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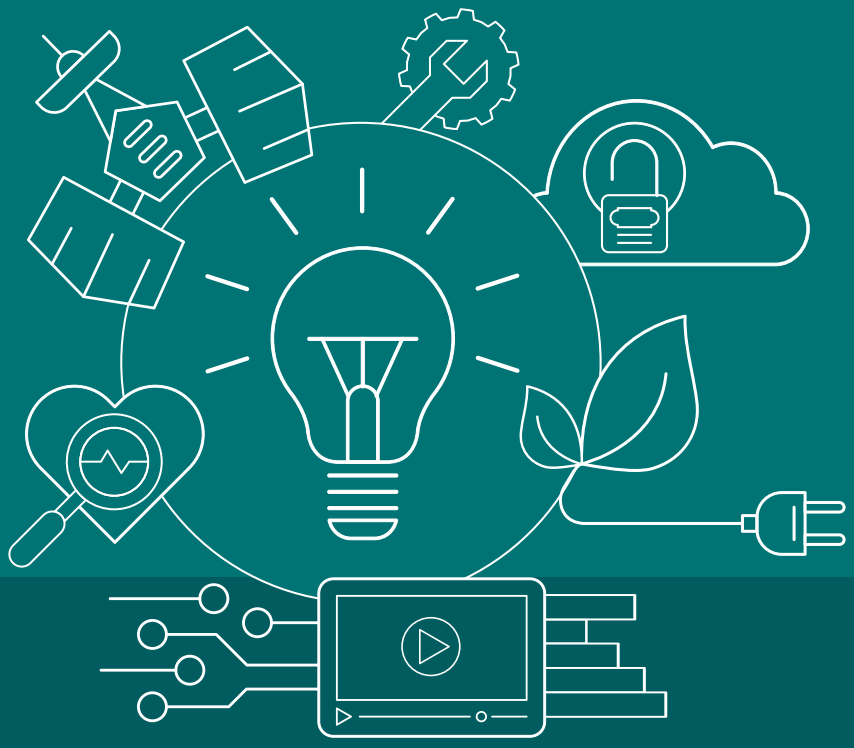

The P-TECH Model of Early College High School

A Timely Opportunity for Massachusetts?

OCTOBER 2021

Executive Summary

Now more than ever, Massachusetts students, especially those from historically marginalized and low-income communities, need more than a traditional high school diploma to succeed—they need the postsecondary credentials and career preparation required to compete for good jobs that enable economic security and upward mobility.

The P-TECH high school model stands out as one emerging, effective approach that can meet the needs of students and employers alike. P-TECHs are public schools that provide a seamless pathway from high school through college and career. The acronym stands for Pathways in Technology Early College High School. P-TECH high schools specifically prepare students for technology careers and offer the STEM high school and college courses needed to help them qualify for those jobs. Students enroll for as long as six years, allowing them to earn a high school diploma and a no-cost industry-aligned Associates degree that will enable them to secure a competitive entry-level position in a growing STEM field and to continue, if and when they choose, to complete further study in a four-year higher education institution.

The Massachusetts economy demands strategies like P-TECH to fuel the STEM workforce pipeline. Between 2018 and 2028, one of out of every three jobs created in Massachusetts will be in STEM fields. Yet, demand for graduates in computing and mathematical occupations far outstrips supply. Adding to the pressure to grow the tech workforce, 143,000 Massachusetts tech workers are expected to retire by 2027.

These jobs pay family-sustaining wages and offer career ladders for growth and advancement. Creating pathways to these opportunities for all students, but particularly for Black and Latino students who are underrepresented in these fields, is essential to closing wage and wealth gaps that plague our society. P-TECHs have intentionally been launched primarily in under-resourced communities with large populations of students of color to accelerate access to STEM careers from historically underserved communities.

P-TECH high schools have the capacity to bring together and leverage proven innovations and approaches that are already happening in disconnected ways in Massachusetts' high schools. They combine an emphasis on postsecondary degree completion similar to what we're seeing in the state's very successful Early College programs, with exposure to careers and work-readiness experiences similar to our career vocational technical schools and that are attracting students to our Innovation Pathways programs.

As of September, 2020, there are more than 127 P-TECH high schools operating in ten states. None of them are located here in Massachusetts. It's time for that to change. Massachusetts has plenty of highly qualified and interested employers and well-positioned colleges that together are the essential foundation of every P-TECH, and Boston and the Gateway Cities have students in need of greater opportunity for success in college and career.

This paper makes the case that P-TECH can help Massachusetts meet the need and demand for a dynamic and relevant high school education that connects students to the career opportunities our employers create and that can enhance their chances for future success.

The P-TECH Model of Early College High School

Across the country, as of September 2020, there were more than 127 P-TECH high schools open in 10 states in the U.S. and over 600 industry partners globally. P-TECH is an acronym for a model of Early College High Schools that stands for Pathways in Technology Early College High School.

The broader Early College High School movement also had one of its first emergences in New York City nearly fifty years ago and has proliferated to thousands of campuses in many states. While the specifics vary depending on state enabling policy and local preference, Early Colleges generally include at least three core defining features:

- Students in Early Colleges take significant numbers of college courses while in high school and those courses count both towards fulfillment of their high school curriculum and for permanent college credit;
- Early Colleges provide considerable scaffolding and support to students, not just access through dual enrollment; scaffolding often includes career-aligned pathways of intentionally sequenced courses and significant amounts of academic, social-emotional and guidance support to students; and,
- Early Colleges target populations of students that traditional college has served least well—low-income students, students of color, and first-generation college goers.

The P-TECH model adds some key specific features to the core Early College design. Firstly, while P-TECH includes a college, it also includes one, or a few, **employers** as full design and operating partners with the high school. Secondly, it focuses **on technology careers and STEM** courses needed to qualify for those jobs. And thirdly, P-TECHs are intended to enroll students for as long as six years (i.e. up to two more years than traditional high school) to support **completion** of a STEM Associate's degree and significant job exposure and experience with a partner employer. P-TECHs aim to graduate students with both a high school and a college degree and with the specific skills and experience to flourish in their chosen technology industry career.

P-TECH architects and sponsors emphasize the mission, the intentional balance between college and career goals, and the integrated approach.

Mission: P-TECHs are envisioned to offer broader access, through unique academic preparation and school-to-career connection, to technology careers for underrepresented populations. The schools are intended to be schools of choice, with open enrollment, where students elect to attend and have no admission criteria other than student interest. An ongoing "outcomes" evaluation being conducted by the social policy analytics nonprofit MDRC on the seven pioneering New York City P-TECH schools shows that among 1,500 students admitted over a five-year period by lottery from nearly 3,000 applicants, the students reflected the city's diversity with 85% of students reporting as Latinx or Black. The students arrived with academic challenges with only one quarter meeting or exceeding grade level in English Language Arts in 8th grade and only 15% doing so in math. The students' families' income reflected the median incomes of their neighborhoods and 10% were classified as English Language Learners. P-TECH leaders and educators actively recruit students from disadvantaged backgrounds to consider this pathway program as an alternative to a traditional high school experience, where many students from underserved populations get left behind.

College and Career Balance: While many recent innovations in high school structure include integration with postsecondary pathways, there is a divide between those such as Early College High Schools emphasizing college degree goals and those such as CTE and apprenticeships emphasizing career exposure and readiness. The Early College programs often include career-aligned pathways and the career-focused programs often generate some potentially "stackable" college credits but there is generally an overall focus on either progress towards reaching college degrees or pathways towards gaining certain jobs. By contrast, P-TECHs are designed to meet both goals, utilizing a fully integrated approach. Students gain work-based learning experiences with specific employers throughout their time at P-TECH and their courses of study are specifically aligned to

the career opportunities in their partner companies' industries. But they also are intended to graduate with an Associate's in Applied Sciences (AAS) in the school's focused pathway. P-TECHs measure their success both in terms of degrees attained and jobs and careers gained.

Integrated Approach: The P-TECH model design integrates three strands of engagement for students to support both their academic and professional growth. Of course, the model includes the core high school requirements and, in some cases (e.g. N.Y.C.), also a CTE strand of courses. At the same time, through close coordination with a college partner, P-TECHs offer participating students college engagement throughout. As 9th graders, the college side may focus on visits and preparation, while in 10th grade, students who are ready to proceed start taking college classes. From there, students progress across general education courses and end, often in the 5th and 6th years, with the specialty courses tied to their field of study. The third strand of activity for students focuses on the career side with the employer partner(s) of the P-TECH. That strand starts with exposure, awareness, site visits and exploration and includes direct mentoring from employees at partner companies. By 12th grade, the prototypical structure includes paid internships/apprenticeships at an employer partner. Designing these three strands to be inter-related and enabling of each other while delivering the intended high school, college, and career outcomes requires careful planning with the college and company partners fully engaged. For example, one of New York City's P-TECHs has utility companies such as Consolidated Edison as partners and features a custom created AAS in Energy Engineering,

The Arc of P-TECH—from Brooklyn, New York in 2011 to Across the Nation and Globe

P-TECH has an unmistakable starting point with the first school launched as a New York City Public School in Brooklyn in 2011. The technology company IBM was a central catalyst to the effort, envisioning a fundamentally new approach and making a major commitment to be the corporate partner to that first campus including supplying mentors for every student, offering job exposure, mentoring and internship opportunities, and ultimately promising a job interview for all successful graduates.

The original school in the Crown Heights neighborhood of Brooklyn has attracted visitors from all over the country and world including then President Obama who commented on the high value of the debt-free college degree included in the P-TECH model when he visited in October, 2013 and went on to note: "So this is a ticket into the middle class, and it's available to everybody who's willing to work for it. And that's the way it should be. That's what public education is supposed to do. And the great thing is that what started small is now growing."

The P-TECH model caught fire quickly. With IBM giving it visibility and its novel model addressing high priority concerns around equity and STEM career readiness, multiple states put new funding and policy behind it. New York State was quick to pick up the baton providing start-up funding for 16 more P-TECH schools in 2013 and New York City itself quickly grew to nine P-TECHs. And other states joined the movement with a total of ten states (NY, CA, CO, CT, IL, LA, MD, NJ, RI, and TX) now hosting over 127 P-TECH schools with over 300 industry partners, generally with state policies that both enable and financially support their design, launch, and operations.

For example, in TX, a state that has moved quickly to grow and expand P-TECH, with Early College, and generally with postsecondary innovation in their K12 systems, the Texas Education Agency (TEA) reports that there were 6,500 students in 62 state-approved P-TECHs in School Year 2019-2020 with 19 more schools in state-supported planning processes. TEA and its longstanding nonprofit technical assistance and policy partner Educate Texas (part of the Communities Foundation of Texas) provide considerable guidance and support during a 12- to 18-month planning process and TEA administers a competitive grant program that has provided up to $250,000 to support planning. Successful applicants for designation receive $50 per student per year in supplemental funding on a continuing basis and, under Texas's higher education funding formulas, all P-TECH students' college courses are funded at the same level as they would be if the students were post-high school matriculants, without costs to students. Finally, Texas has evolved its entire K12 report card and accountability system such that 40% of the score for high schools depends on their performance in College, Career and Military Readiness (CCMR). Each student participating in any form of Early College adds to the score for a high school providing considerable incentive to adopt P-TECH and other programs that help students succeed in their postsecondary trajectories.

Perhaps the most ambitious district-driven effort has been in Dallas, TX. Dallas Independent School District (ISD) leadership launched a P-TECH as part of every comprehensive high school in this major U.S. city, resulting in now 18 P-TECHs serving over 6,000 students, all launched in just the last few years. According to district officials, already 1,000 students have earned at least 45 credit hours of college each and have engaged deeply with the 90 industry partners tied to the campuses.

> "P-TECH has been transformational for the entire district. I've been a superintendent for 27 years and I have never before seen anything else that can be such a catalyst for change."
>
> Superintendent Michael Hinojosa

Through all of this proliferation and spread, the range of focus for P-TECHs has followed the range of focus of the corporate partners. For example, in New York City, the partners across the first seven campuses include IBM at the initial campus; global software company SAP at a second campus; two energy utilities at a third; two hospitals at two others; a consortium from the American Association of Advertising Agencies at a Manhattan site; and, finally, the public transit Metropolitan Transportation Authority at a seventh school. The deep partnerships mean that the aligned degree paths developed with the CUNY campus partners match up to the specific industries; for example, LaGuardia Community College created a new pair of Energy Technology degree paths. On IBM's P-TECH Website, visitors can sort P-TECHs by any of the nearly 50 separate Pathways (and associated AAS degree programs) across an impressively wide spectrum of fields of endeavor. This range of programs speaks to both the commitment to deep alignment with the specific corporate partners' needs and opportunities as well as to the varying local job and economic environments of different host communities and regions.

Finally, given IBM's global reach and also the compelling logic of the P-TECH model's fusion of high school, college, and career pathways, it is perhaps not surprising that P-TECHs have also emerged in countries beyond the United States.

The Results to Date

P-TECH is still young with the majority of campuses not yet mature enough to have produced graduates over the five or six-year arc. More than half of the earliest cohorts of the original IBM P-TECH in Brooklyn have graduated both high school and earned their full AAS. Over 40 of those students have been hired by IBM while nearly all of the students received meaningful work-based learning and mentoring from IBM and its employees.

As mentioned above, the well-respected nonprofit social policy evaluation organization MDRC is conducting a multi-year evaluation of P-TECH that is funded by the US Institute of Education Sciences (IES). The study looks at about 3,000 students who participated over five years in lotteries to gain seats at the seven earliest P-TECH sites. With more students applying than could be accepted, NYC uses lottery processes so the students in the sample who enrolled in P-TECH schools are being compared to a "gold standard" control group of about 1,500 students who lost out in those lotteries. There should be no significant difference in any characteristics of the two groups since the selection among them was by chance.

A 2020 report by MDRC provided some promising interim data on the seven P-TECHs being studied with an overall “outcomes” report still a couple of years away. The two most striking positive findings were that P-TECH students are accumulating more high school credits primarily by supplementing core traditional high school classes with CTE and career preparation courses. This is one of the design goals of P-TECH schools.

Even more promisingly, the intentional supports and more motivating circumstances have led to significant gains for students in meeting high school benchmarks for college readiness. New York State relies on Regents tests to determine student progress on academic skills with one cut score necessary for graduation and another, considerably higher one, needed for eligibility to take courses at N.Y.C.’s public college—City University of New York (CUNY). CUNY, in the form of individual campuses across its portfolio of 25 two- and four-year institutions, is the college partner for all N.Y.C. P-TECHs.

The performance of the program graduates have been very successful. For example, in the latest public report by MDRC on May 5, 2020, it was reported that P-TECH students earned two more total credits than students in other schools, and that at the end of two years of high school, 42 percent of P-TECH students had passed the ELA Regents exam with a score qualifying them for enrollment in CUNY courses, compared to 25 percent of comparison group students.

These interim results do not yet assure the long-term outcomes in terms of degrees earned and good-paying jobs secured but they do represent exciting evidence that the P-TECHs are raising student achievement and accelerating timelines to enable early college access and success. The goal of P-TECHs and Early College in general are to help students successfully reach college readiness, not just access college courses, and this data is encouraging evidence in support of that.

Why Massachusetts and Why Now?

Massachusetts is well positioned for a P-TECH initiative. Our economy demands it, our policy environment creates a strong foundation for it, and our students, particularly those in underserved urban centers, need it. Creating high school pathways to fields that pay family sustaining wages is essential to closing wage and wealth gaps that threaten our Commonwealth.

Growing Our STEM Workforce Pipeline

The Massachusetts economy demands game-changing strategies like P-TECH to fuel the STEM workforce pipeline. Adjusted for population, Massachusetts has more demand for STEM jobs than almost every other state. (STEM Brief 2019, commcorp.org)

Between 2018 and 2028, one of out of every three jobs created in the Commonwealth will be in STEM fields according to state estimates using Bureau of Labor Statistics. The pandemic may accelerate this trend with a surge in digital or digital enabled products that could lead to increased demand for tech talent.

In their 2019 report, State of the Massachusetts Tech Economy, the Mass Technology Leadership Council (MassTLC) stated "Massachusetts has a high concentration of expanding technology organizations looking for more talent, especially in software engineering and high-demand specialties such as AI and cybersecurity."

Yet, demand for graduates in computing and mathematical occupations far outstrips supply with 26 job openings per bachelor level graduate, seven job openings per associate degree graduate, and three per master's level graduate. (State of the Massachusetts Tech Economy Report 2019, Mass Technology Leadership Council)

Adding to the pressure to grow the tech workforce are retirements in the sector. MassTLC projected in 2019 that 143,000 Massachusetts tech workers are expected to retire over the next eight years.

Meeting workforce demand will require both growing and diversifying the tech workforce. Data from 2020 show that only 5 percent of Massachusetts' tech workers are Black, and around 7 percent are Latino. (State of the Massachusetts Tech Economy Report 2019, Mass Technology Leadership Council)

Other core Massachusetts industry sectors are facing similar workforce challenges. The state's life sciences industry forecasts growth of about 109,000 jobs by 2024 and warns that the number of college and university graduates in key life science-related fields is not keeping pace with demand. The Massachusetts Biotechnology Council (MassBio) identified "sourcing essential talent to meet the future demands of the industry" as one of four challenges in their five-year strategic plan defining the future direction of the Massachusetts life sciences ecosystem. Diversifying the sector is also called out as necessary to the cluster's sustainability. A June 2020 MassBio report says addressing the skills gap in computational science, advanced manufacturing, and commercialization, will be "critical for growth." The state's medical device industry has also pointed to talent as a key area requiring attention to sustain growth in the sector.

Additionally, STEM jobs are not just in the life sciences and IT. They are in manufacturing, postsecondary teaching, retail, finance, and business. And, the National Skills Coalition estimates that nearly half of all jobs in Massachusetts (46%) are middle-skill occupations that require more than a high school diploma, but not a four-year degree, the sweet spot for P-TECH programs.

Meeting Student Need

Only 45% of ninth graders in Massachusetts go on to earn the post-secondary degree or credential that the vast majority of jobs in our state require, and just 15% of low-income students complete a post-secondary degree within six years. These

rates are far lower in many of our Gateway cities that together with Boston educate nearly half of all low-income students in Massachusetts. Creating stronger, deliberate pathways to college degrees, workforce opportunities, prosperity and success is an urgent need in these communities, and a responsibility that our public schools must meet. P-TECH is strongly positioned to be a significant tool in meeting that need and fulfilling that responsibility.

There are approximately 3,500 students on waitlists for vocational technical schools in Massachusetts, with significant waitlists in the state's Gateway Cities that rob students of opportunities to connect their learning to economic opportunity. P-TECH can help address this lack of access issue as well.

P-TECH is effective at removing both financial and non-financial barriers to college attendance and completion. Students are given a seamless pathway to earn their college degree with consistent support from a cohort of educators and student peers while earning their college degree without cost and without debt.

Meeting the Goals of the Student Opportunity Act

In 2019, the legislature passed and the Governor signed the Student Opportunity Act, legislation that increases state funding for systemically disadvantaged students by $1.6 billion over seven years. The law's primary focus is on closing racial and socio-economic achievement gaps that hold students back from success. It requires districts to set targets for closing achievement gaps, create plans for how goals will be achieved using evidenced-based practices, and measure and make public progress toward meeting those goals. The law creates incentives for school districts to assure that learning improves for historically marginalized students, and that it improves more quickly than other student groups.

In addition, under SOA, the Secretary of Education is required to set state and regional targets for improving college and career readiness and to report annually on progress, and will collect and make publicly available data on student preparedness for workforce and post-graduate success by school district and high school. These are important incentives for districts to improve current outcomes and P-TECH is a potent strategy that can help districts and the state achieve critical goals.

Advancing Equity

For students: P-TECHs have intentionally been launched primarily in low-income communities with large populations of students of color to accelerate access to STEM careers from historically underserved communities. These jobs pay family-sustaining wages and offer career ladders for growth and advancement which can contribute to the closing of wage and wealth gaps. According to code.org, computing jobs in Massachusetts pay an average salary of $105,459. Entry-level wages for STEM careers are twice what they are for all Massachusetts occupations. Yet, there continues to be a serious lack of diversity in the technology and STEM fields with regard to senior leadership and employment generally.

Massachusetts continues to be plagued with yawning equity gaps in college acceptance and completion, as well as in income. Black students immediately enroll in college after graduation at rates 17 percentage points below that of white students, and they graduate from college within six years at a rate 25 percentage points below their white peers. The numbers for Hispanic students are even more dire at 30 and 32 percentage points respectively. Rates of income inequality in Massachusetts, which have their roots in educational opportunity gaps, are also persistent and pervasive. Recent data show approximately a 2-1 gap between median income for whites in contrast to Black and Latino or Hispanic families.

Eradicating these inequalities requires implementation of proven practices in support of closing equity and opportunity gaps for today's students. Our state's adoption of P-TECH a strategy that has, since its inception, focused on lifting students from underserved communities into successful pathways to high-growth careers, could be a powerful tool at just the right time. With its commitment to open enrollment, through lottery, and its active recruitment of students identified as potentially "at risk," along with its track record of success in creating positive college and career outcomes, P-TECH's introduction in Massachusetts is timely and necessary.

For Regional Development: Much of Massachusetts' economy centers around its capital city and the metropolitan Boston region. While each region of the state has its own strengths and capabilities, many of the state's Gateway Cities and their surrounding regions continue to struggle from a lack of development and investment, in part due to concerns about meeting private sector workforce needs. The preponderance of higher education institutions in and around Boston have created a synergy for talent, some of it from out of state students who choose to launch their careers here, that has attracted leading finance, life science, and tech firms to Boston, Cambridge, and the surrounding area. Many of the students in our Gateway city schools, and indeed in the Boston and Cambridge school systems, have not had successful enough high school experiences to qualify them for positions in these firms.

P-TECH has the potential to change that dynamic for the state's students while creating new talent pipelines in other parts of the state in ways that ensure a more equitable distribution of trade and development throughout the Commonwealth. Ensuring strong career readiness programs across the state will create a greater advantage for municipalities and regions in need of support in generating a greater quality of life and prosperity for their residents.

Committed Business Community

The state's business community has long been committed to excellence in education and has led efforts to improve opportunities for students. Many employers and employer groups have engaged directly with schools, supporting programs in a wide range of areas and with an emphasis on career readiness.

Business leaders are particularly enthusiastic about Early College. Chambers and industry associations across the Commonwealth supported and helped achieve an FY22 state budget increase to allow expansion of Early College programs. State Street awarded grants to expand Early College in Boston and Quincy. Harbor One Bank recently invested in an Early College program in Brockton. The SouthCoast Chamber is exploring how the initiative could be expanded in that region to foster a culture of college attainment in the South Coast that is needed to grow and create opportunity in the local economy.

This support and general business engagement in education bode well for P-TECH in Massachusetts.

MA State Policy Provides Strong Foundation

Massachusetts is now well positioned at multiple levels in terms of its policy initiatives and resources to pursue the P-TECH model. Further, as with Early College generally, the state can take advantage of a "fast follower" strategy to learn from the policy and practice experiences of other states and schools.

THE MASSACHUSETTS EARLY COLLEGE INITIATIVE

Massachusetts' Early College infrastructure is well suited to supporting an added innovation such as P-TECH.

In January, 2017, the Massachusetts Boards of Elementary & Secondary Education (BESE) and Higher Education (BHE) voted to pursue a Massachusetts Early College Initiative which would solicit applications for official designation by the Commonwealth of joint ventures of a high school and college to offer high quality Early College High School programming. The Boards adopted a set of key design criteria including:

- Equitable Access: EC is intended to target underrepresented populations and to be open access to all willing to try;
- Guided Academic Pathways: EC aims to offer structured sequences of courses leading towards degrees in student-selected fields, not just access to random college courses;
- Enhanced Student Support: EC programs should provide academic, social-emotional and guidance support to lift up students and offer scaffolding;

- Relevant Connection to Career: EC programs should help students gain exposure to career choices and consider pathways that intrigue them while not locking them in prematurely;
- Deep Partnerships: EC programs require deep, adaptive and effective partnerships between the college and the high school to ensure an optimized, student-centered offering that solves the many financial, scheduling, transportation and other logistics in bridging across the silos of high school and college.

The first approved programs were in position for the school year 2018–2019 and have now completed their third years. Most approved programs were built on existing efforts, in some cases thanks to generous support for designing and launching new programs provided by the EC philanthropic pioneer Smith Family Foundation. There are now 31 designated Early College programs that include 42 high schools partnered with 22 higher education institutions that are projected to serve about 4,500 students in the fall of 2021.

The Commonwealth has developed systems and talent to support designation reviews of applicants, offer ongoing technical assistance, compile ongoing data evaluation and reporting and pursue policy refinement. The two enabling Boards actively pursue their governance responsibilities through an Early College Joint Committee that includes leadership from both Boards and from the Executive Office of Education (EOE) and is staffed by the two Department Commissioners and the Office of Early College, established at the Department of Elementary & Secondary Education (DESE).

Financially, the Commonwealth has forged an evolving system of supports for both planning and ongoing operations. This relies on two main funding pots—an annual general use early college appropriation to EOE and an annual allocation to EC college course funding through the "dual enrollment" line item in the DHE budget. For fiscal year 2022, the Legislature doubled its total investment across these two line items to $11 million to match growth in the field and number of students. Each of these are important. Communities considering launching a new program need time and resources to design a robust, large-scale, high-quality program. And every state (e.g. TX, NC, MI, CO) with a large-scale Early College effort provides sustained, scaling funding for the direct costs of the added college courses (often delivered on the high school campus or on the college campus but just for EC students).

In February, 2021, Representative Jeffrey Roy, recent past House Co-Chair of the Legislature's Joint Committee on Higher Education, and Representative Kate Lipper-Garabedian, along with a number of co-sponsors, filed an Act Relative to College in High School, which aims to create a comprehensive and catalyzing framework for the full gamut of approaches to offering college to high school students including Early College. The Act would provide a set of specific authorities, tools, and funding to support ambitious growth for these efforts and includes levers that would specifically help support P-TECH programs should the Commonwealth choose to proceed here.

Beyond state government support for EC, there is a growing nonprofit ecosystem including philanthropic supporters, technical assistance providers, think tanks, policy organizations, and civil rights and other advocacy groups. These groups have been focusing on Early College, heartened by the initial evidence from Massachusetts that shows promising parallels to national evidence that EC can be a leading tool to fight for greater equity of opportunity and outcomes in education. A group of them are currently moving together to form the Massachusetts Alliance for Early College (MA4EC), expected to formally launch by the end of 2021, to bring together the many allies across the independent sector to purse ambitious goals around scale, quality, impact, and innovation.

In Texas, home to the largest number of P-TECHs in the country, the Texas Education Agency's Division of College, Career and Military Readiness and the key private, nonprofit partner Educate Texas have been able to layer P-TECH policies and supports on to their existing nation-leading Early College efforts. Massachusetts may now also be ready.

MASSACHUSETTS CAREER READINESS INITIATIVES

In addition to Early College, the state's High-Quality College and Career Pathways initiative includes Innovation Pathways and Career Vocational and Technical Education.

Innovation Pathways programs, designated and overseen by the Department of Elementary and Secondary Education, have guiding principles that are consistent with the P-TECH model, positioning the state well to implement this strategy. Programs connect student coursework and experience to a specific high-demand industry sector such as information technology, engineering, healthcare, life sciences, and advanced manufacturing. They are required to include partnerships with an employer, employer association, or Workforce Development Board, and students must complete 100 hours of a career immersion experience in either an internship or capstone.

Demand for the state's Career Vocational Technical Education (CVTE) schools is high and for good reason. Many CVTE schools have a strong track record of preparing students for both college and the workplace. A 2016 report, *The Critical Importance of Vocational Education in the Commonwealth,* found that 75% of employers surveyed overwhelmingly preferred to hire graduates from CVTE schools or vocational programs for both entry-level (75%) and higher-level (61%) positions. More than 90% of employers surveyed saw a need to increase the number of vocational high school graduates.

A primary challenge in CVTE is the ability to keep up with demand. As previously mentioned, about 3,500 students are on waitlists for vocational technical schools in Massachusetts. P-TECH could serve to meet student need for college and career connected learning in these cities.

The Federal Funding Opportunity

Like other states, Massachusetts finds itself the beneficiary of a robust pandemic-related response from the federal government. The state's share of COVID-Relief ARPA funding is approximately $5.3 billion, with another $2 billion more available to school districts in the form of direct grants. The state's allocation is flexible and can be spent on a range of needs and policy areas, including education and economic recovery and development. The school district funds, which can be used for recovering lost learning and ensuring a safe return to the classroom, are also permitted to be used for reinvention of public education with a specific emphasis on those students most impacted by the pandemic, which, evidence shows, are the very categories of students P-TECH was designed to support.

Though it is one-time funding, available to be spent over several years, the Massachusetts allocation coincides with a state commitment, made before the pandemic, to increase state support for schools through the Student Opportunity Act, beginning with this fiscal year's appropriation increase in Chapter 70 funds of $222 million and continuing for the next five years, ultimately increasing state aid to schools by over $1.6 billion annually. This confluence of funding will allow Massachusetts to do an immediate scaling up of proven strategies, like P-TECH, to support students, without concern for the fiscal cliff that one-time funding, without sustainability, would create. Additionally, ARPA funds to the state can be used for the immediate planning needs of districts looking to launch P-TECH as part of their plans, required by the SOA legislation, to implement strategies to close achievement and opportunity gaps for all students.

The Path Forward for P-TECH in Massachusetts

The P-TECH design and launch process is demanding work. It requires a well-facilitated, well-conceived, thoroughly planned approach with three partners fully at the table—a willing and interested district/high school, a capable college, and one or a few committed corporate partners. Previous efforts in P-TECH provide ample roadmaps and precedents from which to draw, but what does not work is when any of the partners dominate or limit the others. P-TECHs require fundamentally new architecture and components.

A recent MassINC study on Early College highlights that Boston and the Gateway Cities (26 legislatively-designated midsize cities across the state) are the epicenters for this opportunity as they collectively host half or more of the students most likely to benefit. Further, they are home to the companies and industries essential to P-TECH formation and operation. Each of these cities will prove either energetic in its pursuit or unable to seize this moment of opportunity for Early College in general and P-TECH specifically.

Each critical stakeholder in P-TECH has the opportunity to help lead and the obligation to be at least supportive for P-TECH to thrive.

The Role of the State: The P-TECH movement has to date chiefly been driven by state policy. For example, in the fastest growing P-TECH state, Texas, the state has established designation guidelines to help ensure quality of design and offers significant funding (approximately $200,000 per successful applicant in the last round) to promising applicants to support robust planning over 12–18 months. By contrast, Massachusetts' state planning funding for all of Early College has been constrained to a much lower level.

Further, reliable ongoing state operating funding for the college partners in early colleges is essential. Massachusetts has been growing its annual support for Early College costs of college courses through the Dual Enrollment line item in the Higher Education portion of the budget, but there is no guarantee this will sustain itself or continue to grow. Further, current funding per credit hour may be too low, especially for STEM courses that are often among the most expensive to deliver.

Boston's Vast Potential for P-TECH

Boston has been a relative Early College laggard to date, yet there is tremendous need for better solutions for students outside of the selective admission (aka "exam") high schools. Several factors position Boston well for P-TECH:

- The student need for alternatives to the challenged Madison Park Technical Vocational High School (the only vocational school in the city of Boston);
- The concentration of higher education institutions including Bunker Hill Community College which already has a designated Early College program and the Benjamin Franklin Institute of Technology which is focused on career readiness in technology fields;
- An extraordinary set of potential company partners across key industry sectors and a business community with a history of wanting to be engaged with the schools;
- A robust philanthropic community; and,
- The Superintendent's commitment to redesign all of the city's high schools as part of her strategic plan.

Finally, state policy must be supportive of key P-TECH design features such as the ability of high school programming to be extended to five or even six years length for students and remain eligible for Chapter 70 funding (and perhaps Chapter 74 and other CTE related funding). In addition, students choosing to stay longer and complete a college degree should be measured differently for the purposes of calculating four- and five-year high school graduation rates. State leadership has also often been an important catalyst for the P-TECH bandwagon in other states given the bully pulpit they occupy. Massachusetts would benefit from clear support for P-TECH from the executive and legislative branches.

The Role of Districts: P-TECHs need to be new-launch high schools and districts need to embrace the opportunity. A new P-TECH needs to be a school of choice among high school matriculants (or even earlier for 6-12 or 7-12 versions); needs appropriate facilities; requires fresh start planning and flexibilities on schedule, curriculum, budgeting and other dimensions and needs a strong founding leader as principal. They can be situated in an existing building as a "school within a school" and the students can be part of the greater high school life (e.g. participate in extracurriculars such as sports and theater) but P-TECH is not a "program" in which general stream high school students participate some of the time. For example, in NYC, some of the key success in qualifying students on time for college courses has depended on both a bridge program in the summer before 9th grade as well as a longer school day for all students. Further, the entire curriculum for P-TECH students must be designed differently to help students meet the STEM requirements as well as incorporate the CTE elements and the work-based learning opportunities.

Many Massachusetts districts have been slow to allow new schools to launch, to embrace choice for high school students, and to afford the flexibilities needed for such innovative designs. P-TECH is a worthy reason to do so but will require Superintendent and School Committee determination and follow through during both the design and launch phases to achieve success. Where P-TECH replication has faltered, small scale and watered-down designs and commitments have been part of the problem.

The Role of Company Partners: P-TECH was catalyzed by an innovative and socially responsible company, IBM. The P-TECH company partners' commitment goes way beyond past approaches such as "adopt-a-school" programs involving some volunteers and perhaps some grant funding. Companies that are appropriate and strong long-term partners need a deep and broad-based commitment to collaborate and support the P-TECH. In the design phase, the company should be a full partner in the process of "skills mapping" to ensure students gain what they need to be well prepared for specific jobs in the career field. This is crucial in order to ensure that the resulting educational path, content, and experiences will equip students well for the roles available at the target company and industry. On an ongoing basis, employer partners generally participate in several ways in the core program of the P-TECH:

- During career exploration by early P-TECH students, the partners offer career exposure through job shadowing and introductions to careers and industries;
- P-TECH corporate partners offer internships and paid apprenticeships with embedded work-based learning as students' progress;
- P-TECH partners' employees provide mentorship to students including around soft skills necessary for success in the workplace; and
- Some P-TECH partners offer the opportunity to "go to the front of the line" in interviewing for open positions upon graduation—not a guarantee of employment but a real shot for the right students at the right time

The Role of Philanthropy: Many P-TECHs have been driven entirely by public dollars from sponsoring state governments, both for planning and launch and ongoing operations. But philanthropy can also be an invaluable source of funding for communities considering mounting a P-TECH effort. By enabling interested parties to hire well-qualified technical assistance partners to assess community appetite, to facilitate interest from potential corporate partners, and to map out and support necessary design and approval processes, a philanthropic supporter can increase the likelihood of exploration and of high-quality implementation. Philanthropic support could also be important to help build and sustain an ecosystem to nurture and grow a network of P-TECHs. At a time when many foundations are focusing on "the future of work" and "career pathways," P-TECH would seem a great opportunity to support lasting and powerful change.

The Potential Role for a Facilitating Non-profit: Because P-TECH requires multiple stakeholders, from high schools/districts to colleges and employer partners, to come together and assess a variety of interconnected matters, from community appetite to local approval paths to state policy needs, it may take a proactive "action tank" to foster this in Massachusetts. Such a facilitating nonprofit could support explorations in one or several communities and could ensure a brisk pace of exploration and a high-quality approach. This "jump start" might be crucial to get the first P-TECH launched but also could be important to build beyond that to a growing network.

Conclusion

Pandemic Recovery, Racial Equity & Economic Competitiveness Considerations

As the Commonwealth and nation race towards recovery from the pandemic, the top priority is how to get students back on track to future success. An analysis from McKinsey and Company shows that by the end of the 2020–2021 school year, students were on average five months behind in mathematics and four months behind in reading. Historically disadvantaged students have been impacted the most by pandemic disruptions to learning. In math, students in majority Black schools ended the year with six months of unfinished learning, students in low-income schools with seven. (COVID-19 and education: The lingering effects of unfinished learning | McKinsey)

For high school age students, learning disruptions are translating right now into considerably lower rates of matriculation to college, with the strong possibility of resulting lifetime impacts. Data released by the Massachusetts Department of Higher Education (DHE) revealed a shocking impact—comparing the Fall of 2020 to the Fall of 2019, there was a decline of 33% in Black first-time freshmen and 25% in Latinx first-time freshmen in our community colleges. That amounts to 1,600 students who have fallen out of a pipeline that was already unacceptably leaky and incomplete.

While much discussion of "learning loss recovery" efforts fueled by federal relief funding has focused on tutoring, summer school, and other approaches targeting younger students, what is the appropriate response for students later in their K12 journey? The US Department of Education's recently issued guidelines and recommendations to states specifically call out Early College generally and P-TECH by name as strategies to provide both immediate and lasting help. California's detailed recommendation from a statewide task force calls for Early College and dual enrollment expansion. Massachusetts guidelines also list Early College as one strategy districts should employ. In addition, our state's Commissioner of Elementary and Secondary Education said recently that he will use challenge grants to incentivize districts to prioritize Early College in their plans for recovery from the pandemic.

The state's 2019 Student Opportunity Act legislation substantially increases state education funding for under resourced districts and requires that districts use funds on evidenced-based practices to close achievement and opportunity gaps. Early College is named in the legislation as one of the preferred practices and about 40 districts identified it as a strategic priority in the plans they submitted to DESE for how they will use funds.

While new P-TECHs could not likely emerge fast enough to help students in the Classes of 2022 or perhaps even 2023, they would help students now in middle school and they would represent the best of the spirit of "Build Back Better" with permanent, structural change that will both offset the pandemic and address our fundamental need to provide more effective college and career opportunities to students who have been historically underserved. This moment in education history allows for us to demand a reimagination of education and the student experience, and P-TECH does just that. It provides an authentic connection between traditional education and specific career opportunity, and benefits students by clearly paving the way to that opportunity and investing in them to complete the path.

Both Massachusetts and the nation are wrestling now more than ever with the historical legacy of structural racism and the urgent need to offer Black, Latinx, and low-income students better pathways to opportunity. The Massachusetts Board and Department of Higher Education have placed an Equity Agenda front and center for their efforts in this regard, including specific numeric targets for improvement in the rates at which our higher education system delivers college success to Black and Latinx students and the overall attainment rates of our working age population including these demographic groups.

Improvements alone to the system as it exists are very unlikely to sufficiently achieve these goals. We need large leaps forward of the sort that Early College has already shown in randomized control trials in North Carolina and Texas. MassINC's recent

report entitled Early College as A Disruptive Force for Equity in the Post-Pandemic Era highlights the need to move urgently at all levels to deliver about 10 times the current scale of Early College over the next five years as both the one-time federal recovery dollars are committed and the long-term Student Opportunity Act funding increases roll out. The Boston Globe's Marcela Garcia recently issued a clarion call to take Early College from a successful pilot to sustainable policy with the subtitle summary argument—"Why, in the midst of a pandemic, should early college be a priority? Because it addresses two vital issues related to the crisis: educational equity and economic recovery."

P-TECH is an especially promising and innovative model within the broader Early College field with its design carrying forward all the way to degree completion in high-value, high-demand career areas. Combined with other Early College models that embrace a broader range of fields beyond STEM and that can overlay onto existing comprehensive high schools, P-TECH in Massachusetts could add further thrust and diversification of opportunity and success.

Finally, looking even more broadly, Massachusetts enjoys perhaps the highest value-added, knowledge-based economic ecosystem in the country. The industries that fuel the state's economy rely on highly educated workforces and offer many attractive career ladders for the willing and able. But Massachusetts lags on preparing our own native students sufficiently to take advantage of these opportunities. It is a matter of economic competitiveness and social justice for us to raise our game. P-TECH speaks directly to these dual pillars through its close ties to specific companies and industries and their identified needs as well as their willingness to be part of the solution, and its focus on the STEM careers that dominate the future of our economy. Connecting students to these opportunities is imperative. P-TECH helps move us in that direction.

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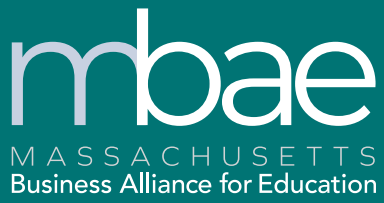

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