schools exists. Problems abound in attracting and processing appropriate candidates. The low salaries CTE teachers receive compared to private sector jobs in the candidate's respective industry is the first deterrent for potential candidates. When the District can find industry experts willing to join the teaching ranks, the next obstacles encountered are the costs associated with their hiring (\$410 for clearances and payment of the required occupational skills assessment) and the processing of the candidate. The out-of-pocket costs and the lag time getting through the entire hiring process causes unnecessary frustration for candidates. It can take interested candidates six to seven months to get through the entire process which includes: receiving necessary clearances, taking/passing the occupational skills exam, getting through the District's human resource process (including interviews), and picking a school before finally, making their way into a classroom.

Data collection

There is no uniform system of data collection for the CTE schools, and the data that are collected are typically used to satisfy state reporting mandates and not necessarily to inform practice. Furthermore, data on Programs of Study, student state examination pass/fail rates, special populations and other related issues are collected and housed in different offices both in and outside the School District. Without consistent collection and storage, analyses require extensive reconciliation of multiple, overlapping and at times contradictory data sets, which makes data-driven decision-making extremely challenging.

Summary:

- The differentiated and specialized needs of CTE schools within a larger system, combined with administrative support gaps in some cases and duplication of supports in others, lead to difficulties for CTE leadership at the school level and central levels which include:
 - Difficulty procuring industry-specific equipment in a timely manner,
 - Lack of resources and competition for forming industry partnerships,
 - Professional development offerings that do not address the needs of CTE teachers and CTE principals,
 - Inconsistent and under-credentialing of staff across sites,
 - Inaccurate, incomplete data collection and coordination,
 - Underutilization of data for planning, and
 - Duplication of efforts and/or confusing overlap of functions and responsibilities among District staff and partners.

VI. Recommendations

In considering existing research and the efforts of the Youth Workforce Preparation Committee members and partners, the Philadelphia Workforce Investment Board, the School District of Philadelphia's Office of High School Reform: College, Career and Technical Education Division, the following recommendations are designed to collectively maximize the potential of Philadelphia's Career and Technical Education system in serving students, the community, and local employers.

Recommendation #1:**Strengthen the Focus, Quality and Access of CTE Programs**

- a. **Transform the School District's CTE high schools into Centers of Excellence** by consolidating programs of study in key industry areas effectively concentrating resources and expertise. Centers of Excellence should be focused on high-wage/high-demand careers in the Greater Philadelphia region.
- b. **Develop and provide a common core of relevant instruction and experiences** available to students in all CTE high schools.
- c. **Establish an alternative admissions policy** that widens focus to areas beyond traditional academic criteria for CTE high schools to ensure that capable students are not screened out based solely on grades.
- d. **Ensure the quality of Programs of Concentration**, monitoring their effectiveness and providing them with the support necessary for success.

a. **The School District should consider transforming each CTE High School into a "Center of Excellence,"** with the intention of providing schools the opportunity to focus their instruction and resources on specific industry clusters, eliminating the uneven distribution of resources and duplication of efforts. This organizing framework addresses the variations inherent in multiple programs of the same type spread across several different schools, as well as enhancing student preparation for high-wage/high-demand careers. Through Centers of Excellence, all Programs of Study offered in each school would be focused on an occupational cluster that is clearly aligned with needs in the Greater Philadelphia region, and holds promise for self- and family-sustaining wages.

Essentially, each Center of Excellence would provide an organized structure for industry-related teaching and learning, business participation and higher education partnerships, providing support for curriculum and instruction, internships, job guarantees, equipment, and off-site learning labs. Given the current resources, limited pipeline of teachers and variations in facilities and physical plant, it is highly unlikely that multiple programs of study in various industry areas can be supported at the highest quality across multiple schools in the City. Therefore, concentrating these resources into Centers of Excellence promises greater efficiency and effectiveness for schools, teachers, students and regional employers.

One example of a Center of Excellence currently exists in Philadelphia. Saul High School has emerged as the highest performing of the CTE High Schools in the School District of Philadelphia. Saul, a working farm, is considered to be a Center of Excellence, where all programs of study are connected to the local industry cluster of Agricultural Science. At Saul, resources, partnerships, and expertise are pooled to ensure a high quality, authentic, career-connected experience for each of the students attending. Saul maintains a 95% daily attendance rate, 95% graduation, and Adequate Yearly Progress according to No Child Left Behind measurements.

The leadership at Saul considers the single industry focus to be critically important in attracting and maintaining the appropriate industry partners, developing strong postsecondary partnerships, and most importantly, facilitating the integration of the academic and technical content in classes. Teachers work together closely on a single focus which facilitates a thematic approach to teaching; all teachers have a deeper comfort level with science because of the agricultural focus. Teachers are also more adept at knowing how to select and make the most of their industry partnerships. Finally, because of the industry focus, the school staff does not have to “compete” for students. The agricultural focus attracts students that have a true interest in the technical training offered at Saul.

To move the Centers of Excellence concept forward, **a process should be undertaken to select Centers of Excellence in different geographic areas of the City.**

Considerations should include community input, availability of industry partnerships, appropriateness of facilities, and current enrollment in different industry clusters. For example, Swenson lends itself to being a Center of Excellence in areas such as Engineering and Building Trades, since current programs of study provide the foundation for this type of Center, the facility is conducive and multiple partnerships exist with organized labor.

b. Centers of Excellence will include a variety of related occupations within a high-wage/high-demand occupational cluster. Training will vary depending on the occupational preparation. However, **all enrolled students should receive a common core of**

Promising Practice: CHOICE Institutes

Career and Technical Education in Okaloosa County, FL, has been organized into a growing number of CHOICE Institutes, each centering on a particular area relevant to the local economy such as aerospace technology, construction technology, information technology, and the creative arts. As a requirement of the CHOICE Institutes, students leave the school with a nationally recognized credential or certification, a high school diploma, and credits earned relevant to articulation agreements with postsecondary institutions and training facilities. The CHOICE Institutes were able to develop legislative support in the form of the Florida Career and Professional Education Act (CAPE) that includes a mandate for five-year planning and a continuous, third-party program review process. An analysis of wage differentials showed that this CTE system yielded nearly \$300,000 more over the course of a lifetime for CHOICE graduates over other students. The CHOICE Institutes were honored by the U.S. Dept. of Labor as a national model for CTE and by the Florida Department of Education for the best academic performance among 67 school districts.

relevant instruction and experiences. For example, all students should have access to a rigorous academic core curriculum that complements CTE courses, preparing them for postsecondary education and careers, as well as workplace internships that illuminate their career choices.

c. Once up and running, CTE Centers of Excellence are likely to be even more competitive and selective than the current CTE high school model. While students who attend these Centers must be prepared to succeed there, it is also true that rigorous admissions standards have the potential to exclude students who have fared less well in traditional high school, and for whom contextual learning might be more conducive to success. Therefore, the **School District should develop alternative admissions policies for CTE schools that would permit consideration of students who demonstrate potential for success on measures beyond traditional academic criteria.** Alternative strategies for providing CTE opportunities for more academically diverse students can include extending the school day to provide a second shift for students needing additional academic support or remediation or a “Twilight School” model that allows flexibility for students returning to school from placement or other extended absence.

As noted, the School District is establishing a number of new Programs of Concentration, which provide career-focused education for high school students at lower levels of intensity than formal Programs of Study (e.g. three CTE courses instead of six over three years). The theory behind the establishment of these Programs of Concentration is that they will provide motivation by bringing relevance to students’ high school experiences, promote academic achievement and encourage high school graduation. **The School District should carefully monitor the Programs of Concentration model to determine its value for participating students. Furthermore, Programs of Concentration should not exist outside of a supportive structure that ensures quality and rigor. A more thoughtful process for determining programs of concentration, coupled with a solid quality assurance and monitoring system is needed.** As noted earlier in this report, Philadelphia Academies, Inc. is offering technical assistance to high schools offering Programs of Concentration, including curriculum development and teacher training, and connections to employers and internships for students. The School District and Philadelphia Academies should work collaboratively to determine guidelines and requirements regarding what it means to be an Academy within a school. Minimally there should be a course sequence requirement with support and commitment from the school administrator as demonstrated by resource allocation including dedicated staff, roster support, student recruitment, equipment, etc. While further research regarding other approaches might also be considered, **in all cases, the School District should evaluate this approach to gauge the efficacy of support and assistance offered, by comparing student outcomes to sites not supported by PAI.** PAI is currently partnering with the University of Pennsylvania to conduct an evaluation of outcomes for the class of 2011 including a six year follow-up study.

Recommendation #2:

Promote Academic Rigor and 21st Century Skills within CTE and non-CTE schools

- a. **Continue to promote rigorous academics** for all students participating in CTE.
- b. **Blend coursework and instruction** in ways that enable students to meet both academic and occupational requirements.
- c. **Expand the use of contextual learning strategies** to convey 21st Century Skills for both CTE and non-CTE students.
- d. **Expand work-based learning and career-connected learning opportunities** as vehicles to promote high school graduation, particularly for students at-risk of dropping out.

a. The essential component of 21st century high school reform is rigorous academic preparation for all students. Therefore, the first and most important recommendation in this section is that **the School District must continue to promote the highest quality educational programming for CTE students**. An excellent starting point for this work would be to review strategies developed and implemented by Philadelphia CTE schools that are faring well on state assessments, and to replicate these effective practices in other schools. In addition, the School District should consider re-establishing its relationship with High Schools That Work, a research-based CTE reform model that promotes rigorous, college-prep academics and industry-relevant occupational-skills development for all students.

b. Despite the fact that CTE high schools offer both academic and career-focused instruction, for the most part these courses are offered separately with little or no integration or blending of skills. Meanwhile, in an effort to increase the rigor of Programs of Study, beginning in the 2009-10 school year, CTE students will be required to take *more* courses than non-CTE students in order to graduate. Given the structural and contractual constraints inherent in the current CTE system, this stop-gap measure is needed, but not ideal. In order to ensure the rigor of both CTE and academic courses and the subsequent achievement of students in both areas, in the long term, **the School District should take steps to develop blended occupational and academic courses which can count for credit in both areas, and are sufficiently rigorous to ensure that CTE students are ready for college and careers**. In order to accomplish this long-term goal, the district must continue to support teachers in obtaining the appropriate certifications (see recommendation # 7). **Both the State Bureau of Career and Technical Education's program approval**

process and the School District’s Core Curriculum must offer schools the flexibility to develop and to infuse integrated courses that meet both academic and CTE standards.

This also reinforces a related recommendation in the WIB report to “improve the integration of contextualized math applications into academic math classes to address the wave of new technical jobs (and to) develop deeper analytical skills using job-based applied writing and analysis in language arts classes.”

c. The value of contextual learning also extends to the acquisition of 21st century skills. Employers, colleges and universities continue to be strong proponents of applied learning competencies like problem-solving, creativity and self-discipline, as evidenced by the continuing efforts of the employer-led organization *Partnership for 21st Century Skills*. Applied learning techniques and pedagogies can be found in innovative academic classrooms, but are much more likely to be present in schools and courses where learning can be organized and applied within a specific context.

Promising Practice:

Lehigh County Technical Institute

The National Center for Research in Vocational Education works with schools and school districts across the country on processes that promote integrated academic and CTE coursework. Furthermore, leading CTE high schools, like Lehigh County Technical Institute – barely 50 miles away – integrate academic and technical instruction by focusing squarely on state academic standards and using the CTE applied environment as a ready-made platform for project-based and contextual instruction. Technical and academic teachers work together to build rigorous, standards-based curricula that prepare students for industry certification and also the PSSA, SAT and ACT assessments.

Therefore, **the School District should examine the contextual learning strategies practiced by CTE schools and Academies as potential vehicles for teaching and conveying 21st century applied learning skills** not only for CTE students, but also more broadly to non-CTE students.

d. Research suggests that CTE and career academies have beneficial impacts for high-risk students, who were more likely to stay through the 12th grade, show improved attendance and increase credit accumulation toward graduation. These research findings underscore the common sense beliefs of many employers and members of the general public about the value of work and practical experience in bringing relevance to school work, and in so doing to increase the likelihood that students will stay in school and graduate.

Therefore, **the School District should expand work-based learning and other career-connected learning opportunities to more Philadelphia students, particularly those who present dropout risk factors.** Strategies to promote this recommendation include

expanding the number of career academies, and partnering with the City's Council for College and Career Success to connect students to high-quality workplace experiences.

Recommendation #3:

Align CTE Coursework More Closely with Regional Economic Development Needs and Opportunities

- a. Develop and share workforce data on emerging occupations** with the Philadelphia Workforce Investment Board so that CTE programs can anticipate and prepare students for careers of the future.
- b. Better align CTE Programs of Study** with Commonwealth-established High Priority Occupations and other high-wage/high-demand careers in the region.
- c. Plan collaboratively across sectors** to ensure tight alignment of CTE programming and regional workforce and economic development needs.

a. The **School District of Philadelphia and the Philadelphia Workforce Investment Board should develop a mechanism for sharing information on emerging occupations.** Current labor market data should be used more consistently to plan Philadelphia's CTE Programs of Study, particularly as the system moves to adopt and implement Centers of Excellence. To address this need, the **Philadelphia WIB should provide a yearly update on emerging trends**, based on information gleaned from industry partnerships, educational institutions, trainers, Commonwealth agencies, the Philadelphia Department of Commerce and employer groups. **The update should be aligned with the planning cycle at the Philadelphia School District** and include information on the predicted growth in the next five years, certification requirements, and core competencies. Then, based on recommendations of a citywide Industry Advisory Partnership (discussed in the next recommendation), rational decisions can be made about which new Centers of Excellence and Programs of Study should be incubated and developed, based on WIB-identified emerging trends.

b. The Centers of Excellence concept will take careful planning and thoughtful implementation. In the meantime, **the School District should take steps to ensure that all Programs of Study are aligned with high-wage/high-demand careers in the region.** For example, pathways such as Hospitality and Cosmetology are popular and engaging for youth, but they often prepare students for low-wage jobs. Therefore, students enrolled in those programs that are unlikely to yield high wages should also be taught competencies that yield transferable skills in areas such as business, bookkeeping, and accounting that will allow a greater diversity in future occupational choices.

c. On a related point, according to the WIB there are a number of instances in which School District CTE occupational programs – including their current curricula and coursework – are quite comparable to High Priority Occupations and might, with modest changes in their curricula, be made to align. For example, within the Agriculture Science cluster the Philadelphia CTE Large Animal Science and Small Animal Science program might be easily modified so that it aligns with the HPO Veterinary Assistants & Laboratory Animal Caretakers. In this and other related instances, **the School District should modify appropriate occupational programs to ensure alignment with regional workforce needs.** In conjunction with the HPO list, other factors such as local industry partnerships should be included in a criterion that determines program creation, expansion, or deletion.

Understanding that this alignment process can be quite challenging for schools that may not have access to the industry data necessary, additional steps are needed. In order to assist schools in this process, and to keep pace with business and industry timelines, discussions on emerging occupations must take place on a regular basis. Therefore, **structured, semi-annual meetings on regional workforce alignment should take place between SDP officials, and Local Industry Advisory Boards and the WIB.**

The Project Labor Agreement between the School District of Philadelphia and The Philadelphia Building Trades Council is another area where closer alignment is needed to support the growing need for diversity and labor in the Building Trades union. The District should consider tightening language in the agreement to require a specific number of apprenticeships for District graduates, 18-24 years of age, within five years from their date of graduation. Additionally, the creation of “Senior Apprenticeship Centers” proposed by the District (see attachment) should be implemented to better prepare students for admission into building trades apprenticeship programs upon graduation.

Promising Practices: Three Rivers E4

The Three Rivers Workforce Investment Board's E4 Initiative connects employers, educators, and youth to improve career education in Southwestern Pennsylvania. Through an industry cluster analysis of more than 300 industries, 780 occupations, 2,000 unique skill sets, an expert opinion panel of 13 regional and national professionals, and a review of national research, E4 evaluated the A.W. Beattie Career Center and suggested ways to improve workforce alignment and to tap into existing workforce partnerships. Further, 16 essential “KSA’s” (knowledge, skills, and abilities) were identified as common to all growing occupations and continuing education opportunities in the region. Recommendations were made regarding ways to better align programs of study to identified KSAs.

Recommendation #4:

Better Coordinate and Connect Industry to CTE Programs of Study and Other City-Wide Efforts by Creating a Unified, Unduplicated Structure for Industry Support and City-Wide Coordination

- a. **Develop a unified set of *Industry Advisory Boards*** to support CTE occupational clusters and CTE teachers and ensure close connections to the WIB and Council on College and Career Success.
- b. **Establish a citywide *Local Advisory Committee*** and align with the Council for College and Career Success, to ensure citywide coordination of CTE and related occupational programming.
- c. **Explore combining the existing *Perkins Participatory Planning Committees*** into one committee with shared oversight for both the District and Community College's Perkins funds.

a. One system of Industry Advisory Boards should be put into place in support of each industry area and connected to the Philadelphia Workforce Investment Board and the Philadelphia Council for College and Career Success. These Industry Advisories should serve as a city-wide support and advocacy system for CTE programs of study with clear roles in relationship to CTE schools. Key tasks should include:

- Annual evaluations focused on: outcomes of programs of study in the previous year, current relevance of curriculum, adequacy of facilities and equipment, appropriateness of certifications, etc;
- Review of data and recommendations regarding emerging programs of study based on trend data;
- Support for the HPO application submission process based on data from employers and emerging occupation trends;
- Recruitment and coordination of exposure activities and internships for youth; and
- Support for and analysis of teacher professional development.

With the move towards the Centers of Excellence, the Industry Advisory structure will become much more efficient and focused. The boards will need to support the Citywide coordination as well as all of the requirements outlined in Perkins. Furthermore, structures should be put in place to support individual community volunteers who are interested in working with particular schools.

Finally, the Industry Partnerships funded through the Department of Labor and Industry and coordinated through the Philadelphia Workforce Investment Board should be utilized as part of the industry advisory board structure.

Promising Practices: Ford Motors

In 2008, the Ford Motor Company Fund, through The Ford Partnership for Advanced Studies (Ford PAS), designated Philadelphia as one of nine Next Generation Learning Communities that share a common interest in scaling up and sustaining successful career academy networks within their schools. This designation came in part because of the development and management of Industry Advisories by Philadelphia Academies, Inc. (PAI) that support more than 29 career academies in the School District of Philadelphia. These Advisories provide a forum for information sharing and generate mutually beneficial results. Employers in each cluster-specific Advisory provide input on industry needs, identify necessary competencies, inform instruction and curriculum design, and provide internship and mentoring services to students. In return, employers have the opportunity to influence public education's impact on a locally grown future workforce.

b. The Citywide Local Advisory Committee should be better aligned with the Philadelphia Council for College and Career Success. The Council currently has all of the partners needed for the Local Advisory Committee. More strategic alignment would enable the Council to leverage and align the needs and agenda of the CTE schools with the broader citywide workforce system. The heads of each of the Industry Advisory Boards should be included on the Committee. This will provide the opportunity to connect more broadly with internships, resources, and additional supports. Because the Council is connected to the Philadelphia Workforce Investment Board, it will also allow for better coordination with the Industry Partnership Initiatives as they currently exist in the adult system.

c. Currently, there are two Perkins Participatory Planning Committees in the city. One serves the School District of Philadelphia and one serves Community College of Philadelphia but many of the same organizations are represented on both committees. **Combining the existing Perkins Participatory Planning Committees into one committee with shared oversight for both the District and Community College's Perkins funds** will not only alleviate duplication of efforts for members, but would also allow key decision makers on the secondary and postsecondary education fronts to better align their work priorities and practices. In addition, this committee must align itself with similar Committees serving other local institutions that receive students from Philadelphia. These committees are not necessarily represented and a channel in which to share efforts and information must be provided. This alignment will move these organizations toward successful preparation, and transition to postsecondary education for students in CTE which is a key element of the Perkins IV Reauthorization.

Recommendation #5:

Increase Post-Secondary Alignment

- a. Design all CTE schools and course sequences to promote post-secondary connections,** and to ensure that they are clearly understood by all students and parents.
- b. Promote participation in *Dual Enrollment* for CTE students,** taking maximum advantage of the Commonwealth's unique funding support.
- c. Create a CTE, STEM-focused *Early College High School*** to enhance post-secondary access for students and increase skills for CTE school staff.
- d. Increase college preparation programs and services for all CTE students;** begin by significantly increasing the number of students served by Tech Prep and by including other postsecondary preparation service programs in CTE schools.
- e. Modify and strengthen *Tech-Prep* programming,** increasing student access to post-secondary education through campus-based programming and articulated secondary-postsecondary curricula.

a. Career and Technical Education schools must be designed with a strong focus on post-secondary connections and career ladders, with clear articulation of coursework between secondary and postsecondary institutions that is **conveyed to and understood by all CTE students.** With very few exceptions, CTE students should not view their high school diploma as a terminal credential. This may require a focused effort to convey to students and their parents the almost certain need for post-high school education and training. Efforts aimed at policy makers might also be needed. The ultimate goal is to increase the number of students graduating from CTE schools with credits towards degrees as well as to increase the total number of students who enter and persist in two and four year institutions of higher education.

In fact, as the WIB noted, most of the high-wage/high-demand clusters and related occupations offered in Philadelphia's CTE schools will require postsecondary education, and often a four-year degree, to get good jobs at family-sustaining wages. Furthermore, most students who are in CTE programs that prepare them for immediate entry into the workforce after high school will struggle to maintain economic self-sufficiency without additional education or training.

b. The School District should work with CTE school faculty and administrators, as well as students, to ensure that they understand the availability of Commonwealth-supported dual enrollment opportunities, and take advantage of them in greater numbers and percentages. With CTE students in Philadelphia much less likely than their non-CTE peers to participate in Commonwealth-funded dual enrollment programs, and given the importance of postsecondary connections for CTE students, it is particularly important to ensure that they, their parents and school faculty understand the

potential of these powerful dual enrollment opportunities. The state must also allow Dual Enrollment funds to be used for technical courses at the postsecondary level so that CTE students pursuing a degree in their selected field are not denied credit-earning opportunities.

c. Innovative strategies that blend secondary and postsecondary education are being demonstrated throughout the country, largely due to visionary investments by the Bill and Melinda Gates Foundation. While most of these new blended approaches are directed at regular academic high schools, some evidence suggests that they can also apply to CTE schools.

Building on these evidence proofs, the **School District should consider adoption of the “Early College High School” model**, another vehicle that can help not only increase the postsecondary access and attainment of students, but also to increase the academic and instructional skills for CTE school staff. Early college high schools are small schools designed so that students can earn both a high school diploma and an Associate’s Degree, or up to two years of credit toward a Bachelor’s degree. The schools are designed to reach students that are most underrepresented in higher education (e.g., students of color, English language learners, low-income).

Specifically, with the Governor’s Science Technology Engineering and Math (STEM) initiative and the development of the Regional STEM center located in the city, there is a unique opportunity to create an Early College High School demonstration model that offers a STEM career focus. With the correct alignment of resources and expertise, Philadelphia can develop the region’s first STEM career and technical education center that aligns CTE pedagogy with STEM workforce needs and Mayor Nutter’s postsecondary attainment goals.

d. **Increase college preparation programs and services for all CTE students;** begin by significantly increasing the number of students served by Tech Prep and by including other postsecondary preparation service programs in CTE schools. In particular, one strategy to help administrators reach these goals is working to unify local college preparation programs and expand and better organize the college credit earning opportunities for students in the CTE schools.

**Promising Practices:
Greenville Technical Charter High School**

Originating through a stakeholder group of business, community, and educational leaders, Greenville Technical Charter High School (GTCHS) in South Carolina is an Early College High School with a focus on career and technical education. The school is situated on the main campus of Greenville Technical College where an average of 70% of the student body is enrolled in at least one college class at any time. In late 2007, GTCHS earned “silver” status in the U.S. News and World Report’s list of America’s Best High Schools, and boasted a 98% graduation rate with 57% of that year’s graduation class attending four-year colleges and 42% attending two-year colleges.

e. Modify and strengthen Tech-Prep programming. As changes are made to the Career and Technical Education system as a whole, Tech Prep practices must also be modified to ensure effective delivery of services. Recommendations to this end include:

- The School District of Philadelphia should take a more active role in monitoring the participants and activities of Tech Prep.
- The Tech Prep Consortium must provide regular updates and data on participation and student achievement to combined Perkins Participatory Planning Committee, the Local Advisory Committee and the School Reform Commission and share copies of state required reports with the CTE office.
- Significantly increase the number of students the Tech Prep program serves.
- Provide Tech Prep classes on CCP's campus.
- Schedule additional professional development for teachers on the technical curricula currently available.
- Develop a quality assurance system to monitor curriculum and instruction.
- Expedite the articulation agreement contract process.

Recommendation #6:

Implement Administrative Changes and Reorganize to Provide Structural Supports that Meet the Unique Needs of CTE Schools

The educational offerings of CTE schools must align with rapidly changing industries. Because of this and the other significant ways in which CTE schools differ from all other schools, a separate administrative structure and customized policies are warranted.

- a. Create a CTE “mini-region” or “hub” for CTE schools** that will focus squarely on the unique needs and requirements of programs, students and CTE schools and will have line authority over CTE principals.
- b. Implement a uniform system of data collection and analysis** that will allow for ongoing planning and monitoring of program effectiveness.
- c. Address the hybrid structure at Edison High School**, which currently offers separate CTE and traditional academic programming.

a. **Create a Career and Technical Schools “Mini-Region” or “Hub”.** CTE schools currently draw students city-wide. A move to the recommended Centers of Excellence would further geographically diversify the student populations. Grouping CTE schools into geographical organizational structures, i.e. regions, that are based on neighborhood feeder patterns isolates them within the District’s organizational structure and is at odds with efforts to meet many of the needs specific to CTE schools, including professional development; staffing, certification and governance regulations; and access to industry. Furthermore, grouping them in the high school region without focused support will not necessarily resolve some of the structural issues presented in this report.

In order for CTE schools to be more aligned to industry needs, they must become more nimble organizations that can change and move to accommodate the quickly changing standards in business and industry while still adhering to state and District guidelines. In order to accomplish the strategic yet flexible planning that is needed to run a state-of-the-art CTE school, **the School District should create a smaller, more flexible Career and Technical Schools “Mini-Region” or hub in Philadelphia.** In the beginning phases, this office will need a priority status within the District to help organize and provide support to CTE principals across the city to move into compliance with state guidelines and meet industry standards. This status should include the development of an expedited process for partners to quickly and easily volunteer resources such as teachers, professional development services and equipment. The goal of this office would be to provide direct support in the development and administration of CTE-related activities listed above through a regional superintendent and staff that are knowledgeable about CTE guidelines and Perkins regulations, know how to manage partnerships and raise additional funds to support state-of-the-art CTE facilities and have the expertise necessary to supervise CTE teachers and ensure the support necessary to the CTE system’s overall effectiveness. The person who leads this office should have line authority over the CTE principals.

A primary responsibility of School District staff in this hub would be to translate input from industry into pedagogy and instructional practice. Therefore, the staffing structure should focus on teacher and student preparation. The staffing of an effective Career and Technical School “Mini-Region” or hub would include the following positions and functions:

- A high level leader who is knowledgeable about CTE pedagogy as well as Perkins funding, workforce development and industry partnerships;
- A business manager who works directly with the office of Budget and Finance at the District to assist in the ordering and procurement of industry related equipment and other expenditures and supports principals in the administration of Perkins funds;
- CTE Innovation Fund Manager to help raise additional resources through new funding, leveraged funding and partnerships;
- Human Resources specialist that will work on recruiting industry experts and expediting the hiring process for CTE schools;

- Roster and/or block roster expert to assist schools in creating standardized schedules that allow for the teaching of the core curriculum while providing enough time in the CTE technical courses for students to meet the 1,080 hour requirement set forth by the Commonwealth.
- Career Development Specialists for each CTE school to provide college and career planning and preparation to the student body; and
- Curriculum Integration support.

b. Implement a uniform system of data collection and tracking. With the new monitoring system that the PA Department of Education is beginning to implement, it is recommended that the School District develop one uniform system for data collection for CTE schools that amasses information on:

- student demographics (including an emphasis on equity for Special Education and ELL students)
- graduation, promotion, and retention rates
- programs of study (demographics, alignment to workforce needs)
- teacher certification/recruitment needs
- teacher certifications and industry credentials
- PDE requirements (CATS system)
- postsecondary entrance and completion rates (college and professional schools)
- workforce entrance and mobility rates
- certification rates (application and completion)

Additionally, staff at CTE schools must be trained on how to enter the required information into such a database. Partial and/or inaccurate data entry could render all data useless.

c. As evidenced in Edison High School, the hybrid structure created when a comprehensive high school and CTE school are merged has proved to be problematic in areas of administration, student data collection and ensuring academic quality and equity across programs. **The District should implement short-term and long-term remedies to address the hybrid structure** at Edison High School. The District should explore several alternatives to the current structure at Edison High School including administratively separating the CTE programs from the comprehensive high school with either a school-within-a-school model or a two school model. Either model must include separate leadership/administration with the requirement that the leadership of the CTE programs have CTE-related credentials or experience.

Recommendation #7:

Improve the Quality of CTE School-Based Leadership and Teaching by Increasing CTE-Related Professional Development Opportunities and the Talent Pipeline.

- a. **Train CTE principals in specific roles and responsibilities** associated with being a successful instructional leader in a CTE high school.
- b. **Establish a professional development center** to provide high-quality training on the unique skill sets required to design and deliver rigorous and relevant CTE instruction.
- c. **Adopt an “adjunct faculty” model** that will enable industry professionals to provide expert support to students in CTE classrooms.
- d. **Encourage the PA Department of Education (PDE) to change ACT 48 requirements** to ensure that a significant portion of continuing education credits for CTE teachers be industry related.
- e. **Work with the Bureau of Career and Technical Education (BCTE) to require local education agencies** to collect industry-related credentials for CTE teachers.

The City’s CTE high schools need administrators and staff that can increase the integration of rigorous academic content and up-to-date technical skills through common planning and multidisciplinary approaches to teaching. All professional development must be focused on academic *and* industry curricula as well as the integration of the two in the classroom.

- a. **Train CTE principals in specific roles and responsibilities** associated with being a successful instructional leader in a CTE high school. Administrators need to be able to lead their staff in the design and monitoring of more rigorous academic and career technical programs while developing professional opportunities for collaboration with regional industry leaders. To this end, the District’s principal training model should incorporate a CTE focus to prepare future administrators for the unique needs involved in managing a CTE school. The training provided should be done in conjunction with the Temple Center for Professional Personnel Development in Career and Technical Education, the state’s only CTE certifying body in the region, so that incoming principals that are assigned to a CTE school can receive credit toward their CTE certification for their experience in the District’s principal training model. The District should consider requiring that all CTE-related credentials be obtained before allowing an administrator to be appointed to a CTE school. A higher pay scale for CTE principals would serve as an incentive for future administrators to enroll and complete the necessary training. Finally, CTE principals need additional time during the summer to participate

in professional development with industry and community partners that can be accomplished as part of the District's reorganization days.

b. Establish a professional development center to provide high-quality training on the unique skill sets required to design and deliver rigorous and relevant CTE instruction. CTE Teachers may have sufficient field experience but lack professional training as high school instructors, therefore the need for formal training in instruction and ongoing professional development is critical. Significant support is needed to help them make the shift from industry experts to industry educators and from traditional teachers to facilitators of 21st Century learning.

Given the lack of CTE-specific professional development available at the District, it is recommended that the District partner with the Philadelphia Federation of Teachers (PFT) to develop a professional development center that focuses specifically on the needs of CTE teachers and CTE schools. The PFT will support the development of a CTE teacher center to provide District teachers with on-going professional development that is focused on and relevant to CTE schools. Additionally, the professional development center can also become the central source for advocating and offering dual credentialing opportunities for CTE teachers. The dual credentialing opportunities would then allow the district to offer credit for academic and technical blended courses moving towards the end goal of an academically integrated CTE system.

The center would work with District and PFT staff to provide training on CTE pedagogy and will partner with industry to provide opportunities for industry skill upgrades. Industry experts will be used as adjunct faculty (*explained in the next section*) to help teachers stay current with industry standards and help teachers develop adaptive strategies and practices to implement in their classrooms and curriculum. Additionally, providing industry exposure via worksite experiences (teacher externships) and cross training of professional staff can also be coordinated through the center.

Until the center develops the capacity to provide all training directly, it should solicit the assistance of national expert trainers and Temple University's CTE Professional Personnel Development Center to provide training. Once the PFT has hired the staff and developed the capacity to provide the professional development directly, the center will become a fully functioning CTE teacher support model and will serve as an important step for administrators of CTE high schools to help increase the perception and value of the technical programs for all staff.

c. Adopt an "adjunct faculty" model that will enable industry professionals to provide expert support to students in CTE classrooms. Until the District has a sufficient supply of CTE teachers in the pipeline, other alternatives must be implemented to appropriately staff CTE schools and programs of study. One alternative offered comes from the pages of higher education institutions and how they address vacancies: create opportunities to utilize industry experts as *adjunct faculty* for the schools. The use of adjunct faculty to work at CTE schools is an example of strong business, industry and higher education collaboration. One such example currently exists at Dobbins High School. The unique program at Dobbins combines a quality

digital imaging curriculum from Xerox with hand- on instruction on industry-standard digital presses as part of the Graphic Communications program of study. Three Xerox certified Digital Print Technicians assist instructors with lessons on the equipment and manage the overall print and graphics operations tracking jobs and the related accounting procedures of those jobs. Additionally, these technicians have become mentors, encouraging students to strive for excellence and to go on to college after graduation.

The adjunct faculty model can also be a way to use the “short-term substitute” status currently in place at the District. The recommendation includes building a resource pool of industry experts willing to provide technical skills training as adjunct staff through tax-credit opportunities (such as Pennsylvania’s Educational Improvement Tax Credit) for area companies. Connecting this pool of experts to schools in need can be accomplished through collaborative efforts between the CTE regional staff and the Industry Advisory Boards. In order for this to work for both the schools and the companies involved, the structure must be coordinated and closely monitored and the adjunct person’s position in the school must not affect the overall teacher allocation formula. Essentially, the adjunct faculty would serve as supplemental staff with industry specific expertise but would not be utilized to supplant teaching staff.

Finally, to satisfy the certification and credential requirements set forth in NCLB, industry adjunct faculty can be certified through the Temple Professional Development Center and paired with certified academic content teachers to provide credit for blended academic and technical courses.

d/e. Encourage PDE to change ACT 48 requirements to ensure that a significant portion of continuing education credits for CTE teachers be industry related. Act 48 continuing education requirements can be an effective tool in ensuring that CTE staff upgrade their industry-specific skills on a regular basis. The PDE and the BCTE can change the requirements for approval for CTE school professionals requiring that a significant portion of their continuing education credits be industry related. These changes can be included in the CTE schools’ individual professional development plans.

Once this policy change is made, the **Bureau of Career and Technical Education can then require local education agencies** to collected industry-related credentials for CTE teachers.

Recommendation #8:**Raise, Leverage and Reprogram Funds in Support of CTE Schools and Programs**

- a. **Increase, leverage and/or reprogram existing funding streams** to support recommendations.
- b. **Raise new funds** to support targeted recommendations, incentivize structural changes, pilot programs and align reform efforts.
- c. **Strategically target new and leveraged resources** to support recommendations, especially in the areas of: Equipment and Facilities; Human Capital; and Programming and Curriculum.

a. Possible underutilized funding sources that could be increased, leveraged or even re-programmed to support this work include:

- Workforce Investment Act youth funds for internships and incumbent worker training funds for teacher training
- Education Improvement Tax Credits to be used for release time for industry experts
- Increased state Dual Enrollment allocation with provisions to include dual enrollment credit for technical classes
- Foundation and State support for model development and curriculum support
- STEM funding leveraged to support the development of Science and Math skills, particularly in the CTE high schools
- Leveraged federal stimulus funding, especially as it relates to ‘green jobs,’ to retool curriculum and create internships and employment pipelines.

b. The move toward Centers of Excellence impacts all of the recommendations set forth in this report and is the most important structural change leading to the ultimate alignment of programs of study with regional labor and industry needs. Therefore, the **Commonwealth of Pennsylvania should support this important shift in structure by offering financial incentives to schools as they move towards Centers of Excellence.** This significant financial investment from the state can be leveraged against other funds and used to phase in Centers over the next three to five years moving the District towards the long term goal of redesigning the high school experience.

These financial incentives can be a part of a larger legislative effort to underscore the importance of CTE in dropout prevention, high school reform and economic development. Many states that have seen measurable success in CTE reform have passed legislation mandating the alignment of CTE with traditional academic programs and postsecondary programs such as North Carolina's *Learn and Earn* model, Florida's *Career and Professional Education Act (CAPE)* and California's *Career Technical Education Model Curriculum Standards for Grades Seven Through Twelve*

c. Specific areas where additional resources will be required include:

Equipment and Facilities

- Equipment needs and facilities modifications related to Center of Excellence model

Human Capital

- Improved professional development and the establishment of CTE professional development center
- Improved talent pipelines and recruiting structures

Programming and Curriculum

- The development of emerging programs of study to respond to new industry areas
- Curriculum development/enhancements to ensure better integrated academic and technical curriculum
- Increased use of industry recognized assessments to evaluate students' work readiness skills
- Increased dual enrollment opportunities
- Development of Early College High School CTE model

Conclusion

Career and Technical Education in the School District of Philadelphia is well-positioned to provide high-quality educational opportunities for City students, enabling them to become world-class employees, entrepreneurs and leaders for the Greater Philadelphia economy. Its unique mix of high schools focused on career-connected education, connections to engaged and involved employers, and highly motivated students offers the essential components of an educational pathway to postsecondary education and high-wage/high-demand careers.

Informed by research and by the insights of leaders from public, private and non-profit sectors, this report offers a series of recommendations that build on these strengths, and proposes innovative strategies that will enable the School District and the City to realize the potential of

CTE schools. An accelerating focus on academic rigor in concert with tighter connections to postsecondary education, employers and regional economic development needs is essential. Similarly, increased attention to data collection and analysis for program improvement, relevance to economic development needs and accountability, are clearly needed. Furthermore, teachers and administrators must have increased opportunities and support to master the skills they need to equip their students with the skills and competencies that will prepare them for college and career success.

In the current economic climate of increasingly scarce resources, the successful adoption and implementation of these recommendations will present significant challenges. Re-programming and alignment of existing resources is necessary, but is unlikely to be sufficient. Fortunately, Philadelphia has the demonstrated ability to build innovative partnerships of committed public, private and non-profit partners to tackle issues of critical importance. Continuing in this tradition, the recently-impaneled Council for College and Career Success, representing major employers, higher education institutions, the School District and major philanthropies, is well-positioned to lead efforts to align, re-allocate and develop the resources needed to fund and implement these recommendations.

Despite the challenges, investments in creating and maintaining a high-quality CTE system for Philadelphia are critical - for the well-being of our regional economy, and for that of the many young people for whom well-designed CTE programming represents the best pathway to high school graduation, post-secondary education and career success.

Attachment I - Resources

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<http://www.ed.gov/policy/sectech/leg/perkins/index.html>

Workforce Investment Act of 1998. <http://www.doleta.gov/USWORKFORCE/WIA/act.cfm>

Additional resources, organizations and agencies consulted in preparing this report:

American Youth Policy Forum

Department of Labor and Industry, Commonwealth of Pennsylvania

The Early College High School Initiative: www.earlycolleges.org

Governor's Office of Policy & Planning, Commonwealth of Pennsylvania

Greenville Technical Charter High School, Greenville, SC: <http://www.gtchs.org/>

Greenville Technical Charter High School: www.gtchs.org

Jobs for the Future

National Assessment of Vocational Education

National Association of State Directors of Career and Technical Education Consortium

National Centers for Research and Dissemination in Career and Technical Education

National Governors' Association

National Occupational Competency Testing Institute: www.nocti.org

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Philadelphia Workforce Investment Board, Philadelphia, PA

School District of Philadelphia: Office of High School Reform; College, Career and Technical Education Division; Office of Management and Budget; Office of Student Placement; Office of Human Resources

Southern Regional Education Board / High Schools That Work

State Departments of Education, Career and Technical Education Divisions:

California: <http://www.cde.ca.gov/ci/ct/sf/>

Maryland: <http://www.marylandpublicschools.org/msde/divisions/careertech/>

New York: <http://schools.nyc.gov/ChoicesEnrollment/SpecialPrograms/CTE/default.htm>

North Carolina: <http://www.dpi.state.nc.us/cte/>

Pennsylvania: http://www.pde.state.pa.us/career_edu/site/default.asp?g=0

Florida: <http://www.fldoe.org/workforce/fcpea/default.asp>

North Carolina Learn and Earn High Schools: <http://www.nclearnandearn.gov/learnEarnHighschools.aspx>

Site Visits:

Dobbins High School, Philadelphia, PA
Edison High School, Philadelphia, PA
Gloucester County Technical Institute, Sewell, NJ
Lehigh Career and Technical Institute, Schnecksville, PA
Randolph High School, Philadelphia, PA
Reading Area Community College, Reading, PA
Saul High School, Philadelphia, PA
Swenson High School, Philadelphia, PA

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Richard Kazis, Senior Vice President, Jobs for the Future, Boston, MA
Dave Kipphut, Principal, Swenson High School
Heidi Ramirez, Commissioner, School Reform Commission, Philadelphia, PA
Wendy Shapiro, Principal, Saul High School
Charles Whiting, Principal, Dobbins High School, Philadelphia, PA

CTE Lecture Series Speakers:

Martin Bean, General Manager, World Wide Education Strategy, Products & Solutions, Microsoft Corporation

Gene Bottoms, Senior Vice President, Southern Regional Education Board

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Meg Shope Koppel, Director of Research, Philadelphia Workforce Investment Board

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Business Focus Group Participants:

Aqua America

City of Philadelphia

Colonial Electric

District 1199C Training Fund

Independence Blue Cross

KPMG LLC

Lockheed Martin

Micro-Coax

Pennsylvania Real Estate Investment Trust

Philadelphia Water Department

SEPTA

St. Christopher's Hospital for Children

Sunoco