Pathways in Technology Early College High Schools:
A Grades 9-14 School Model

Pathways in Technology Early College High Schools are innovative public schools spanning grades 9 to 14 that bring together the best elements of high school, college, and the world of work. Within a six-year, structured, and integrated timeframe, students graduate with a no-cost Associate in Applied Science degree, along with the skills and knowledge they need to continue their studies or step seamlessly into well paying, high potential jobs in the Information Technology (IT) industry. This model was designed to be both widely replicable and sustainable as part of a national effort to reform career and technical education.

Background: The U.S. Skills Gap Crisis
Throughout the United States, community college graduation rates hover at or about 25%. This means that a staggering 75% of young people who begin a two-year program fail to graduate. At the same time, national data indicates that there are 28 million middle skill jobs – those requiring postsecondary degrees – currently available in the U.S., with these jobs paying close to $40,000 per year on average. Data also shows that over the next 10 years, 14 million new jobs requiring middle skills – a 50% increase – will be created, with those needing STEM skills the highest paid of those jobs. In New York City alone, there were 300,000 vacant jobs in January 2013, most requiring middle skills.

Clearly, the U.S. is suffering from a skills crisis that threatens our nation’s economic vitality. New education models can and must play a key role in resolving this crisis by helping better prepare our young people for 21st century jobs. Career and technical education, which has a long history in both America’s high schools and community colleges, needs to be revamped through innovative public-private partnerships that provide a clear pathway from high school to college and career.

The First Schools: P-TECH and Sarah E. Goode STEM Academy
The first 9-14 school, Pathways in Technology Early College High School (P-TECH) opened in September 2011, in Brooklyn, New York, as a collaboration between the New York City Department of Education, the City University of New York, New York City College of Technology (“City Tech”) and IBM.

P-TECH was replicated in three schools in Chicago in September 2012. IBM is spearheading one school, the Sarah E. Goode STEM Academy, in collaboration with the Chicago Public Schools, City Colleges of Chicago, and Richard J. Daley College. Other lead companies that IBM is working with include Cisco, Motorola, and Verizon. A fifth school in Chicago has partnered with Microsoft and is adapting the model somewhat differently.

A Public School Model for All Students
9-14 schools are public schools. As such, they operate using existing public school funding at levels not different from other schools. These schools also do not screen students, meaning that there is no testing or grade requirements that deny this opportunity to the majority of students; students only need to express interest in attending.

Featured Components
The 9-14 school model provides all students with a rigorous, achievement-oriented program designed to inspire them to focus and strive by connecting education to career.

Focus on Early College: Student learning is focused from grade nine on, through a six-year scope and sequence of high school and college coursework to ensure students earn an Associate in Applied Science degree awarded by the school’s college partner.

- In Brooklyn, students are taking college courses as early as grade 10, as they work toward an AAS degree in either Computer Information Systems or Electromechanical Engineering Technology.
Focus on Careers: Students participate in an ongoing, sequenced Workplace Learning curriculum informed by current and future industry standards. All students are matched in one-to-one relationships with IBM mentors, participate in project-based learning activities, meet guest speakers, participate in workplace visits and will tackle skills-based, real-world projects through internships and apprenticeships. Minimum requirements for entry-level IT jobs, as provided by IBM and other industry partners, have been mapped to the curriculum and are serving as academic benchmarks and targets.

Focus on Personal Pathways: Each student moves through a personalized academic pathway, aligned to college and career requirements, which is closely monitored by his or her teachers and advisors, based on their individual needs and performance. The focus is on mastery, not seat time.

Focus on Extended Learning Time
The 9-14 school model features an extended school year, with students attending school in the summer.
- In Brooklyn, the school also features an extended day, providing 81,180 minutes in a school year, compared to 64,800 minutes in a school year based on 180 days.

School Snapshot: P-TECH

Leadership and Staff
- Founding Principal: Rashid Ferrod Davis
- 17 teachers, 2 assistant principals, 4 central office staff, 2 full-time liaisons from City Tech and IBM
- Student to staff ratio is about 10:1

Student Profile
- 227 total student population (100 grade 10, and 127 grade 9)
- 76% boys and 24% girls, with Black and Hispanic males making up more than 60% of the population
- More than 80% of students are on free or reduced lunch and 16% of students have Individualized Education Programs (IEPs)
- Average attendance to date is 94%
- All 227 students have an IBM mentor, who works with them on structured online projects, focused on workplace learning

Academic Achievements
NYC High School Standards:
- 98% were promoted from grade nine to 10.
- After only two semesters, 72% of students passed both English and math Regents with a score of 65 or better, meeting NYC high school graduation requirements. The English Regents is typically given to 11th grade students.
- After only three semesters, 80% of the legacy cohort is meeting or exceeding the state standard of scoring proficient on two core NYS Regents exams in English and math.

College Readiness (CR) Indicators:
- After only two semesters 48% of students met the CUNY college readiness (CR) indicators by scoring a 75 on the English Language Arts Regents (ELA) or an 80 on a Math Regents exam. A few highlights of the results include 89% passing the integrated algebra (with 32% at college-ready threshold) and 77% passing the ELA regents (with 42% at college-ready threshold).
- As we enter the fourth semester, 50% of the legacy cohort has met college-ready benchmarks in both English and math, which will allow over 60 of them to enroll in college courses at the New York City College of Technology.
- Every student in the legacy cohort took the PSAT during their second year at P-TECH. Although this exam is typically taken in the third year of high school, our legacy class exceeded the 2010-2011 NYC 10th grade mean of
37.7 in critical reading. 25% of students’ mean scores exceeded the national average for 10th grade students. In math, our legacy cohort exceeded the 2011-2012 NYC 10th grade mean of 39.4, and 48% of our students exceeded the national average of 43.1.

College Credit Completion:
- Within three semesters, 48 students completed at least one college course at City Tech (EMT 1111- Logic and Problem Solving, CST 1100- Introduction to Computer Systems, SPE 1330- Effective Speaking). Over 90% of students earned a C or higher in the technical courses. This group of students will have completed **11-17 college credits** by the end of their second year at P-TECH.
- Currently, 74 students (62 sophomores and 12 freshmen) are enrolled in at least one of nine college courses, including EMT 1111- Logic and Problem Solving, CST 1100- Introduction to Computer Systems, CST 1101- Problem Solving with Computer Programming, and Math 1475- Calculus.

Jobs
Every student who successfully completes the six year program with an AAS degree will be "first in line" for jobs at IBM.

School Snapshot: Sarah E. Goode STEM Academy in Chicago

Leadership and Staff
- Founding Principal: Matsuo Marti
- 14 teachers, 4 student development staff, 3 central office staff, 2 full-time liaisons from IBM and Daley College
- Ratio of students to school staff is approximately 10:1

Student Profile
- 242 Total student population in inaugural class
- Approximately 50% male, 50% female, with more than 90% of population Black and Hispanic
- There is a 1:1 ratio of students to desktop computers, laptops or tablets
- Year to date attendance is 96%
- All 242 students have an IBM mentor, working with them on structured online projects, focused on workplace learning

Academic Achievements
98% of students are on track to be promoted from grade 9 to grade 10

Jobs
Every student who successfully completes the six-year program with an AAS degree is "first in line" for jobs at IBM.

National Spotlight
The P-TECH model has been widely covered in the media, including *The New York Times*, *The Wall Street Journal*, and *Time Magazine*. It also has been embraced by high profile Mayors in New York City and Chicago, as well as U.S. Secretary of Education Arne Duncan, who visited the school. Importantly it is fully consistent with the U.S. Department of Education's "Blueprint" for Career and Technical Education reform.

Currently a number of states, cities, private foundations and private sector companies have expressed interest in supporting a broad expansion of the model in other geographies – both urban and rural. The challenge is to turn this interest into action to reach many more students, helping to better connect education to jobs and restore economic opportunity and U.S. competitiveness.
P-TECH DESCRIPTION AND FUNDING COMMITMENTS

P-TECH schools are innovative grades 9 to 14 public schools that create clear pathways from high school to college and career for young people from all academic backgrounds. In six years or less, students, who are pre-screened for admission, graduate with a high school diploma and a no-cost, two-year associate degree in a growth industry field. Each P-TECH school works with a corporate partner and a local community college to ensure an up-to-date curriculum that is academically rigorous and economically relevant. Hallmarks of the program include one-on-one mentoring, workplace visits, paid summer internships and first-in-line consideration for job openings with a school’s partnering company.

P-TECH graduates are fully prepared to begin middle-class careers in the 21st century workplace, continue their educations at the four-year college-level and beyond, or both.

Ensuring adequate funding for P-TECH schools is critical to ongoing sustainability. States have identified various ways to fund the model and ensure high quality replication. This document reviews the key components and lays out the funding requirements of the model. How to scale P-TECH is up to the state.

Key Components of the P-TECH 9-14 School Model

- Partnership between school district, higher education partner and industry: All making long-term commitments to the success of the school and its students
- Six-year program, featuring an integrated Scope and Sequence of high school and college courses, leading to an industry-recognized, postsecondary degree for all students. Students can graduate within the six-years, but the six-year model ensures that students have the time and seamless supports necessary to earn their degree.
- Workplace learning strand, including mentoring, worksite visits, speakers, project days, skills-based and paid internships, and “first-in-line” for jobs
- Open enrollment
- Cost-free postsecondary degree
- First-in-line for jobs with industry partners

What Costs Need To Be Covered?

At a high level, funding must be provided for:

- Six Years: A six-year program that enables students to earn their postsecondary degree at no cost to the student or their families within a six-year time frame. Students move through the model at their own pace, with some students able to accelerate through the model, and some students requiring the full six years
- Planning Year: P-TECH schools require significant planning prior to launch among all the partners involved – state departments of education, school districts, higher education institutions and industry. Funding for the planning year includes bringing on a school leader
who can lead school development, as well funding for student recruitment, curriculum
development and summer orientation.

- **High school programming:** All students must complete high school course requirements,
  and in most P-TECH schools, are considered high school students for the full six years (or
  less, if accelerated).

- **Extended day and year:** Because P-TECH schools are open enrollment with no testing or
  grade requirements, additional time ensures that all students can earn their postsecondary
  degree within a six-year time period. This mean extending the school day and the school
  year.

- **College credits toward the degree:** College credits are funded only for those courses that
  are identified as part of the defined Scope and Sequence and lead toward the degree. There
  are creative ways to pay for college credits, including dual credit programs, using high school
  teachers as adjunct faculty, and paying for faculty time as opposed to tuition costs.

- **College expenses:** In addition to college credits, P-TECH schools may need to fund
  transportation between high school and college and must fund textbooks and other fees (lab
  fees, for example).

- **College Liaison:** The Early College Liaison serves as an intermediary between the college
  partner and the P-TECH 9-14 school, and is focused on strengthening student performance
  and expanding students’ horizons to include postsecondary educational opportunities and
  career goals. (Description here: http://www.ptech.org/docs/tools/Early-College-Liaison-Job-
  Description.pdf)

- **High school programming and supports for students who may require in Years 5 and 6:**
  While the majority of students entering Years 5 and 6 in P-TECH schools will be solely in
  college classes, there may be a smaller group of students who not have met any – or only
  one, college readiness benchmarks in English and Math. As a result, they will not be ready
  to take the college courses along the pathway to their postsecondary degree. They will need
  programming at the high school that will support their progress to meet the benchmark(s) so
  that they are able to graduate within the six-year timeframe. This is key to the P-TECH
  model – a commitment to ensuring that the most vulnerable students receive the academic
  supports necessary to attain a postsecondary degree with industry and economic relevance.

- **College supports:** Even for those students who are in college classes, supports are necessary
  to ensure their success in college. These supports could be high school teachers or
  counselors providing support to students while they are in college classes and/or enabling
  collaboration between high school and college faculty.

- **Professional development:** For high school teachers and college faculty that may focus on
  needs of students in college classes, project-based learning, workplace learning, collaborative
  instruction.

**Industry Funded Commitments**

Industry commitments to P-TECH schools are primarily in-kind and are detailed below. Costs
also include funding a full-time or part-time liaison who is responsible for the success of the
overall school, with primary responsibility for implementing industry commitments to the
school.
Industry partners may choose to fund schools in additional ways at their discretion. For example, they may choose to fund professional development on project-based learning for teachers and staff.

**Year One**
- Skills Mapping
- Mentoring
  - Events (at least two large and/or 6+ small events): food, giveaways, project materials, student and/or mentor transportation
  - Mentor background checks
  - Online portal (cost free)
- Worksite visits (at least two)
  - Student transportation
  - Food
- Project days
  - Volunteer transportation
  - Project materials
- Career fairs
  - Volunteer transportation
  - Food
- Speakers
  - Speaker transportation
  - Project materials

**Year Two**
- Same costs covered but for twice as many students

**Year Three**
- Same costs covered for three years of students
- Summer internships for eligible students (Schools set criteria, which at a minimum require students to be in college classes.)
  - Salaries
  - Equipment
  - Space
  - Transportation (depending on proximity of students to job sites)

**Year Four**
- Same costs covered but number of students will change depending upon programming for Year 4 students
- Summer internships for eligible students (Schools set criteria, which at a minimum require students to be in college classes.)
First in line for jobs

**Year Five**
- Same costs covered but number of students will change depending upon programming for Year 4 and Year 5 students
- Summer internships for eligible students (Schools set criteria, which at a minimum require students to be in college classes.)
- First in line for jobs

**Year Six**
- Same costs covered but number of students will change depending upon programming for Year 4, Year 5 and Year 6 students
- Summer internships for eligible students (Schools set criteria, which at a minimum require students to be in college classes.)
- First in line for jobs