

AMERICAN Educator

A JOURNAL OF EDUCATIONAL EQUITY, RESEARCH, AND IDEAS



Where Passion Meets Purpose

Transforming Education with
Career and Technical Education
and Experiential Learning





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Transforming Education

RANDI WEINGARTEN, AFT President

In his 2024 State of the Union address, President Biden said one of his key economic and educational priorities was “Connecting businesses and high schools so students get hands-on experience and a path to a good-paying job whether or not they go to college.”

It’s a watershed moment. A US president talking not about standardized test scores, but about the promise of career pathways—taking career and technical education (CTE) off the sidelines and making it a priority in high schools. And involving businesses—small and large—in students’ lives, not as an afterthought, but as a means of giving students internships and future choices.

The American public education system, at least its educators, wants this. I see it in schools I’ve visited across the country: CTE is transformative—not only for students, but for American education itself.

For decades, policymakers saw preparing all kids for college as *the* mission of public schools—thus the obsession with reading and math scores. What laws like No Child Left Behind *really* left behind was the true purpose of public education: to prepare kids for *everything*—life, career, college, civic engagement.

Then came two social upheavals: the pandemic and AI. The pandemic confirmed that relationships and problem solving, not test prep and memorization, are critical for learning. The artificial intelligence challenge for students and educators is to harness the good and prevent AI from exacerbating the harms of social media.

We have to meet this moment. Experiential learning—project-based, hands-on learning, of which CTE is a prime example—gets kids engaged. It lifts attendance and expands workforce training. It makes public schools places where parents want to send their children, educators want to work, and students thrive. And it boosts the economy. It’s truly a win-win-win for individuals and for America.

These days, CTE prepares students not only for highly skilled trades, like carpen-

try and auto repair, but also for careers in healthcare, transportation, culinary and hospitality, graphic design, and now advanced manufacturing. The Biden administration’s historic investments in American manufacturing and infrastructure are creating high-paying, high-demand jobs that don’t require a four-year degree. (It’s part of Biden’s effort to grow the economy and reshape it so that workers, not just the wealthy, prosper.) But CTE isn’t merely an alternative to college. Far from it. CTE gives all kids tools for success in life, like working in teams, thinking critically, and meeting deadlines. Of students who concentrate in CTE, 94 percent graduate from high school and 72 percent go on to college.

CTE is a game-changer—that’s why we devoted this whole issue to it. As you’ll see, CTE today means:

- **Trailblazing partnerships:** I was honored to be with President Biden in April as he announced a multibillion-dollar federal investment for Micron to build microchip plants in Clay, New York, and Boise, Idaho, creating 70,000 jobs. The AFT and our New York affiliates are working with Micron and New York state to develop a curriculum framework to prepare students for a variety of good jobs in advanced manufacturing (page 21).
- **Career exploration and academics:** At Salem High School in Massachusetts (page 31), CTE is integrated with academic standards; students engage in advanced coursework and develop transferable skills while preparing for jobs, apprenticeships, and college. Its 10 CTE programs feature everything from restaurant-grade induction cooktops to virtual dissection tables and are guided by advisory boards of business leaders and union and postsecondary representatives.

- **A head start on healthcare professions:** Cleveland’s Lincoln-West School of Science and Health partnered with Cleveland’s MetroHealth main hospital to create a high school housed in a hospital (page 26). Students learn firsthand about hospital careers and work with healthcare-professional mentors. Our union is helping seed more of these programs—including the Northwell School of Health Sciences in Queens, New York—by partnering with Bloomberg Philanthropies.

CTE exemplifies what the AFT is fighting for: real solutions to help students thrive.



- **An entree to maritime careers:** At New York City’s Harbor School, students have eight pathways leading to good jobs in marine science, technology, or policy (page 37). Students learn to captain boats, build submersible robots, participate in oyster restoration, and prepare for careers protecting our waterways. Keeping multiple pathways open, they also study traditional academics.

This important work exemplifies what the AFT is fighting for: real solutions to help students thrive, by transforming education and building a better life for all. CTE does just that—and points the way to transformative change in American education. □

Where Passion Meets Purpose



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From Margins to Mainstream

Bringing Career-Connected Learning to Scale



By Robert Schwartz and Kerry McKittrick

As recently as 30 years ago, vocational education in the United States was generally regarded as “second class.” It was a fine thing, as the saying went, for other people’s children. In a world in which high school students were tracked—with one track typically leading to college and another to the skilled trades—vocational education was designed for the students not deemed to be “college material.” Too often, students from low-income families and students of color were funneled onto this track and sent on pathways to low-paying, low-mobility careers.

Today’s career and technical education (CTE) bears little resemblance to this model. In our home state of Massachusetts, many of the 28 regional vocational and technical high schools have long waiting lists for admission. These schools collectively have reading and math scores and graduation rates similar to those of the comprehensive high schools in the state.¹ They are significant contributors to the consistently high performance of Massachusetts students on the National Assessment of Educational Progress. The equity

problem is now reversed, with many civil rights leaders voicing concerns about unequal access for students of color and students from low-income families.² With far more applicants than seats, there is growing scrutiny around school admissions policies and pressure to move to a lottery-based admissions system.

In addition to the 28 regional vocational-technical schools, Massachusetts has eight urban district-run vocational-technical schools, one of which has attracted national acclaim: Worcester Technical High School, which serves the second-largest city in the state. Like the regional schools, it is structured into alternating weeks of academic instruction and hands-on lab or shop work. It offers 23 technical programs ranging from biotech and environmental tech, IT support, and programming and web development to the trades (e.g., electrical, carpentry, HVAC, plumbing), advanced manufacturing, and robotics and automation. The school features small class sizes, a student-run bank and restaurant, and a veterinary clinic run in collaboration with the veterinary program at Tufts University. In their senior year, nearly all students have a substantial paid co-op experience in their field of study. Students also have access to advanced placement and dual enrollment courses. With a total enrollment of more than 1,400 students, Worcester Tech has a 97 percent attendance rate, a 98 percent graduation rate, and a 66 percent college-going rate—higher than the school district and state as a whole.³

Programs at full-time CTE schools like Worcester Tech are comparable in intensity and duration to high-quality CTE programs internationally. However, while roughly 9 percent of the

Robert Schwartz is a cofounder of and senior advisor for the Project on Workforce at Harvard University. His previous roles include high school teacher and principal, education advisor to the mayor of Boston and the governor of Massachusetts, education director of the Pew Charitable Trusts, founding president of Achieve, and Harvard education professor. He is also the author or editor of numerous reports and books on career pathways, most recently America’s Hidden Economic Engines: How Community Colleges Can Drive Shared Prosperity, which he coedited with Rachel Lipson. Kerry McKittrick is codirector of the Project on Workforce. Previously, she was a senior manager at Jobs for the Future and a senior policy advisor on education, labor, and workforce development issues for Congressman Jim Langevin.

ILLUSTRATIONS BY RACHEL SENDER

state’s high school students are CTE concentrators (i.e., students who take three or more courses* in a particular career field), full-time CTE schools enroll just half of the state’s CTE concentrators.⁴ The other half is in comprehensive high schools, where CTE programming is less intense. This raises an important question for Massachusetts policymakers, one that is likely a concern for other states as well: How can we expand access to high-quality, high-intensity CTE programs like those at full-time schools to more CTE concentrators?

A second, more challenging question emerged about a decade ago when Massachusetts and many other states adopted the goal of preparing *all* students for *both* college and career. Less than 20 percent of students⁵ nationally are CTE concentrators, so how can we ensure that all students have access to—and benefit from—career preparation opportunities? In response, a growing career pathways movement has developed with CTE at the center but with a broader focus and reach: to enable all students to graduate high school “college and career ready.”

What Do We Mean by “College and Career Ready”?

Today, at least 37 state education plans include a unified definition of “college and career ready.”⁶ “College ready” is a term that most people understand, although they might have differing opinions about what metrics to use in defining college readiness. In our view, an important indicator of college readiness is successful completion of a rigorous, well-structured early college program—including attainment of a postsecondary credential. The growth in dual enrollment, which we document below, suggests we are not alone in this judgment.

What we mean by “career ready,” on the other hand, is not as clear. In part, this is because we do not want or expect most students to go directly to work after high school. The vast majority of high-paying, high-mobility jobs today require some kind of credential beyond a high school diploma but not necessarily a four-year degree. Other valuable credentials include industry certifications, apprenticeship certifications, one-year postsecondary occupational certificates, and associate degrees, preferably in a career field. To make the best decision about which pathway to pursue, students need some knowledge of the careers available to them and the foundational skills to pursue those careers. Therefore, we define a career-ready graduate as a student who has (1) had enough systematic exposure to the world of work and careers, including through career-connected coursework, work-based learning, or paid internships or summer jobs, to make an informed choice about the best education or training pathway to take post-high school; and (2) developed the foundational skills (also known as employability skills or soft skills)—like communication, teamwork, and problem-solving—needed to succeed in the world of work.

If we are to deliver on the promise that all students will leave high school ready for careers as well as college, we can’t (and shouldn’t) rely on our CTE systems alone. While we must improve the quality and intensity of CTE programs for students who choose to concentrate, we must also find a way to spread the benefits of CTE to the other 80 percent of high schoolers. We must build stronger, more coherent, and transparent pathways from high school to

postsecondary education and training and then to careers for every student. This insight led to the development of the career pathways movement. Career pathways may incorporate CTE, but they are aimed at the broader student population. They integrate career-focused and academic learning and increasingly span grades 11–14, leveraging early college/dual enrollment models to help students get started on both college and a career while in high school.

In this article, we use “career-connected learning” as an umbrella term that includes both CTE and career pathways.⁷ We argue that, taken together, CTE and the broader career pathways movement have the potential to become a new majority-serving system that will improve academic and economic outcomes for *all* students. To make that case, we will first document the growth and evidence base for both CTE and career pathways.

Growth and Modernization of CTE

Over the past century—from the 1917 enactment of the Smith-Hughes Act to the 2006 passage and 2018 reauthorization of the Carl D. Perkins Career and Technical Education Act—CTE has evolved into a rigorous academic option for students preparing for a variety of post-high school futures. At the state level, policymakers have embraced CTE, with several leaders embedding CTE into their broader education plans. Today, 31 states have a college and career readiness indicator that includes CTE coursework or work-based learning in their assessments of school quality and student success.⁸ In 2022 alone, 37 states—led by both Democrats and Republicans—enacted 123 policies focused on CTE.⁹

The vast majority of high-mobility jobs today require a credential beyond a high school diploma but not necessarily a four-year degree.

Today’s CTE is characterized by several trends: (1) increased industry involvement, paired with a focus on career exposure and work-based learning opportunities (e.g., internships and apprenticeships); (2) focus on the integration in high school of postsecondary education and credentials; and (3) inclusion of employability skills alongside technical skills instruction. In high schools across the country, CTE is high-tech and wide-ranging, spanning 16 career clusters[†] with course sequences in in-demand fields from business to health sciences. Among schools that offer CTE, 77 percent offer work-based learning opportunities and 73 percent offer courses that earn both high school and college credit.¹⁰

In the 2021–22 school year, approximately 8.2 million high school students took a CTE course, but drastically fewer chose

*State definitions of “CTE concentrator” vary, but we would argue that students should take at least three CTE courses to be considered a concentrator.

[†]To learn about the 16 career clusters, visit careertech.org/what-we-do/career-clusters.

to concentrate by completing three or more courses in a single field or program of study. Overall, white male students are more likely to participate in CTE than female students and students of color, and there tends to be an occupational divide wherein female students are more likely to study health sciences and fewer students of color are enrolled in STEM fields. In 2021–22, the most popular career clusters were business, arts and communications, agriculture and natural resources, and health sciences.¹¹

A 2018 survey of public school districts found that CTE is offered in 98 percent of districts, but delivery mechanisms are diverse. The majority of school districts (83 percent) offer CTE courses at comprehensive high schools, while less than half (43 percent) offer courses at CTE centers that students attend part-time and even fewer (12 percent) offer courses at full-time CTE-focused high schools. Thirty-five percent offer courses at two- and four-year colleges.¹²

We must build stronger pathways from high school to postsecondary education and training and then to careers for every student.

Overview of the Evidence for CTE

As national interest in CTE has grown, so has rigorous research on the topic. Alongside longstanding observational studies, new research demonstrates that high-quality, high-intensity CTE can lead to improved academic and economic outcomes for students, particularly higher rates of student engagement, on-time high school graduation, and workforce earnings.¹³ Studies suggest that impacts can vary by the form of content delivery, course timing, and field of study, among other factors.

Historically, the evidence base for CTE has been relatively slim because students tend to self-select into courses. However, a causal study of admissions data from CTE high schools in Massachusetts found that participation increased the likelihood of on-time graduation by 7 to 10 percentage points for students from higher-income families, with even larger impacts for students from lower-income families.¹⁴ Another study of CTE-dedicated high schools in New York City found that CTE coursework led to increased school attendance and a higher likelihood that students were on track to receive a diploma. At smaller schools with a single or themed career focus, there were even more meaningful increases in student graduation and college enrollment rates.¹⁵ Similarly, a study of national data found that high school CTE course-taking is associated with lower dropout rates and increased rates of on-time graduation, especially when courses are taken in later grades.¹⁶

The impact of CTE may vary for different student populations. A causal study of students at CTE-focused high schools

in Connecticut found that male CTE students were 10 percentage points more likely to graduate from high school, had higher attendance and 10th-grade test scores, and had 32 percent higher quarterly earnings than non-CTE students at age 23, but the same benefits did not accrue for females.¹⁷ Another study using student data from Massachusetts uncovered differences in academic outcomes by gender as well as large variations across fields such as IT, healthcare, and construction.¹⁸ Meanwhile, evidence on the impact of CTE on college enrollment is mixed, but a study using transcripts from the High School Longitudinal Study of 2009 found that participation in CTE programs was not related to a student's probability of enrolling in college.¹⁹ That is, CTE can be a different path to college—not one that precludes or discourages attendance.

Importantly, the structure and amount of CTE coursework that a student engages with seem to have an impact on outcomes: more advanced, sequenced coursework is associated with better results. A comprehensive longitudinal study that followed three cohorts of more than 100,000 students in Arkansas from eighth grade to college and into the workforce found that students who chose to concentrate in CTE (by earning three or more credits in a program of study) were 21 percentage points more likely to graduate from high school than their peers who did not concentrate. The study found that additional CTE coursework translated to a higher probability of graduation, community college enrollment, and employment and earnings.²⁰ These findings are supported by a study finding that taking advanced CTE courses is associated with a 2 percent wage premium for each additional year of study, while introductory CTE courses created little wage gains.²¹ Some of the strongest evidence supporting CTE has been conducted at career academies,²² which offer highly structured, sequenced, themed CTE learning, as we discuss below.

The Development of the Career Pathways Movement

While the term *career pathways* has been floating around for decades, it took on a more specific meaning with the launch of the Pathways to Prosperity Network²³ in 2012. The Pathways Network, cofounded by Jobs for the Future and the Harvard Graduate School of Education, was established in response to a 2011 report²⁴ that one of us (Schwartz) coauthored, which argued that we should create multiple pathways alongside the four-year college path for students after high school. The Pathways Network was deliberately designed to build generally on the CTE system, and specifically on two well-established prior initiatives: (1) career academies, best represented by the work of NAF, formerly the National Academy Foundation; and (2) early college high schools, a structured form of dual enrollment that helps students get started on college while in high school.

Career academies are typically small schools within a larger comprehensive high school, using career-focused coursework and aligned work-based learning opportunities to engage students and keep them motivated to stay in school. NAF, for example, supports academies in five industry sectors: engineering, finance, health sciences, hospitality and tourism, and information technology. NAF began with one Academy of Finance in 1982. Today, there are over 600 NAF academies in 35 states and territories serving 112,000 students. Beyond NAF, the National Career Academy Coalition

estimates that there are career academies operating in 7,000 high schools serving over one million students.²⁵ They are designed to be college as well as career focused, but career academies typically have little or no direct connection to postsecondary institutions.

By contrast, early college high schools (ECHSs), an innovation largely sponsored initially by the Bill and Melinda Gates Foundation in the early 2000s, are explicitly connected to postsecondary institutions—mostly community colleges—but only occasionally designed with a career focus. Two states in particular, North Carolina and Texas, led the development of the early college movement.²⁶ With initial Gates funding, both states created new statewide organizations—North Carolina New Schools and Educate Texas—to develop and spread the ECHS model. These schools were deliberately designed to create a low-cost, accelerated pathway to a first postsecondary credential for students from groups historically underrepresented in higher education. In a relatively few years, North Carolina launched 130 ECHSs, Texas, 170. In Texas’s Pharr-San Juan-Alamo district, all high schools are ECHSs and students can graduate with a high school diploma and an associate degree, 60 hours of college credit, or an occupational certificate from South Texas College.²⁷

The best-known national network of ECHSs, and one of the best examples of career-focused early college, is P-TECH: Pathways in Technology Early College High School. This model was developed by IBM and first implemented in a single Brooklyn high school in 2011. P-TECHs require collaboration among a high school, a community college, and one or more employers. Students enroll in the school for a six-year period, beginning in ninth grade and culminating in an associate degree in a tech field leading to a job in a partner company or transfer to a four-year college or university. As of 2021, there were nearly 250 P-TECHs serving over 150,000 students in 12 states and 28 countries.²⁸

It is difficult to estimate the number of early college high schools in the nation, especially because some states, including Massachusetts, have developed an ECHS model that focuses on programs within comprehensive high schools rather than a whole-school model. A conservative guess, based on our knowledge of the field, would place the number of ECHSs around at least 1,000, in addition to the P-TECHs.

The Pathways to Prosperity Network, as mentioned above, was designed to combine the strengths of career academies and early college high schools. The goal was to help member states and regions develop career pathways systems that combine academic and career learning, span grades 9–14, and ultimately help young people get launched in high-growth, high-demand fields where they could expect to earn a living wage and have opportunities for upward mobility and further education. As with career academies and ECHSs, career pathways programs have been deliberately designed to serve students from groups that have historically been underrepresented in higher education and focused on career fields with the greatest opportunities for growth and mobility.

Over the past 12 years, the Pathways Network has supported the development of career pathways systems in over a dozen states, metropolitan regions, and big cities. Among the states that have been with the Pathways Network the longest and have made the most progress are Arizona, Delaware, Illinois, Minnesota, Tennessee, and Texas. Of these, Delaware is furthest along in scaling career pathways into a mainstream system. (It’s easy to dismiss Delaware’s

success because of its small size, but we argue that the core design principles of Delaware Pathways are relevant for all states.)

Delaware Pathways has been the subject of three case studies since 2019.²⁹ All have commented on the thoughtful way the program has been designed and developed. Delaware Pathways is the product of a genuine public/private partnership, with strong political leadership from two successive governors, excellent executive leadership from the former state CTE director, and strong support from private and nonprofit sector leaders. A cross-sector steering committee developed a strategic plan by mapping the regional labor market, identifying 12 high-demand and high-growth industry sectors with good middle- and high-skill jobs, and then slowly developing and making available to the high schools course materials for 24 CTE programs of study, all aligned with programs at Delaware Tech, the state’s single statewide multicampus community college. Beginning with 27 students from one high school enrolled in an advanced manufacturing program at Delaware Tech in 2014, Delaware Pathways now serves over 50 percent of the high school students in the state, with over 20 percent of students earning some type of postsecondary credit before graduation.

The career pathways movement has now spread well beyond the members of the Pathways Network. Several other national organizations in addition to Jobs for the Future are active in this space, including Education Strategy Group, Advance CTE, New America, and ExcelinEd, as well as state-based organizations like the Linked Learning Alliance in California and CareerWise in Colorado. There is also a consortium of national funders that is fueling the further development and expansion of the career pathways movement.

The Role of Community Colleges in Career Pathways

As the career pathways movement has evolved, community colleges have emerged as central institutional players, sitting between high schools on the one side and employers on the other. In our experience, employers have generally been more willing to engage with community colleges than with high schools, though building such partnerships is not without challenges.³⁰

Many American employers, unlike their counterparts in youth apprenticeship countries like Germany and Switzerland, have a difficult time imagining that 16-year-olds can be productive contributors to their bottom line. Consequently, they are more willing to invest in training older students who are closer to the point of employment.

Community colleges at their best are the nimblest, most market-oriented institutions in our postsecondary education system. However, they face many challenges that impede their ability to enable the career pathways movement to scale. First, community colleges are multipurpose institutions serving a broad range of constituencies, not just career-focused 18-year-olds. In many



states, community colleges were created primarily to provide students a low-cost way of starting a four-year degree. As a result, many are seen and funded as transfer institutions, with little or no support for workforce development. Although community colleges serve the highest-need students in our postsecondary system, including half of Hispanic undergraduate students and 40 percent of African American undergraduate students,³¹ they are the least well-funded colleges in our system. A 2020 estimate found the funding gap between community colleges and their four-year public counterparts to be \$78 billion, which translates to an \$8,800 per student revenue difference.³²

Community colleges have been the beneficiary of the huge growth in dual enrollment in the last few years—from 800,000 students in 2009 to 1.5 million today. There are now 1 million students under the age of 18 enrolled in community colleges, accounting for 17 percent of community college enrollments in credit-bearing courses. This continuing growth—a 16 percent increase just from 2021 to 2023—has enabled community college enrollments to stabilize after a precipitous decline during COVID-19.³³

High-quality CTE can lead to higher rates of student engagement, on-time high school graduation, and workforce earnings.

Perhaps the most striking national example of the growth of the college-in-high-school movement is at Dallas College, where nearly 30,000 dual credit high school students are enrolled. These students constitute nearly a third of the college's 100,000 credit-seeking students. A substantial number of these students are in ECHSs or P-TECHs. Collectively, in 2022, these students were awarded 2,100 credentials and earned over 235,000 credit hours.³⁴

The growth in dual enrollment presents an opportunity for community colleges that is linked to a larger challenge: to ensure that all course-taking leads to credentials with value in the labor market, whether or not the student decides eventually to pursue a four-year degree. This will require high schools and their community college partners to strategically design dual enrollment programs to ensure courses are connected to academic and career majors while discouraging random course-taking. Fortunately, the major reform initiative in community colleges over the last decade has been the adoption of *guided pathways*, a strategy to channel student course-taking into pathways leading to academic or career majors that are aligned with in-demand regional industries.³⁵

What do community colleges look like when they operate on the premise that any student who walks in the door, including dual enrollment high school students, is there for economic opportunity and advancement? To answer this question, Schwartz and

our former colleague Rachel Lipson recently coedited a volume of case studies profiling the work of five community colleges: Lorain County Community College in Ohio, Mississippi Gulf Coast Community College, Northern Virginia Community College, Pima Community College in Arizona, and San Jacinto College in Texas. *America's Hidden Economic Engines: How Community Colleges Can Drive Shared Prosperity* documents the internal policies and practices that enable these colleges to focus so intently on the goal of providing economic opportunity and mobility for their students. Most importantly, these colleges realize that to deliver on that goal, they must position themselves as go-to players in their regional workforce and economic development ecosystems to align their programs with current labor market needs and help shape the future regional economy. These colleges illustrate the comparative advantage that good community colleges have over high schools in bringing industry leaders to the table and providing meaningful work experiences for students.

The Evidence on Career Pathways

The career pathways movement is little more than a decade old, so there is scant evidence on the most important metric: the labor market outcomes of graduates. However, we do have credible evidence on the two foundational initiatives on which the career pathways movement has been built: career academies and early college high schools.

Thirty years ago, a multisite, eight-year study compared 1,400 career academy students with a similar number of carefully matched nonacademy students. The researchers found that academy graduates earned about \$2,000 more annually than their counterparts. The effects were even more significant for Black males, who earned \$30,000 more than their counterparts over the eight years. Overall, there was no difference between the two groups in high school graduation rates or postsecondary attainment rates. Roughly 90 percent of both groups graduated high school and half earned a postsecondary credential.³⁶

Another rigorous study of career academies in North Carolina found that enrollment increased the likelihood of high school graduation and college enrollment by about 8 percentage points, but only for male students.³⁷ A multiyear evaluation of Linked Learning—a California-based academies model—found that participants were 2 percentage points less likely to drop out of high school and 3 percentage points more likely to graduate high school.³⁸

Since 2010, an outside evaluation firm has tracked the impact of participation in NAF academies on graduation rates. The most recent four-year study found that students in NAF academies had a 6 percent higher high school graduation rate than nonacademy students. For at-risk students, the NAF academy effect was even stronger, a 10 percent difference.³⁹

With regard to early college high schools, there have been two substantial studies monitoring impact. The first was a lottery-based, random assignment study of students enrolled in 10 ECHSs from 2005 to 2011. Researchers found that ECHS students were significantly more likely to graduate from high school, enroll in college, and attain a postsecondary degree than comparison group students. The postsecondary attainment difference was stark: 22 percent (mostly associate degrees) versus 2 percent. And 20 percent of those degrees were attained by students while in high school. Among ECHS students, there were no significant

differences by subgroup—all students experienced the benefits of accessing college while in high school.⁴⁰

The second study, also a lottery-based, randomized control study, followed students from 19 North Carolina ECHSs for 15 years. The results of this substantial study were striking:

- 49 percent of ECHS students attained a postsecondary credential, compared with 36 percent of control group students
- 37 percent of ECHS students earned an associate degree, compared with 14 percent of control group students
- 28 percent of ECHS students earned a bachelor's degree, compared with 25 percent of control group students

ECHS students also earned their degrees more rapidly than non-ECHS students. ECHS associate degree holders saved two years, while ECHS bachelor's degree holders saved six months.⁴¹

Massachusetts is a relative newcomer to the early college high school network, having launched its first ECHS programs in 2017. The state now has more than 6,000 ECHS students enrolled in 48 programs, involving 58 high schools and 27 postsecondary education partners (mostly community colleges).⁴² The Massachusetts ECHS program model is career-focused, with partners targeting one or more career areas in their application for state funding. Early results are promising, particularly with regard to college enrollment immediately after high school:

- 69 percent of all ECHS students enrolled in college, compared with 54 percent of matched peers
- 61 percent of economically disadvantaged ECHS students enrolled in college, compared with 45 percent of matched peers
- 63 percent of Black and Hispanic ECHS students enrolled in college, compared with 48 percent of matched peers

Results are also promising for college persistence, with 60 percent of ECHS students returning for their second year, compared with 44 percent of matched students.⁴³

Career-Connected Learning at Scale

Before turning to broader implications for policy and practice, we'd like to briefly describe strategies that two jurisdictions are pursuing to scale career pathways with quality: Career Connect Washington and FutureReadyNYC.

Career Connect Washington

Career Connect Washington's comprehensive approach offers a powerful strategy. The Washington story began with a 2017 alarm-bell report from the state's Business Roundtable highlighting a projected 30 percent gap between the number of jobs requiring some postsecondary education or other credential and the number of young adults with such a credential.⁴⁴ That same year, Governor Jay Inslee announced the creation of a task force co-led by the Microsoft president and the chair of the state's Workforce Training and Education Coordinating Board to address this problem. The task force's report⁴⁵ led to the design and development of Career Connect Washington (CCW). The program was launched in 2019, supported by legislative authorization and funding.

At the heart of the CCW plan is a three-stage framework for career development: Career Explore, Career Prep, and Career Launch. The first two stages are designed to ensure that by the

time students arrive at their senior year of high school, they have had systematic year-by-year exposure to the world of work and careers, career-aligned classroom instruction, and hands-on work experience through an internship or pre-apprenticeship program. Career Launch is really the focus of CCW, requiring meaningful, high-quality job experience, aligned classroom learning, and an industry certification or other credential with value in the labor market. These criteria are defined with an admirable degree of specificity. Although Career Launch is aimed primarily at graduating seniors, it is also designed to serve young adults up to age 29, especially since the expansion of Registered Apprenticeships* is a key element in the Career Launch program.

One of the distinguishing features of CCW is that organized labor has been a core partner from the inception of the program.

What is most striking about CCW is its strategy for getting to the goal of 60 percent of the class of 2030 completing a Career Launch program by age 29. At the state level, there is an extraordinary coalition of about a dozen state agencies, business and industry organizations, labor organizations, and equity-focused nonprofits. The initiative is led by a small team with a dotted line to the governor's office but carried out primarily through a highly decentralized regional structure supported by two types of competitive grants.

Each region has a funded intermediary organization with convening and coordinating responsibilities. Cutting across the regions is a network of funded "program builders," organizations responsible for expanding existing Career Explore, Prep, and Launch programs or creating new ones. Program builders can be industry sector organizations, trade unions, workforce intermediaries, community colleges, or education service districts. CCW recently funded employer associations in 10 key industries to expand employer participation and ensure that Career Launch programs meet industry needs. This is not an act of charity by employers; it is in their economic best interest to ensure that they have a productive workforce.

There is also an extraordinary student-facing online directory† of career-connected learning programs with links to support services that can help remove barriers to participation. Across all three stages, CCW is carefully tracking completion by subgroups within regions and industries. These disaggregated reporting requirements typify the very strong equity current that runs through the entire initiative. As of summer 2023, there are over 19,000 enrollees in Career Launch programs, a 30 percent enrollment increase since 2019. With nearly 6,000 Career Launch completers already, CCW is off to an impressive start.⁴⁶



*Registered Apprenticeships are industry driven and approved by either a state agency or the US Department of Labor. To learn more, visit go.aft.org/s2i.

†To explore this directory, visit careerconnectwa.org.



FutureReadyNYC

New York City, with approximately 915,000 public school students,⁴⁷ is by far the largest school district in the nation. In 2019, the mayor's office published *CareerReady NYC*, a landmark report⁴⁸ two years in the making, produced by a working group of representatives from the New York City Public Schools, the City

University of New York, the Department of Youth and Community Development, the mayor's office, employer organizations, and a variety of youth-serving organizations across the city. The report laid out a compelling vision of a coherent, coordinated K-16 system that would provide developmentally appropriate experiences across the age span designed to prepare all young people for college and career success. Unfortunately, this report sat on the shelf, without political or educational leadership to act on the vision.

Fast forward to 2022, when a new mayor, Eric Adams, and a new schools chancellor, David Banks, declared career pathways a major priority of the new administration. Chancellor Banks established a new Office of Student Pathways with the goal of ensuring "that each student graduates on a pathway to a rewarding career and long-term economic security, equipped to be a positive force for change."⁴⁹ This office created the Student Pathways initiative, with the FutureReadyNYC program as a cornerstone to meet that goal.

FutureReadyNYC has five components, with some further along in implementation than others. All participating students currently receive (1) career-connected instruction ranging from broad awareness to specific career preparation, (2) early college credits and credentials that demonstrate skills employers value, and (3) work-based learning (including workshops and paid internships). The last two components are being built out: (4) personalized college and career advising and (5) financial literacy education.⁵⁰ (The latter is especially important for students to be able to make an informed cost-benefit analysis of their postsecondary education and training options.) To ensure students' career-focused learning is meaningful and leads to practical job skills, students choose a pathway in one of four high-wage, high-demand sectors: technology, business, health-care, or education.

What's most striking about this strategy is that FutureReadyNYC is embedded in a comprehensive citywide initiative coordinated out of the mayor's office that includes the other two major youth-serving organizations in the city, the City University of New York and the Department of Youth and Community Development (an agency that connects 100,000 city youths to jobs through its Summer Youth Employment Program). In December 2023, the mayor's office released *Pathways to an Inclusive Economy: An Action Plan for Young Adult Career Success*. This 65-page plan provides a detailed road map to accomplish the following five goals:

1. Expand career-connected learning at every stage of a young person's journey....
2. [Provide] early interventions to ensure youth and young adults remain connected to career pathways....
3. Re-engage young people who are now out of school and out of work....
4. Improve data collection and analytics to support stronger transitions, promote continuous improvement, and ... address ... disparities....
5. Implement a coherent and comprehensive strategy to improve and expand employer engagement.⁵¹

With this action plan, city leaders have declared their intention to make career-connected learning a new mainstream system designed to put all city youth on a path to career success.

Implications for Policy and Practice

What are the implications of our findings for policy and practice? We offer six takeaways from this summary of CTE and career pathways and from our broader research and experience in the field:

1. CTE is the critical building block for spreading career-connected learning to most high school students. As we document, the evidence shows improved academic outcomes for students, especially for those students who take at least three courses in a career field and participate in an aligned work-based learning experience.
2. As the Delaware, Washington state, and New York City examples illustrate, political leadership is critical for building the cross-sector coalition needed to develop and support a new college *and* career readiness system that benefits all students.
3. Career readiness needs to begin at least as early as the middle grades, including through career exploration, and extend across the secondary/postsecondary divide. Dual enrollment, especially through the career-focused early college high school model, is the best vehicle for helping students attain a first postsecondary credential with value in the regional labor market.
4. Community colleges are better positioned than high schools to engage industry leaders in the co-creation of programs leading to meaningful career opportunities, a crucial element in successful programs. One of the best ways to engage employers is through sector-based organizations. Sector associations can help employers understand that engaging with young people helps them build a reliable talent pipeline at a time when they are struggling to acquire talent.
5. Work-based learning, especially paid internships or aligned summer jobs, is a critical element of career-connected learning. Essential professional skills (teamwork, communication, problem-solving) are best learned in well-structured work settings, not in classrooms. Experiential learning writ large should be a core element embedded in *all* educational programs from kindergarten through college.

We also have suggestions for two key areas needing more innovation and investment:

1. Career counseling in schools and career services in colleges, as currently structured, are woefully inadequate for a fully implemented career-connected education system. This is an area crying out for experimentation. In Switzerland, this function is seen as so important that it is carried out not through the schools but through a network of community-based information and counseling centers staffed by professionals and accessible to all parents and students.⁵² We offer this as an example of the kind of fresh thinking this issue requires.
2. The development of strong, well-staffed, employer-facing intermediary organizations that operate between schools and companies to scaffold and support both sets of institutions as they scale up quality work-based learning opportunities is crucial. Intermediaries can be especially important in enabling small and medium-size companies to participate, sometimes serving as employers of record to handle payroll and other logistical matters that are seen as barriers to participation.

Lastly, we offer four specific state policy recommendations to facilitate career-connected education at scale:

1. In some states, seat-time requirements are real or perceived barriers to the expansion of internships and other forms of extended work-based learning. States must make it clear to districts and schools that they have the flexibility to provide academic credit, as well as compensation, to students for structured and documented learning that occurs outside the classroom, whether during the school day, after school, or in the summer. Learning should be the focus, with schools having sufficient flexibility over time and resource use to maximize learning opportunities for all students.
2. If community colleges are expected to become central players in a career-connected learning system, legislatures need to fund them appropriately and hold them more accountable for student outcomes. This means funding systems that acknowledge that career programs are more expensive to operate than academic programs, and using accountability systems that focus less on enrollment and program completion and more on labor market outcomes. Texas just passed legislation that trades a substantial increase in state funding, with special support for expansion of dual enrollment and for adults seeking short-term credentials, for improved labor market outcomes.⁵³ We think this is a model that other states should study.
3. Employers play a crucial role in providing work-based learning opportunities for students. Therefore, we believe it is worth exploring incentives for employers who agree to provide high-quality, structured internships or other forms of substantial work-based learning, especially for students unlikely to find such opportunities on their own. There are some states, notably South Carolina, that provide tax credits for employers that participate in the state apprenticeship program. We think this is a policy other states should examine, especially for programs designed to increase the flow of well-prepared workers into high-demand fields.
4. States must improve coordination between education, labor, and economic development departments to facilitate stronger alignment between schools and regional economic growth strategies. Improving economic outcomes for students requires building programs of study that lead to high-demand, high-paying careers. In Massachusetts, the governor created a

Workforce Skills Cabinet, which brings together the executive offices of Education, Labor and Workforce Development, and Housing and Economic Development to oversee a common economic growth strategy. To date, this cabinet has issued several grants to CTE schools and intermediaries to support programs in strategic industries, like advanced manufacturing and cybersecurity. Cross-agency coordination is also crucial for states to develop longitudinal data systems to track student academic and economic outcomes from K–12 into the workforce, enabling policymakers and practitioners to understand which programs work, and for which students.

Our recommendations have focused mainly on states, but we close with a word about the federal role in advancing career-connected education. Today’s federal policy environment is striking: there is an unprecedented focus on education and workforce development that extends well beyond the US Department of Education. In 2022, the Departments of Education, Labor, and Commerce joined together to launch an extraordinary cross-agency initiative, “Raise the Bar: Unlocking Career Success.” The initiative aligns closely with the pathways vision we outline in this article, including by expanding access to career-focused dual enrollment, work-based learning, credentials of value alongside the four-year degree, and sufficient exposure to the world of work to enable informed student choice of pathways beyond high school.

We can address the technical skills gaps that impede economic growth while putting millions of young people from low-income families on a path to the middle class.

Furthermore, the Infrastructure Investment and Jobs Act and the CHIPS and Science Act provide unprecedented resources for workforce development, with a focus on training Americans for high-paying, high-demand jobs that do not require a four-year degree.⁵⁴ These new federal investments underline the broader economic importance of bringing career-connected learning to scale. The nation needs more young people with the skills that the best CTE and career pathways programs are designed to produce.

By expanding and strengthening CTE and career pathways, we can address the technical skills gaps that impede economic growth while putting millions of young people from low-income families on a path to the middle class. A career-connected education system—based in evidence—can improve outcomes for all young people. Now is the time for systemic transformation; we have the knowledge and tools to do so. □

For the endnotes, see aft.org/ae/spring2024/schwartz_mckittrick.

Signature Features of High-Quality Career and Technical Education



By James R. Stone III

Although the United States has been attempting to address education for the workplace for over 150 years, it still has no national system linking education and the workforce.¹ Instead, it has a nonsystem built upon a series of ad hoc efforts in which the 50 states individually make and carry out most education policy, with some federal policies providing direction or oversight. Within each state, school districts often modify and interpret state policy. As a result, state and local efforts have shaped career and technical education (CTE) policy and programming in many ways. In a very real sense, context matters.

Because of our nonsystem, CTE has evolved into a broad concept with a variety of working definitions. Even key terms like *CTE concentrator* (which relates to how many courses in a specific career pathway a student takes) and *work-based learning* have

multiple definitions used by different states, with none used by a majority of states.²

A recent cost analysis of standalone CTE high schools in two states showed the impact of these differences among states in definitions—and thus in their program implementation. The researchers found one state’s approach offered clear positive returns to its investment; the other produced mostly “non-negative” smaller returns.³ Clearly, each state’s definitions and resulting real-world context matter.* With shared definitions—ideally embedded in a national system connecting education and work—lagging, states would have better odds of learning from higher-functioning states.

Given the variability among states and programs, the best approach a district or school might pursue to create a high-quality CTE program is to focus on the essential skills that students need to develop and the signature features common to any high-quality CTE program regardless of context, label, or description. In this article, I summarize the research on both these skills and features.

James R. Stone III has held faculty positions at the University of Wisconsin–Madison, the University of Minnesota, and the University of Louisville. He served as the director of the National Research Center for Career and Technical Education for nearly two decades and has authored or coauthored more than 100 reports of research, journal articles, or books. His most recent book, coauthored with Morgan V. Lewis, is College and Career Ready in the 21st Century: Making High School Matter.

*For details on context effects, see “From Margins to Mainstream: Bringing Career-Connected Learning to Scale” on page 4.

Essential Skills

Among researchers and policymakers, there is general agreement that a high-quality CTE program must address three types of skills in context: academic, technical, and employability (although different terms may be used to describe each).⁴ To cultivate these skills, the focus will necessarily be adapted to the stage of student development: career awareness, career exploration, career preparation, and career training.⁵

For academic skills, it is obvious that different occupations require different levels of reading ability and knowledge of mathematics and science—often requiring a level of skill that extends beyond or is different than what is necessary for successful high school completion. For example, strong oral skills are considered paramount for students pursuing business careers.⁶ Potential engineers and workers in advanced manufacturing will most certainly require different and higher levels of math skills (e.g., statistics) than those pursuing careers in the arts or culinary industry. More generally, research has found that while the math needed to be “career ready” is typically found in college-prep courses, it tends to have more advanced content than what is necessary to be considered “college ready.”⁷

Despite the recognized variability across careers, and in keeping with our nonsystem, the field of CTE still does not have a baseline or benchmark that defines what academics all future workforce participants will need to master to be career ready. Although the World Economic Forum summarized over 200 studies and identified how students apply core skills to everyday tasks,⁸ far more needs to be done to support how academics are embedded in CTE programs.

Regarding technical skills, the situation is clearer. The most powerful signal of an individual’s career readiness is earning an industry-recognized credential (IRC). Acquiring skills unique to different work environments enhances employability because IRCs signal to the labor market that an individual possesses a specific set of technical skills desired by an employer. A robust system of career pathways would nest IRCs in specific CTE programs, providing a series of stackable credentials that give individuals a variety of pathways to future success. These credentials should signal an individual’s developmental growth, which begins with general work readiness credentials (e.g., the ACT WorkKeys National Career Readiness Certificate or the Occupational Safety and Health Administration’s 10-hour safety certification), leads to entry-level skills, and provides a specific path to more advanced skills (such as becoming a certified nurse aide by the end of high school and then a licensed practical nurse after another year of training).

Beyond academic and technical abilities, employers look for employability traits, behaviors, or skills that are necessary for getting, keeping, and doing well on a job. From the simple ability to communicate with a customer or supervisor to navigating relationship challenges in the workplace, these are often selected as the most desirable skills in employer surveys.⁹ Research indicates that college typically does not build these skills. One study found that recent college graduates lack basic workplace proficiencies such as adaptability, communication skills, and the ability to solve complex problems.¹⁰

Character traits are also critical. Noncognitive skills such as persistence, dependability, self-control, curiosity, conscientious-

ness, grit, and self-confidence are more important than sheer brainpower to achieving success in the workplace as well as in college.¹¹ As with academic skills, the World Economic Forum’s literature review identified 10 employability competencies needed to equip students to succeed in the emergent digital economy,¹² but CTE instructors will need support to embed these skills in their programs. Fortunately, there is some evidence that work-based learning and out-of-classroom experiences through career and technical student organizations may offer better venues for this aspect of youth development than classroom-based learning.¹³

How best to engage students in acquiring these academic, technical, and employability skills is the primary challenge of developing high-quality CTE programs. Implementing the following signature features will help.

Signature Features

The signature features of high-quality CTE programs described below are a distillation of research drawn from many sources,¹⁴ including lessons learned from several advanced industrial nations. They emphasize the need for CTE programs to address elements of curriculum, pedagogy, and assessment within a career pathway framework that begins no later than middle school.

The curriculum for any given CTE program must be driven by industry-recognized standards.

Rigorous CTE Curriculum

A high-quality curriculum begins with a context that offers both meaning for the learner and an appropriate locus for the application of academic, technical, and employability skills. Work provides a social context¹⁵ and experiences that will engage the learner.¹⁶ To maximize learning in the classroom and in work-based settings, the curriculum needs to be authentic, which is marked by the following four elements.

1. The curriculum is derived from industry and reflects qualifications for future employment.

The curriculum for any given CTE program ought to begin with a career focus and the knowledge and skills needed for successful entry into and advancement within that career pathway. It must be driven by industry-recognized standards. For many CTE programs, identifying these standards remains a challenge. Unlike many of our economic competitors, US labor markets lack a national framework for education, credentials, or qualifications for most occupations.



Consequently, the market proliferates with perhaps as many as one million education and industry credentials.¹⁷ This includes degrees but also badges, certificates, licenses, apprenticeships, and myriad industry certifications. Many are narrowly focused, and many are proprietary. Further, many career fields have few if any nationally recognized credentials. (By contrast, Germany has 350 apprenticeable occupations in which more than 60 percent of high school graduates participate.¹⁸) The best strategy for addressing this challenge is for educators to work closely with regional leaders from in-demand industries or occupations.

Despite the limitations of our nonsystem, there are regional and national credentials that can be built into a high-quality CTE curriculum and stacked over time as students move from high school to the workplace and to further education at a postsecondary institution or an employer-based training program. A career pathway with such stackable credentials offers options for the many youth who will not move directly from high school to college to the workplace.



2. The curriculum is delivered through activities that address authentic problems.

In a robust technical course, authentic problems of practice abound, requiring the application of both academic and technical knowledge to resolve. Students need to struggle with authentic, real-world problems and “figure it out” to encourage deeper learning and to develop critical employability skills

such as persistence. An authentic, problem-focused curriculum that integrates related academics must begin with the technical requirements, not the academic. Other academic curricula may use context-based approaches that are often framed as applied learning. Such approaches may make academics more interesting, but absent authenticity of a real work problem to solve, they contribute little to a student’s career development.

3. The curriculum continually enhances related mathematics, literacy, and science concepts.

Academic teachers and courses are responsible for educating students in academic content. However, CTE courses can show the connections to academic learning and how the workplace uses academic concepts, reinforcing what students learn in other classes. This also helps ensure that students graduate from high school prepared to continue learning in a postsecondary institution. CTE programs should integrate multiple strategies for building students’ mastery of math, science, technical reading and writing, and communication. The National Research Center for Career and Technical Education (NRCCTE) developed and experimentally tested an approach to integrating academics into CTE courses that showed strong positive outcomes in mathematics and literacy (for more, see the box below).¹⁹

4. The curriculum seamlessly feeds into postsecondary CTE programs because it is guided by an industry advisory committee.

A structural mechanism to facilitate student transitions, stackable credentials, dual high school and college credit, and other linking elements is for secondary and postsecondary CTE programs to share a joint industry advisory committee. The benefit is that a single pathway advisory committee that speaks to secondary and postsecondary program leaders helps ensure a more unified career pathway to better meet the needs of students and employers.²⁰

Through such advisory committees, educators and employers have one conversation and therefore engage in complementary work. Central to this conversation is describing the needs of industry and facilitating the design of a more tightly integrated curriculum derived from a common set of industry standards and advice. The result should be a smooth pathway from high school into the postsecondary technical curriculum and into employment.

Educators with Technical and Pedagogic Skills

Although it should be obvious that well-prepared teachers are important to the delivery of high-quality CTE programs, developing CTE teachers can be a challenge. Many CTE teachers come directly from industry with great technical expertise but little or no traditional teacher preparation.

High-quality CTE programs provide three pedagogic venues for CTE teachers: the classroom/lab, work-based learning, and career and technical student organizations.²¹ As shown in the table on page 15, each offers opportunities for CTE teachers to effectively enhance students’ academic, technical, and employability skills.

1. The classroom/lab integrates academic content and connects to work-based learning.

Relatively few CTE teachers enter the classroom with a traditional teacher education background, especially those who teach in the skilled trades. One state estimate suggests that as many as 95 percent of CTE teachers begin as experts in their trade and

Videos on Integrating Academics

After developing and testing its approach to integrating academic content in CTE, the National Research Center for Career and Technical Education produced a series of free videos to support educators.

- “Maximizing the Academics in CTE: The NRCCTE Curriculum Integration Studies” provides an overview of the approach and the research findings: go.aft.org/xgw.
- “An Introduction to the Math-in-CTE Curriculum Integration Model” includes interviews with educators in Arlington, Virginia; Detroit, Michigan; and Eugene, Oregon, explaining how they transformed their teaching: go.aft.org/a7e.
- “Math-in-CTE at the Arlington Career Center, Arlington Public Schools,” offers more in-depth commentary and examples from educators in Virginia: go.aft.org/ytw.
- “Math-in-CTE Sample Lesson: Information Technology” shows a class at the Arlington Career Center using Scratch (a coding language for youth) and learning how to plot points on a coordinate plane: go.aft.org/6ew.
- “Math-in-CTE Sample Lesson: Cashiering” shows a class at Detroit’s Breithaupt Career and Technical Center using basic math to handle guest checks in a restaurant: go.aft.org/woy.

—J. R. S.

later pursue a career in teaching.²² Other estimates are lower but as high as 75 percent in the 30 states surveyed.²³ Not only are CTE teachers more likely to enter the profession sans traditional teacher education, but there is also evidence that their leaving rate is considerably higher than traditionally prepared teachers.²⁴

To address these challenges, the NRCCTE developed an intensive, evidence-based approach to help new CTE teachers master essential teaching skills and reduce their leaving rate.²⁵ Called “Teaching to Lead,” it focuses on four traditional teacher skills adapted for the CTE classroom, beginning with classroom management and moving on to instructional planning, instructional strategies, and student assessment. This iterative approach is designed to span a new teacher’s first year, starting with a 10-day summer institute before school begins and continuing with an intensive coaching component during the school year and another institute the following summer. An evaluation found that teachers improved their classroom management and student engagement.²⁶ (To implement this professional development, see sreb.org/cte-teacher-preparation.)

In addition to the instruction they provide, high-quality CTE teachers are necessary for the authentic learning contexts they facilitate. Most important are work-based learning and career and technical student organizations.

2. Work-based learning is authentic.

Work-based learning (WBL)—and connecting work- and school-based learning—can be done in many ways, such as applying academic and/or technical skills learned in school to tasks encountered on the job, showing the relevance of school to the real world, or demonstrating mastery of skills to earn a certification.²⁷ Regardless, authentic WBL must be a goal of high-quality CTE program design.²⁸ The National Governors Association,²⁹ in its argument for more authenticity in WBL, identified four key characteristics:

- a partnership agreement that details the expectations for each partner: the employer, the participant, and the school;
- a work experience where the student is engaged in real or authentic work activities supervised and mentored by an industry professional;
- a structured learning component that intentionally connects theory with practice and workplace skills; and
- a third-party assessment and recognition of skills (such as an industry-recognized credential), ensuring that the student is progressing in a career pathway.

Many researchers have considered European models of WBL for lessons that might be applied to US educational systems. Colorado implemented a Swiss-style apprenticeship program, a more intense form of WBL than most CTE students experience in the United States.³⁰ Its essential features include

- engaging in meaningful work experience, such as earning a wage while receiving hands-on work experience;
- earning a nationally recognized industry certification;
- being a true team member doing meaningful work;
- being part of a professional network; and
- having opportunities to earn college credit without incurring debt.

Authentic work-based learning provides a test of how well students’ interests and abilities align with the occupations they are considering.

Authentic WBL benefits are many, including students gaining the soft and hard skills necessary to be successful in both college and career settings³¹ and improving reading scores, attendance, high school graduation, college attendance, and postsecondary achievement.³² More than skills, authentic WBL also provides a test of how well students’ interests and abilities align with the occupations they are considering.³³

What is critical but rarely discussed is the importance of occupational socialization as a function of high-quality WBL pedagogy.³⁴ While schools can replicate the appearance of a workplace in a CTE program, they cannot replicate occupational socialization.

Industrial psychologists define occupational socialization as the process whereby individuals learn to be fit for performing work by becoming aware of organizational and occupational practices, internalizing them, and carrying them out as partici-

Pedagogical Setting	Integrated Academic Skills	Technical Skills	Employability/Work-Readiness Skills
Classroom, Lab, or Shop	Address math, English language arts, or science in the context of the industry skill.	Develop and practice industry standards-based skills.	Work in teams on in-class assignments.
Work-Based Learning	Reinforce relevant skills in an applied setting.	Apply skills in an authentic context working with occupational incumbents.	Engage in occupational socialization as part of a work group.
Career and Technical Student Organization	Participate in leadership development activities.	Test skills in a competitive environment.	Interact with industry professionals.

pating members of a work group. It is the learning of attitudes and behaviors, informal work norms, and peer-group values and relationships necessary for success in an occupational context.³⁵ Formal elements include company, team, or organizational meetings where the adolescent worker engages with adults (including customers); classes, including those taught by external vendors, demonstrating the newest tools or processes; and meetings with mentors and with other adult employees working on the same tasks. Informal elements include casual conversations with other employees, social get-togethers, and

the simple act of observing how adults in the workplace interact with each other, their supervisors, and the work itself. These are experiences that cannot be replicated in a school setting and are fundamental to an adolescent's career development.



It is important to develop well-defined pathways that ensure students are on their way to their chosen careers.

Finally, authentic WBL helps youth begin to acquire the social capital created by interactions with adult supervisors, mentors, instructors, and others who can provide access to valuable resources such as information, assistance, support, encouragement, and connections.

3. Career and technical student organizations provide students more opportunities to explore career pathways and develop their skills.

Successful CTE programs have active student organizations. Career and technical student organizations (CTSOs) are co-curricular, meaning activities are directly related to the CTE curriculum and some activities occur during school. CTE teachers can use CTSO competitive events in their classes to develop teamwork, decision-making, career awareness, and personal development. CTSO leadership opportunities also add to students' development through club meetings and projects. Many CTSO activities occur outside of the classroom and include community service projects, conference participation, and professional development through state and national CTSOs. For teachers, CTSOs are an effective pedagogy to enhance students' career development, noncognitive skills, and academic

engagement.³⁶ One of the few studies of CTSOs found evidence of positive effects on several proximal variables linked to post-secondary student success, including academic motivation, academic engagement, grades, career self-efficacy, college aspirations, and employability skills.³⁷

An Assessment Framework That Incentivizes Career Pathways

Although it is beneficial for CTE programs to be open to students who are just exploring, it is also important to develop well-defined pathways that ensure students are on their way to their chosen careers. States and school districts should offer options among high school CTE programs and pathways, recognizing that not all students will wish to pursue the same level of technical preparation—and they should incentivize establishing more intensive CTE options.

At an operational level, it might be useful to consider three levels of standards that CTE programs must meet to receive funding, with bronze as the minimal level acceptable for state or district support.

Bronze-level CTE programs require that students meet all high school graduation requirements and have an option for students to earn at least one industry-recognized credential (IRC).

Silver-level CTE programs require that students meet all high school graduation requirements and

- ensure students meet established postsecondary entrance requirements—for example, a score of 22 on the ACT exam or the reading and math cut scores on a two-year college placement exam such as Accuplacer;
- integrate related math, literacy, and science concepts into each career pathway;
- include at least one authentic work-based learning experience in a related industry setting;
- meet at least one IRC requirement that links to a next-level IRC;
- incorporate dual enrollment so students have the option of earning college credits; and
- lead to a two-year technical education program that provides the next-level IRC or academic credential.

Gold-level CTE programs require that students meet *silver-level* expectations and

- have higher academic expectations (e.g., advanced math and science courses as appropriate for each career pathway, etc.);
- include an extended, more intensive authentic WBL experience in a related industry setting; and
- include a four-course technical education sequence in each career pathway that concludes in at least one dual enrollment course in the technical sequence.

High-quality, world-class CTE programs and pathways are necessary for a prosperous 21st-century society. By designing CTE programs that include the essential skills and signature features described here, schools and districts greatly increase their likelihood of success in preparing youth to move from secondary education into productive adult lives. □

For the endnotes, see aft.org/ae/spring2024/stone.

Maximizing the Effectiveness of Workplace Learning

Instructional Principles for Career and Technical Education



By Paul A. Kirschner, Mirjam Neelen, and Tim Surma

It seems like everyone who has ever gone to school is an expert in how to teach. And all of this “folk wisdom” seems based on two simple thoughts: “Well that’s the way I learned and look at me now!” if the results turned out positive, or “Boy did I hate school; it was all wrong!” if they were negative.

Perhaps this pervasive folk wisdom is why there are so many myths about teaching and learning, including the notion that 70 percent of our learning happens informally (via experiences), 20 percent happens socially (via others), and 10 percent happens formally (via school).¹ While there is absolutely no evidence in the scientific literature to support that idea, it is of course true

Paul A. Kirschner is an emeritus professor of educational psychology at the Open University of the Netherlands and a guest professor at the Thomas More University of Applied Sciences in Antwerp, Belgium. He is a research fellow of the American Educational Research Association whose books include How Learning Happens and How Teaching Happens. Mirjam Neelen is the global learning experience design lead at Novartis and has over 15 years of experience with companies such as Houghton Mifflin Harcourt, Google, Learnovate Centre, and Accenture. Together, Kirschner and Neelen write the blog 3-Star Learning Experiences, and they recently published the book Evidence-Informed Learning Design. Tim Surma is the director of the Expertise Centre for Education and Learning at the Thomas More University of Applied Sciences in Antwerp, Belgium. A former teacher in secondary education and teacher education, he turned to research on effective teaching and learning strategies and has published four books to date.

that informal learning and learning from and with others is very important, especially in the workplace.

As educators and cognitive scientists, we want to support excellent instruction and efficient learning in all contexts. So we’ve been considering how the 10 principles of instruction described by Barak Rosenshine (a high school teacher turned educational psychologist) apply to learning in career and technical education (CTE).² These principles are based on three compelling lines of research: cognitive science, expert teachers and what they do, and cognitive strategy instruction. The major strength is that even though these are three very different bodies of research, there is no conflict whatsoever between the instructional suggestions that they provide.

Our vision of CTE aligns with the Department of Defense Education Activity (DoDEA), which describes CTE as

an education pathway that provides students with the academic, technical, and real-world knowledge, skills, and experience they need to be prepared for a variety of career options ... [giving] students training and skills in many different types of careers in high growth industries.... CTE programs are personalized, hands-on, and let students explore different career fields ... [during] middle school and high school ... [preparing] students for the full range of post-secondary opportunities, including college and careers.³



CTE becomes more effective when the instructional content is placed in a context that mirrors real-life situations.

As such, CTE is meant to “empower students to acquire the necessary academic, technical, and employability skills to enter, compete, and advance in their education and career in a global economy.”⁴ CTE tries to achieve this by combining regular coursework in school with mentored internships from potential employers in the community to give students extra preparation for their later careers. Local instructors take the role of workplace teachers.

CTE becomes more effective when the instructional content is placed in a context that mirrors real-life situations. The DoDEA suggests that creating authentic learning experiences that closely resemble the actual workplace scenarios where the knowledge will be applied can greatly enhance the transfer of skills. The more closely aligned the learning situation is to the ultimate workplace environment, the smoother the transition of knowledge will be. We need to note here that CTE is not meant as an updated version of vocational education. CTE programming is meant to link secondary and postsecondary education (including workplace learning) in a sequenced series of courses that aligns the educational curriculum with industry-validated standards. As such, one could see CTE not as a track, but rather as a pedagogy that contextualizes learning in real-world settings.⁵

Rosenshine’s 10 Principles in the CTE Context

In the Spring 2012 issue of *American Educator*, Barak Rosenshine shared his 10 principles of instruction (see go.aft.org/ms7) and summed them up with this brief description:

The most effective teachers ensured that their students efficiently acquired, rehearsed, and connected background knowledge by providing a good deal of instructional sup-

port. They provided this support by teaching new material in manageable amounts, modeling, guiding student practice, helping students when they made errors, and providing for sufficient practice and review. Many of these teachers also went on to experiential, hands-on activities, but they always did the experiential activities *after*, not before, the basic material was learned.⁶

In a blog⁷ published in 2015, two of us (Mirjam Neelen and Paul Kirschner) explored to what extent Rosenshine’s instructional principles can be applied to the informal and nonformal ways of learning* in the workplace and to what extent they can enhance the work of learning professionals. Although Rosenshine’s principles were not initially intended for workplace learning, they have been demonstrated effective when applied and tested in the workplace context.⁹ In this article, we apply these same principles to workplace learning with students in CTE programs.

Principle 1: Begin a learning experience with a short review of previous learning.

Review at the workplace doesn’t mean glancing over an article that you read the day before (besides, rereading is a completely ineffective learning strategy that is likely to create vague familiarity with the content instead of a strong memory of the content¹⁰). Review could take place as an individual or collaborative exercise through reflecting on how newly learned content could be applied or curating recently learned content to better organize and more deeply understand it. It could also be a well-structured discussion with peers in which all involved can review and discuss a learning experience or moment experienced during working. In the CTE setting, this would involve a combination of (1) reviewing with the teacher how previous learning can be applied in the training situation and (2) discussing with the workplace mentor the relevance and importance of the previously acquired knowledge in the workplace.

Principle 2: Digest small amounts of new material, then practice that material.

In the workplace, it is very common to encounter learning tasks that involve practicing the entire task (such as removing an engine from a car or checking a patient’s vital signs), which means using all or nearly all of the skills, knowledge, and attitudes needed to complete the task. In the context of CTE, it is advisable to begin with easier whole tasks to learn and gradually move to more challenging ones.¹¹ For nursing students, low-risk tasks like taking vital signs can be practiced on peers, while higher-risk tasks like drawing blood or inserting an intravenous line can be practiced on medical manikins. To support this whole-task approach, instructors can provide simple *just-in-time procedural information* to students about how they will be expected to do certain things.¹² Microlearning is hot in many different learning settings, including workplace learning. When we search the literature on microlearning, we find many definitions; the one we find most useful in a workplace learning context is that “microlearning is an instructional unit that provides a short engagement in an activity

*Formal learning in the workplace is an extension of formal schooling and includes credentialing programs to certify learners’ competencies. Nonformal learning does not result in certification but still contains important learning elements in planned activities, and it can be seen as a form of tacit learning.⁸

intentionally designed to elicit a specific outcome.”¹³ For example, employers often provide point-of-need performance support tools in systems that employees use on the job (e.g., a help function that provides bite-sized pieces of just-in-time information to help employees learn how to use the system). In CTE, using the system itself is the practice.

Principle 3: Ask a large number of questions to support connections between new material and prior learning.

In every phase of the CTE learning process, it’s necessary to ask questions. Between demonstration and independent practice of the tasks, instructors ask questions to ensure that everyone understands the steps involved. Even while students are practicing, the instructors move around to offer assistance, demonstrating more complex steps in slow motion, asking questions, providing explanations, and offering help whenever it is requested or needed. Who will determine what the critical questions are to ask? Experts often find it hard to put themselves in novices’ shoes and truly understand what novices need to learn and how they can get there. Peer learning, where individuals have the same level of expertise, might work better because peers often have the same problems. It is also the case that in a CTE setting, one would expect the mentor to understand the needs of the CTE student as a novice employee better than a traditional senior employee. However, knowing what questions to ask to support learning is a skill that requires learning and practice. And being open and secure enough to admit that you don’t know something requires a strong person and a psychologically safe environment. As a result, we believe this principle should be applied to CTE by instructors and mentors constantly asking questions of students and encouraging students to ask each other questions.

Principle 4: Provide models to support learners for solving problems.

In CTE, instructors demonstrate the approaches and activities needed to solve problems in the workplace, while offering suitable supports (which we describe in principle 8) to assist the students’ own endeavors. In other words, they model the behaviors that the students need to carry out. This principle works particularly well for recurrent tasks that are rule-based processes performed in just about the same way from one problem or situation to the next.¹⁴ There is no difference here between traditional workplace learning and CTE. Some workplaces even have traditional classrooms, where instructors can use real-life situations to explain theoretical ideas. They might tell stories, provide hands-on examples, and show pictures or videos to guide students’ learning. Another option is simulations, where the vocational context and tasks are recreated. Simulations can be live, hands-on, or virtual, using VR (virtual reality) or AR (augmented reality) technology. Finally, students can also learn from each other’s experiences (so called vicarious learning) through discussion, observation, challenge, support, storytelling, and scaffolding from a more competent peer.¹⁵

Principle 5: Guide practice of new material.

Nowadays, we assume that people are capable of self-directing and self-regulating their own learning. This, however, disregards the fact that both require content-specific knowledge and that acquiring that knowledge is the goal in most learning situations. Simply put, novices are not very good at directing their own learn-

CTE instructors and mentors should constantly ask students questions and encourage students to ask each other questions.

ing.¹⁶ Although there are many advantages to less-formal learning, good guided practice is particularly effective—especially when first learning something new. Guided practice usually involves the teacher working through problems with students at the same time, modeling what they are doing in a step-by-step way, while checking that they execute each step correctly.¹⁷ A specific example is what is known as *I do, we do, you do*. It’s helpful to think of this as the *assistant looking over your shoulder*.¹⁸ While in the traditional workplace learning situation, a manager or coach could provide guided practice, in a CTE setting this is part of the pedagogy. And it is, or at least it should be, a requirement for all mentors. In the workplace, part of this guidance is offered within a more controlled and monitored environment (for example, carefully selected work tasks) compared to an unmonitored work area.

Principle 6: Check learner understanding at each point.

If the learning objective is clear and the steps to success are clear, the critical “learning points” could be identified as well. These wouldn’t be traditional ways of checking for understanding, but they could be pre-identified tasks to complete that show mastery of certain standards. Objectivity is key here. CTE has an advantage above both traditional classroom learning and workplace learning in that it provides two settings in which to check for understanding. In traditional workplace learning, this check needs to be informal (employees are not tested), and it is often based on proxies for actual understanding. In CTE, the workplace is complemented by the classroom, where testing is possible. This, however, requires good communication between the teacher and the mentor. In addition, *development assessment portfolios* play an important role in a CTE setting.¹⁹ These portfolios are formative and summative assessment instruments used to gather evidence of learning over time. At each moment in time, the portfolio gives information on the learner’s overall level of performance (i.e., task-centered assessment) and quality of performance on particular aspects of the task (i.e., standards-centered assessment).

Principle 7: Obtain a high success rate during practice.

This principle refers back to principle 5 and again, the guided practice piece is currently a gaping hole in the less formal approaches to learning, especially in the workplace. A high success rate cannot be obtained without a well-structured training/learning approach. This can be achieved through, for instance, *overlearning*: continued repeated practice of a task after some initial mastery of that task has been achieved. However, there is evidence that this has a greater effect on cognitive activity than on

motor activity.²⁰ Furthermore, constructive feedback that identifies and corrects inaccurate (or missing) skills and misconceptions further refines knowledge and skills. There is no difference here between CTE and workplace learning.

Principle 8: Provide scaffolds for difficult tasks.

This principle requires carefully designed processes. However, workplaces should be able to successfully implement such scaffolds. A more experienced peer or colleague looking over your shoulder is a good example. Also, performance support tools such as checklists, short instructional videos, and repositories of background information and how-to guides can be scaffolds. One challenge is that it's hard to know the exact level of scaffolding that each learner needs. How do you know when to remove a scaffold to enable the learner to move toward mastery? Maybe the assistant looking over your shoulder is the best scaffold to be found. In this respect, CTE offers the opportunity of taking a time-out and making use of the classroom environment to provide training prior to when deeper or different knowledge or skills are required. It also offers the opportunity of reviewing more difficult tasks after the fact to refine and hone the necessary knowledge and skills.

Although there are advantages to less-formal learning, guided practice is particularly effective—especially when first learning something new.

Principle 9: Require and monitor independent practice.

To implement this principle, you need to establish the standards that need to be met. This is probably easy for some tasks but very difficult for others. Take the case of critical parts of a process where making a mistake during independent practice could cost a lot of time, money, or even lives. The CTE setting is the ideal place for putting this principle into practice. After all, monitoring one's performance is an essential workplace skill that all employees are expected to be able (and willing) to do.

Principle 10: Engage learners in weekly and monthly review.

Review is very important. Effective forms of review require learners to recall what they have learned from their long-term memories, which reinforces and consolidates what they have learned. In addition, increasing the time between learning and review strengthens what has been learned—which is why these 10 principles call for daily, weekly, and monthly review. In the traditional workplace setting, this can be done through well-structured discussion groups, either face-to-face or in an online community of practice format using often-not-available predefined outcomes

(such as complex problems to be solved or novel tasks, for which employees are collaboratively figuring out the best solution or approach, learning together as they go). In CTE, these outcomes are predefined and the classroom setting is an effective and efficient place to do these reviews.

So, where does this leave us? In considering how to apply these principles in a workplace and/or a CTE learning context, we need to state the obvious first: as usual, the whole learning journey should start with a learning need and a learning objective. Then, there needs to be a careful analysis of the required steps to successfully achieve the learning objective. One thing to keep in mind is that in workplace learning, the instructor is often missing. It is important to acknowledge that this is a major challenge. It is not about control or about being rigid. It's about acknowledging how critical it is that a competent individual (or system) who knows the learner's skill or knowledge gaps offers appropriate (point-of-need) instruction, guidance, support, learning content, and constructive feedback. In CTE, mentors and managers play an instructor role. While this is expected of the mentor, managers need to take off their boss "hat" and truly support professional development (and have those just mentioned skills and/or competencies).

Given the importance of structure and review in Rosenshine's 10 principles, here's our summary of how they can maximize the effectiveness of CTE.

1. **Offer daily review:** Recap practical skills, safety procedures, and hands-on tasks completed in the last learning session.
2. **Present new material in small steps:** Break down new complex technical skills or processes into smaller, manageable parts, demonstrating each step, while making sure that the student doesn't lose sight of the whole task.
3. **Ask questions:** Ask questions about practical application, problem-solving, and decision-making in real-world scenarios, and create an environment in which students feel safe asking questions.
4. **Provide models:** Demonstrate tasks or techniques, modeling best practices and procedures during simulations and while executing real-life tasks.
5. **Guide practice:** Closely monitor hands-on practice, offering immediate feedback and correction.
6. **Check for understanding:** Conduct practical assessments or observe task execution to evaluate skill mastery.
7. **Obtain a high success rate:** Ensure students master each skill or technique at a high level of proficiency before progressing.
8. **Provide scaffolds for difficult tasks:** Provide step-by-step guides, checklists, or mentor support for challenging tasks.
9. **Create time for independent practice:** Give students opportunities to work on projects or tasks independently, applying their skills (make sure to choose the appropriate task level for the student).
10. **Engage in weekly and monthly review:** Conduct reviews of practical skills, including cumulative hands-on tasks or portfolio assessments. □

For the endnotes, see aft.org/ae/spring2024/kirschner_neelen_surma.

Advancing Tech Dreams

A Union-Driven Workforce Development Partnership for New York Students



In Micron's Girls Going Tech Español at Onondaga Community College, eighth-grade girls from the Syracuse City School District make binary bracelets.

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EDITORS: Let's dive into the heart of this partnership: the Advanced Technology Framework that schools and districts will use to develop their own career pathways in advanced manufacturing and semiconductor education. How did you develop the framework and how will educators use it?

LEO GORDON: The goal of this initiative is not just to prepare youth in New York to work for Micron but to introduce them to the many careers in and related to advanced technology. When the union began talking to Micron about creating new educational opportunities throughout New York, no one discussed Micron specifically; it was all about industry needs.

This is bigger than just education and bigger than just Micron—that's why this collaboration is working. We have been talking about workforce development and how it aligns to education. That remained true as we developed the framework.

At our first meeting to develop the framework, there was a room full of educational leaders, superintendents, district content specialists, and principals talking about what we should do. As a former CTE teacher, the first question I asked was, "What about the teachers?" Absent the teachers, this conversation should not be happening because the teachers are the closest to the students.

Within a few weeks, we had more than 20 teachers contributing to a Google doc, dropping in whatever they thought would interest middle and high school students in learning about advanced manufacturing and semiconductors. Then we expanded to a larger group of content teachers with different specialties—AutoCAD, mechanics, programming, etc.—who refined the content and added ideas for projects that students would find engaging. With teachers now leading the framework development, we mapped out the necessary skills, whether young people want to go directly to work in the industry or go to college.

Thanks in part to the CHIPS and Science Act, which President Biden signed into law in August 2022, Micron Technology plans to build the nation's largest semiconductor fabrication facility—and it chose a site in central New York. Realizing that this could open a wide array of career pathways to students in the region, leaders from the AFT, New York State United Teachers (NYSUT), the United Federation of Teachers (UFT), Micron, and New York state quickly developed a shared vision for introducing students to advanced manufacturing and semiconductors.

To learn about that vision and how it is coming to life, we spoke with David Chizzonite, Leo Gordon, and Robert Simmons. David Chizzonite, a former engineer, has been teaching at Chittenango Central Schools for 27 years—20 as a middle school science teacher and the past 7 as a STEM (science, technology, engineering, and math) specialist. He's also the president of the Chittenango Teachers' Association,

the advisor for award-winning student robotics teams, and the coach for girls' volleyball and boys' lacrosse. Leo Gordon is the vice president of career and technical education (CTE) for the UFT. He was a CTE student, then completed a CTE apprenticeship to become a CTE teacher in information technology, graphic design, art, and architectural drafting. After several years with the UFT Teacher Center as a CTE instructional coach, and nearly three decades into his career, he was elected to his current position. Robert Simmons, who began his career as a middle school science teacher with the Detroit Public Schools, is the head of social impact and STEM programs at Micron Technology. He is also a scholar in residence and scholar of antiracist praxis at the School of Education at American University and a member of the Diversity Scholars Network with the National Center for Institutional Diversity at the University of Michigan.

—EDITORS

The biggest advantage of having Micron at the table is we all know education can't pivot as quickly as industry. Micron will alert us to industry shifts in real time, and we'll be able to shift curriculum instruction and materials so that the students' skills are truly aligned to the industry.

Now that the framework is fleshed out and districts are getting ready to pilot it, we are positioning ourselves to be the national leader in the conversation. There's never been a time in my history of almost 30 years as a CTE professional that we have had workforce development, industry, government, education leaders, and teachers all on the same page.

"A lot of our CTE classes are teaching for ... a specific job. This is broader preparation for ... careers in advanced technology."

—LEO GORDON

DAVID CHIZZONITE: I'm excited about the framework and the partnership with Micron because of the opportunities they create to expand our STEM courses and to put more students on the path to STEM careers. As a STEM specialist, I've had the opportunity to develop many new courses and programs at our high school, along with some new programming at our elementary and middle schools. My focus is bringing a lot more STEM education, and especially engineering-based education, to our district. Among a few other roles, I am the advisor for our high school robotics teams. Four out of the past five years, we've earned the right to represent New York state in the VEX Robotics World Championship.

In developing the framework, one of the things I liked was that our goal was not to hand a teacher or a school district a curriculum in a box and say, "Here are your modules. Follow this formula to STEM

success." It's truly a framework. How each school district will adapt some of the ideas and practices in that framework is going to vary based on what that district already has in place and what it wants to put in place.

Micron's new semiconductor fabrication facility is going to be 15 miles from our high school in central New York. So my district has a vested interest in students preparing for careers in advanced manufacturing and semiconductor manufacturing. But a district a couple of hundred miles away doesn't have that exact same interest—they may have another technology company to partner with. Making the framework a very broad, general set of practices and ideas gives districts the ability to adapt it to what their local community needs and build on their existing courses and resources.

LEO: I agree. One of the reasons we kept the framework flexible is that teachers have different licenses and districts have different resources and needs. That's why the framework is for advanced technology—not just advanced manufacturing and semiconductors. Each teacher, school, and district can pull different parts from the framework to build out their curricula.

In New York, most of our CTE classes are very linear: you do this, this, and this for a specific certification. When we started planning the framework, we had to ask, "What is it we're really teaching students for?" A lot of our CTE classes are teaching for a specific skill, a specific job. This is broader preparation for lots of careers in advanced technology.

We didn't want to pigeonhole young people, saying, "This is the job in advanced manufacturing that you need to have." At first, the educators and administrators were talking about the highly technical clean room jobs. But Robert and other Micron staff emphasized that we shouldn't be preparing for one specific job. We should prepare for the industry itself. Fortunately, most entry-level jobs in this industry lead to higher-paying jobs.

We developed the framework to make sure educators had flexibility and scalability

at the school level. We also had the forethought to establish industry certifications that schools can offer if they choose. That does require specific licenses, along with classroom structures and CTE course sequences to earn those licenses.

Some districts may offer an elective to give students understanding of the industry; others may do a series of courses that open up multiple career pathways. Either way, we're bringing them real industry skills that they can utilize, such as learning the Python programming language. Maybe it's not specifically for Micron, maybe it's not specifically for advanced manufacturing, but Python is the same program whether you're doing advanced manufacturing or physics or construction and architecture. All the skill sets we placed in this framework are interchangeable for so many other industries.

DAVID: In the workgroup developing the framework, I think I'm relatively unique because I am going to be one of the people right on the frontlines who is helping implement it. Everything in that framework aligns with some of the coursework I'm already offering in terms of project-based and experiential learning. It's about taking a step back as a teacher and being more of a facilitator instead of a deliverer of content.

In my robotics classes and club, for example, there is no textbook. The first thing students do is take apart last year's robots. I don't sit down and teach them, "This is how you attach things together. This is what a drive base or a lift mechanism looks like." They learn by dissecting robots. When we go to competitions, kids see things that they want to use—but



A view of a Micron chip manufacturing plant in Virginia.

AP PHOTO / STEVE HELBER

there's no blueprint, so they have to design and replicate it themselves.

The framework emphasizes this type of learning by necessity through experience. It also emphasizes collaboration, which is the heart of our teamwork. In robotics competitions, students have to work with their team and with other teams. It really helps broaden students' capacities, which I know our employers are looking for when these students go out into the workplace.

One of my students said, "I feel like I'm running a marathon, but the finish line keeps changing." And I said, "Exactly. Welcome to engineering." You're always trying to improve. Somebody didn't invent the cell phone and say, "That's it. The cell phone is finished." We continue to innovate. Those are sometimes hard lessons for students, but they're good lessons.

I am really excited about how this framework fits with some of the things we're already doing and also gives us a pathway to expand opportunities for kids. We have to start at pre-K and kindergarten to build an engineering mindset.

Building an engineering mindset is hard for teachers—myself included. It goes against some of our long-ingrained practices. Teachers need to become comfortable with the idea of their students having different ideas and producing different things. The process is just as important as the outcome. The framework helps build that kind of capacity into the coursework. It's not about a sequence of predetermined classes; it's about developing an engineering mindset in all your classes.

Drawing from the framework, there are a few specific courses I hope we can add for our high schoolers. We used to have an electronics course (which ended when the instructor left our district), and we need to bring it back as a foundation for advanced manufacturing and semiconductors. Then, since the new Micron facility will be so close by, we'll need a hybrid class about semiconductor functioning and manufacturing. I'm excited about that because there's some really amazing science involved, including chemistry and physics, plus technology. The last course I'd love to see developed is resource management and recovery. Where do the materials for semiconductor manufacturing come from? That includes mining, but also reusing materials that are already in products. How can we repurpose that material instead of having it wind up in

a landfill? Those are important pieces of the manufacturing process.

EDITORS: It's interesting that Micron is more focused on education and workforce development for the industry than on filling jobs at Micron. How does this new initiative fit with Micron's larger views on education?

"We see this [partnership] as a continuation of our effort to ensure young people have a pipeline not just to a job but to a dream."

—ROBERT SIMMONS

ROBERT SIMMONS: There are no Micron employees—or employees in the semiconductor industry—without K-12 education. There's a reason that Micron has a team of people working with K-12 educators and that most of the people on that team come from K-12. We need to partner with those who are closest to communities and closest to kids: the teachers. We see this as a continuation of our effort to ensure young people have a pipeline not just to a job but to a dream.

One of my colleagues said, "If the community isn't healthy, it doesn't matter what we do at Micron. So we need to make sure we're doing our level best to contribute to the greater good." And I believe through this partnership we're contributing to the greater good. We're also learning from educators. Colleagues have told me that they reimagined how they engage with young people when they're volunteering and how they frame interview questions for new college graduates because of learning from educators.

We firmly believe that our partnership with the teachers union demonstrates that corporations, school systems, and unions can work together for the betterment of young folks. I started out as an AFT teacher

in the Detroit Public Schools, and I'm a product of my hard-charging, hardcore United Auto Workers (UAW) grandfather. So I am here because of the union. My grandmother was able to support our family when my grandfather passed because the UAW ensured his union benefits were handed down to my grandmother. I'm always humbled and honored to stand in solidarity with organized labor.

With all this discussion of the Advanced Technology Framework, one thing I want to clarify is that you don't need to be an engineer to work for Micron. We need people in finance, human resources, communications, and more. No one wants an engineer trying to run payroll.

LEO: That's a good point. As a CTE person, I always look at the career clusters we have and the disciplines in which we teach. We can argue that Micron covers almost every career cluster: architecture and construction, maintenance and operation, art and advertising, technology and manufacturing, communications, business management administration, education and training, government and public affairs, hospitality, and legal. That's what makes this industry so different than what we're used to in the CTE space. When we're building out a CTE class, normally it's for one specific career cluster. This is a catchall. We're making the state department of education and school districts think differently because we're not talking about one particular class.

DAVID: I agree—and I think the framework, even though it's focused on technology, helps develop broad skill sets. In my robotics classroom, our curriculum is built around different principles of engineering; there's mechanical engineering, electrical engineering, computer engineering, and coding. But there are also other pieces of the puzzle that the kids learn they need to have, like collaboration.

Just as a company has to recruit people to do marketing and graphic design, our kids have to recruit teammates to do tasks that they don't know how to do. I love Robert's comment about an engineer doing payroll. I've seen engineers attempt to do payroll, and Robert is absolutely correct—it didn't work out so great. You don't want the engineer trying to make your logo either.

The kids discover that for themselves. One team had a student dedicated to doing



Gabriel Robinson, captain of the Chittenango robotics team, and David Chizzonite with one of their award-winning robots.

COURTESY OF NYSUT

the technical writing for their engineering notebook. That's a full-time job for one kid. He wasn't really strong in engineering or computer programming, but he was really good at documenting their work—and a vital member of the team.*

ROBERT: David's robotics teams sound fantastic—and they remind me of a couple of my favorite programs for kids. Chip Camp and Chip Camp Jr. are programs we run for third- through eighth-graders that are all about semiconductor education. Young people learn some of the basics of what it takes to make a semiconductor and some basics of STEM. They usually apply their learning to the memory used in rockets and do a rocket launch.

Chip Camp can range from one to three days. It's dependent on the community because we co-construct each camp with the school district and local educators. We don't charge, and we offer hot meals. If needed, we provide transportation too. At the end, we also invite families to join in our celebration.

One important feature is that we work with local educators. Many educators have said that they take some of the lessons back to their classrooms, and then their colleagues may adapt those lessons too. So we believe that Chip Camp has a multiplier effect, not just for students but also for educators.

*To learn more about David's approach to guiding his robotics teams, see "Learning by Necessity: How Robotics Develops an Engineering Mindset" at aft.org/ae/spring2024/chizzonite.

Two other programs we run are Girls Going Tech, which provides STEM role models for female, non-binary, and gender-fluid middle school students, and Careers in a High-Tech World, which shows high school students a day in the life at advanced technology businesses. These programs are flexible, so they are different in different communities, just like Chip Camp. We also partner with Norfolk State University for STEM at the Beach.

DAVID: These sound like great ways to get students

excited about STEM. Another way I've found is through the environment. Since we're near the Great Lakes, I already have projects for second- and third-graders that deal with water conservation and keeping our water resources clean. With the new Micron facility, which will need a tremendous amount of water, I'm adding projects for middle and high school students on resource management. Micron will be pulling water out of Lake Ontario. That water has to be brought in, treated, used, and then retreated to be returned to the lake. Students are amazed to learn that we can't put perfectly clean water back into the environment; it would disrupt the ecosystem. The water chemistry has to be adjusted to match the water chemistry of the lake.

EDITORS: One shared goal driving this partnership is bringing more students of color and more young women into advanced technology fields. How are you accomplishing that goal?

ROBERT: The folks who are underrepresented in STEM are a core part of our conversation at Micron. We're actively trying to ensure that our workforce continues to bring in more folks from underrepresented communities. Personally, it's important to me because I'm the son of a Spelman-educated mother. It's deeply personal to make sure that young people of color have opportunities.

In central New York, we're committed to working with communities where we

know young folks don't have access to STEM opportunities, like the South Side of Syracuse. We built the Youth STEM Funder Collaborative and brought in the nonprofit STEM From Dance, which encourages girls of color to learn STEM by designing and building technology to integrate into the dances they choreograph and perform.

When I first joined Micron, we launched a major K-12 STEM collaboration with a university outside Idaho (we already had many partnerships in Idaho where our company was founded). It was Chip Camp with Norfolk State University, a historically Black university. All of the counselors were Black women from the College of Engineering.

We also take pride in our employee resource groups and in making sure that they are strong, that they're healthy, that they have resources, and that they have an executive sponsor who will listen and be a liaison to carry forward issues. The team that I lead is very diverse—they are from all walks of life, races, genders, ethnicities, sexual orientations, ages, locations. All the ways in which diversity shows up in our society, you see it in who's on our STEM education team.

There's still work to do in the tech sector, as is the case in all sectors, and we remain committed to the work. One reason this partnership is working so well is that the leadership of the AFT, NYSUT, and the UFT consistently discuss making sure that underrepresented students—in particular, students of color and girls—have access to opportunities in advanced manufacturing and semiconductors.

LEO: In New York City, which is highly diverse and highly segregated, we were intentional when we chose the schools to be involved in this partnership. We looked for diversity in the students and in the schools' leadership. It was intentional that we brought Micron to the Brooklyn STEAM Center headed by a former CTE student, turned CTE apprentice, turned CTE principal who is of Jamaican descent in a school that's 80 percent students of color.

As we grow these programs, if we are going to be the example for the nation, we have to make sure we call out the disparities in opportunities for underrepresented students. That's the only way we're going to help close the gaps in employment that hap-

pen in our low-income families, the gaps in education that happen in our inner cities. We have to be intentional to make true change, and we have to be confident enough to have uncomfortable conversations.

ROBERT: When I think about central New York, and communities of color in particular, I think of growing up in Detroit, where working in manufacturing provided a life that I doubt my family would've had if my grandfather weren't at Ford Motor Company. What I do know is that his job killed him, because he worked in the foundry.

What settles my soul with Micron is that it's clean manufacturing. You can come out of high school, become a technician, stay for 30 years (if you want), and retire from Micron with enough money to live on. Whereas my grandfather made enough money but died early because of the hazards of his job. To me, access to clean, safe manufacturing is an equity issue. Micron provides those opportunities. And there's no better way to spread those opportunities than by working with the AFT, NYSUT, and the UFT.

LEO: I am proud to be a part of something that's going to be life-changing for young people.

EDITORS: Thinking about educators and union leaders across the country, what recommendations would you offer if they want to develop this type of workforce development partnership?

LEO: I knew the connection between school and work at a really early age—and CTE has been my life. But as I progressed in my career, I've found that a lot of our young people haven't made that connection. Across the country, there's been too much emphasis on going to college—without an idea of what you want to do or what working in various fields is actually like—and too little emphasis on industries that need a skilled workforce and provide pathways for developing those skills.

This collaboration is different than what I've seen in CTE before because we had the New York State Education Department and Office of Strategic Workforce Development, Micron, and the AFT, the UFT, and NYSUT deeply involved. It is hard work to get everybody to agree with the trajectory of an initiative that

has national implications. Making sure everybody at the table understands the long-term goal and is aligned is probably the most challenging part.

Throughout the spring and summer of 2023 when we started this conversation, money wasn't a factor. We asked, "What's best for students? What's best for the workforce? What's best for the future of semiconductor education in New York state?" Discussions of money came after we had a shared vision.

And if there's one lesson that Robert and I learned, it's that communication is critical. When we started developing our communication plan, we did frequent check-ins to maintain engagement with all the stakeholders. As you build something like this, you can't predict the obstacles. And people don't always hear things in the way they were intended. When something is miscommunicated or an email goes out with misinformation, it's always best to just pick up the phone and have a conversation.

ROBERT: I agree. This reinforces the need for people to be in community and communicate in the process of building public-private partnerships.

"A career pathways partnership can be the perfect springboard ... to create new opportunities for our youth."
—DAVID CHIZZONITE

DAVID: Communication is key at the local level too. When you have a superintendent, a board of education, and a union that work together, a collaborative relationship is going to produce much more meaningful, productive results.

The message I receive from folks like Melinda Person, NYSUT's president, is "Work together, solve problems." The

framework is a great example of that. It's the union, the state government, and Micron working together to make new career pathways for our students. Being collaborative doesn't mean you're going to agree on everything, but as long as you can maintain that collaborative relationship, you can disagree respectfully and still move forward.

The union is more effective when you develop strong relationships. You'll see it when negotiating a new contract and handling the myriad issues that a union leader has to deal with every day. I recently spent an afternoon in our assistant superintendent's office figuring out how to fund new materials for several programs, including 3-D printing and drone technology. If you don't have a collaborative relationship with your administrators, a career pathways partnership can be the perfect springboard to start to work together. Everybody is excited to create new opportunities for our youth.

ROBERT: I'll share a recommendation for industry leaders: listen to and learn from educators.

Other than my mother and grandmother, my teachers were the most influential people in my life as I was growing up, especially Deborah Peek Brown—my sixth-grade teacher for an integrated science class. Years later, we became colleagues. She was teaching in the Detroit Area Pre-College Engineering Program when I joined as a CTE teacher. Because of her, my entire career as a teacher and administrator has been centered around STEM education and workforce development.

Perhaps my most impactful experience as an educator was building a workforce development program largely for students who were under-credited and overage at a school where 50 percent of the students had been incarcerated. Through our CTE and workforce development programs, 89 percent were not incarcerated again; they lived productive lives.

I always say that the most hopeful people in the world are educators. The group of educators working on this project, their excitement, motivates me every day. I can pay forward what education has given to me by providing educators and young people an opportunity not just to work at Micron but to realize their dreams. □

Creating a Healthy Community

How a High School in a Hospital Launches Careers and Enhances Well-Being



By Pamela Hummer

On a busy Wednesday morning, several high school teachers are expertly directing a lively group of students gathered around their lockers to the correct places to begin the school day. But even though the hall has lockers and classrooms and school posters, this is not a school building; it is the MetroHealth Main Campus Medical Center, and the high school students are wearing white hospital coats and genuine hospital ID badges.

This is the Cleveland Metropolitan School District's Lincoln-West School of Science and Health (LWSH). Its partnership with Cleveland's MetroHealth main hospital is a unique model for experiential learning and career preparation.

In this high school housed in a hospital, students study a biomedical curriculum with a STEM (science, technology, engineering, and mathematics) focus, in addition to more traditional high school courses. They learn firsthand about the variety of careers available in a hospital system and work one-on-one with

a mentor who is a healthcare professional. They receive training in advanced healthcare programs such as Stop the Bleed, the American College of Surgeons program that teaches how to stop bleeding in a severely injured person, and Code Red, which is training for an emergency that includes CPR, AED (automated external defibrillator), and first aid certification. Students have access to internships and networking opportunities in the hospital system, which can lead to jobs in the system. Juniors and seniors also have an opportunity to earn state tested nurse aide (STNA) credentialing in an accelerated three-week program in the spring.

"This school—a high school embedded in a hospital—is the only program of its kind in the country," explained Shari Obrenski, president of the Cleveland Teachers Union (CTU). "The former CEO of Cleveland's MetroHealth hospital system, Dr. Akram Boutros, had a vision about what a hospital system should be to a community. And it's far more than just taking care of the physical health of the people. He really was taking a look at the determinants of health and asking, 'How can our hospital impact those determinants of health?' And one of the determinants was around education, and how the hospital system could be part of that."

In 2015, Dr. Boutros and Christine Fowler-Mack, then the school district's chief portfolio officer, were both part of Leadership Cleveland, a local program for community leaders designed to enhance their collaborative leadership skills and deepen community impact.

Pamela Hummer is the editor of Critique, the Cleveland Teachers Union newspaper, and the monthly newsletter of the Northeast Ohio AFT retirees' chapter. A retired early childhood teacher and former union representative, she enjoys traveling and attending Cleveland cultural and sporting events with her husband, also a retired Cleveland teacher and former union officer. She volunteers weekly in several Cleveland preschool and kindergarten classrooms.

PHOTOS BY SUZANNAH HOOVER

They wanted to create leadership experiences for students around a hospital setting and designed the high school within the hospital.

Local philanthropic organizations provided start-up funding. With the strong support of Dr. Boutros and the backing of David Quolke and Eric Gordon, then the union and district leaders, the program came together. The Lincoln-West School of Science and Health opened in the fall of 2016, and the first senior class graduated in 2019. “When the top people in the highest roles in the organizations have a deep belief in the program, anything is possible,” said Juliet King, LWSH’s principal.

That level of commitment to and support of the partnership continues under MetroHealth’s current CEO, Dr. Airica Steed. “Our CEO is on board with the partnership and ready to remove barriers to its success,” said Tiffany Short, MetroHealth director of external education and workforce development. “She is always willing to talk to a student and has even asked to be a mentor! Dr. Steed believes in the vision and is committed to the success of our students and the program.”

Preparing for a Healthcare Career

In grades 9–10, students attend regular classes in the Lincoln-West school building, and they also attend regular MetroHealth experiences—presentations, trainings, and activities—at both the school and hospital locations. In December, for example, 10th-graders attended a presentation on nutritional disparities and their relationship to community health. It included information about nutritional resources available in the community, a discussion with a dietitian, a cooking demonstration, and an explanation of the healthy plate model.

In grades 11–12, students take all their classes at the hospital. They have regular high school classes on Monday, Tuesday, Thursday, and Friday. The LWSH wing at the hospital campus has classrooms for core and elective subjects such as English, math, history, psychology, chemistry, Spanish, and various biomedical sciences, with teachers assigned full-time to the site.

Juniors are assigned to mentors based on their interests and meet with them at least once a month. They also attend lectures and presentations by different healthcare professionals, learn about a wide array of career possibilities in the hospital system, and participate in a variety of healthcare experiences. Seniors are engaged in internships on Wednesday mornings. They begin in science teacher Jessica Wardzala’s large state-of-the-art science lab, where they use a QR code to link to a Google document. On the document, they sign in and record any problems or concerns they may have. Wardzala monitors Wednesday attendance, since there are no regular classes in the morning for seniors on that day, and uses the information provided by students to address any issues.

On a drab Wednesday in January, MetroHealth secondary education specialist Salethia McPherson energetically delivered morning announcements to the quiet group of seniors, including opportunities for afterschool activities that could be included on their college applications and important details about applying for the spring STNA certification program. Her comments incorporated an encouraging “pep talk” and some specific instructions before sending the seniors to meet their internship supervisors throughout the hospital.

On Wednesday afternoons, seniors participate in a capstone study experience. This is a regular course in every senior’s weekly schedule, in which they journal about their internship experiences from the morning, recording their observations and assessments. As a culminating activity, students use this information to study problems or situations they observed at the hospital and devise possible solutions. One recent capstone study was about improving the emergency department patient experience. Students discovered that the ED was short-staffed on weekends, one of the busiest times. The students proposed possible solutions, such as compensation incentives for those who work on weekends and expanding and enhancing the ED area to better accommodate patients.

Avriel Chaney, a teacher and CTU chapter chair, said the senior-year capstone observation and intense journaling experience motivates students to notice details and interactions. It allows for self-assessment, challenges some preconceived ideas of the realities of working in the medical field, and gives students a more realistic perspective about those career choices.

For its healthcare-related courses, the school uses a curriculum developed by Project Lead the Way that combines the study of biology with principles of biomedicine. Students engage in case studies with a series of labs, dissections, and other procedures to determine diseases. They learn how to measure blood pressure and what the normal levels for blood pressure and cholesterol are. They study human anatomy and physiology, along with medical interventions and biomedical innovations.

Lincoln-West students study a biomedical curriculum, learn about health careers, and train in advanced healthcare programs.

Students also get training from emergency department doctors, ultrasound technicians, and other healthcare professionals. They get hands-on experiences in various departments in the hospital system and see firsthand not only different medical careers but jobs in other areas such as human resources, finance, business, nutrition and culinary services, and information technology.

“We are building a school-to-workforce pipeline,” said Principal King. “We are getting students engaged in STEM, and this model is changing the game in so many ways. We hope this inspires others to see education in a different way.”

Although LWSH is highly regarded and students are thriving, there is one major challenge: space. In grades 11–12, due to space limitations at the hospital, only 50 students can be accepted in each grade. “We are very hopeful now, with the opening of the new

MetroHealth Glick Center and additional available space, that more students can continue in the program in grades 11–12,” said Obrenski. “In 9th and 10th grades, we have about 100 students in each grade. But in 11th and 12th grades, the hospital can currently only take 100 students total, 50 in each grade, so the program is losing up to 100 students in grades 11–12. We need to fix that and make sure that we can accommodate all of them—not half of them—in this valuable program.” The need to accommodate more students is especially pressing because of the success LWSH is having. Its graduation rate of 85 percent¹ is 10 points higher than the district’s graduation rate.²

One of those graduates is Khandah Abdullah, the 2023 valedictorian; she now attends Cleveland State University majoring in biology. “I was interested in studying medicine but had limited knowledge about the high school, even though my brother graduated from Lincoln-West two years earlier,” she said. “I didn’t realize how unique the program was and what great opportunities it provided.”

She was planning a career in nursing when she entered the school in the fall of 2019. In her junior year, her mentor was a nurse. “I learned a lot from that experience and from my senior-year internship about the reality of a nurse’s schedule, duties, and expectations.”

Abdullah participated in the white coat ceremony in fall of 2022 and obtained her STNA credentials in the school’s special three-week program in the spring. With her experience and training at MetroHealth, she is now qualified to work as a patient care nursing assistant (PCNA).

“I wouldn’t be able to work at this level, a PCNA, without the experiences I had through the Lincoln-West/MetroHealth program,” she said. “Other college students I meet are surprised because they are just starting to learn those skills now. I learned them in high school.”

The exposure to real career experiences was valuable in other ways, too. She learned what it takes to run a big hospital, all the behind-the-scenes people and departments. “There’s a lot more than doctors and nurses. There are so many specialties and other career opportunities, and they aren’t all in direct patient care. We learned about many different jobs in a hospital system. This program helped me find my passion.”

Responsibility and Relationships

MetroHealth is a unique partner in that it is a community hospital, and addressing the social determinants of health—such as affordable quality housing and education, nutritious food, public transportation, and well-paying jobs—is one of its key goals. Cleveland has some of the best healthcare institutions in the world, but its population also has some of the worst health outcomes. Across two communities just two miles apart, there is a 23-year difference in residents’ average life expectancy.³ This is in large part because the social determinants of health have a huge impact on health and well-being—often far greater than healthcare⁴—and Cleveland is the second-poorest large city in the United States.⁵

Although the LWSH program has open enrollment for students throughout the district, most of its students live in the MetroHealth hospital area. The hospital is located just west of Cleveland’s downtown, in a racially mixed area with a significant Hispanic and Latinx population. While English is the most preva-



lent language, Spanish is second, with 21 percent of residents speaking it at home. The median annual household income in the area is \$32,000.⁶

MetroHealth’s view is that Greater Cleveland’s overall health—the fabric of the community and its quality of life, culture, economy, and future—depends on the health of its residents, and that MetroHealth has a personal and collective responsibility to address these disparities and improve health outcomes for all.

CTU President Obrenski believes this sense of community responsibility was, and is, a crucial factor in the success of the partnership. “In a collaboration like this, you need some level of altruism in the partners. The product of a health system is people, and MetroHealth sees our students as valuable contributors to a healthier community and invests in them. It’s a win for the students, the healthcare system, and the community.”

Gordon echoed her thoughts on MetroHealth as a partner: “The viewpoint that the hospital system should serve the community and be an anchor in the community was key to the partnership. Also, we had principled leadership in all three areas—the hospital system, the school district, and the union—who were willing to work together and be innovative.”

Director Short stressed the importance of buy-in from leadership to the partnership’s success. “Leadership support is essential. For us at MetroHealth, we believe it’s important for students to see different professionals, many who look like them and have had similar life experiences. Our leadership team always shows up for our students.” She told about an emergency room doctor who faced challenges through school; he was not an A student and even considered dropping out. But with resiliency and hard work, he became a doctor. Through his story and experiences, students see that there are all kinds of different paths to a career goal.

McPherson, the education specialist, said that organizations looking to establish partnerships like this one need to understand that it’s more than just the curriculum; building relationships and trust is important, and commitment to the partnership is a service to the students and community. “If you start by building good relationships though, everything else can be worked out.”

“The problem-solving approach worked for us,” explained Quolke. “Shari Obrenski was the CTU vice president representing high schools and special schools and the director of negotiations when LWSH was getting started. She took the lead. CTU’s nurses chapter chair, Pat Forrai-Gunter, was at Lincoln-West and had a great relationship with MetroHealth, having worked closely with

them on creating mobile health units in the schools. Christine Fowler-Mack represented the district in the planning process. They worked with all stakeholders to develop a contractual memorandum of understanding (MOU) and any changes to the school's academic achievement plan."

Cleveland has a portfolio of innovative schools, and each one has a specific MOU agreed upon by the union and the district. "CTU members don't give up their rights when they choose to teach in a special school like LWSH," emphasized Quolke. "Unless something unique to that program is spelled out in the MOU, all language in the collective bargaining agreement is intact. Teachers and staff who wanted to come to this new school had to apply and interview, and they knew ahead of time what the expectations were. Those who were selected were invested in the school and wanted it to succeed."

Chaney, the CTU representative for LWSH, agreed with the cooperative spirit of the staff. "No plan can anticipate every problem, and the contract and MOU don't have specific language for every situation we may face—we're partially housed in a hospital, not a school building! But we try to maneuver gracefully through any issues, to be fair, and to work in the best interests of students and staff."

Principal King said MetroHealth, the school district, and CTU work together well to deal with issues as they come up. "We all want the same thing, so we work together to work out the kinks as they arise." A team of teachers meets with the principal, the campus coordinator, and two MetroHealth representatives on a regular basis.

All stakeholders agree communication is key, and they recommend over-communicating. They established a teacher "ambassador" for each grade level, whose main purpose was communicating with other teachers at that grade to make everyone aware of current teaching topics, expectations, and opportunities. For example, when teachers were instructing on the topic of health disparities, including environmental disparities in the community, MetroHealth provided information about lead poisoning with real-life examples. In another instance, students were engaged in a dissection of cow eyes. A physician from the hospital's ophthalmology department provided a deeper experience for students. Side by side with teachers, the hospital's medical professionals provide in-depth explorations that go beyond books and classrooms. And best of all, "When a 12th-grade teacher let us know that there were some struggling seniors, our hospital residents helped tutor them," added Short. "More communication and collaboration can make the difference for students."

Overcoming Challenges

MetroHealth and LWSH's shared commitment to students and relationships enables them to be good problem solvers. Their revamping of the STNA certification process offers one example. Originally, it was available to up to 10 interested seniors in weekly afterschool classes held throughout the spring semester at the local community college, Cuyahoga Community College (Tri-C). Tuition for the class was paid for by a grant, and the school district supplied transportation, meals, and scrubs. Stretched out over the semester, with state testing scheduled in the spring right around prom time, students

tended to lose focus. The STNA certification passing rate was low, and there was a possibility that the grant would be rescinded.

The school changed the plan. Since LWSH is a year-round school, the STNA program became an intensive, three-week program held entirely during the school's long spring break between its third and fourth marking periods. Study tables were set up in the morning, and individual support was available. The result? A 100 percent passage rate last spring for LWSH candidates.

Abdullah, the 2023 valedictorian, was one of the students who participated in the STNA program. "I think it was harder, all concentrated in just three weeks," she said. "But it was *finished* in just three weeks, and we all passed!"

Being flexible when dealing with challenges is vital to the program's success. "There is no one size fits all. Every year is different, and our focus and plans and professional development may need to change," added McPherson. While the overarching objectives are the same, the day-to-day of the program can be different.

The benefits of this partnership continue to grow.

"The partnership between Lincoln-West and MetroHealth began with a very different vision than many specialty schools that accept only certain qualified students," explained Obrenski. In this school, the original vision was to enroll kids from the nearby community, if they chose to attend, and genuinely involve them in all of the work of the hospital, exposing them to all of the different jobs associated with the hospital, teaching them about health factors, and improving health and economic outcomes for them and their families. The vision has only grown from there.

Beyond the health-focused curriculum, the partnership provides wraparound services to help every student succeed.

Students are finding many personal connections to their learning. For example, when AFT President Randi Weingarten visited LWSH, students were engaged in a Stop the Bleed training. They were told that there are many different types of traumatic bleeding that they might encounter and were asked what type they wanted to focus on. Every student chose gunshot wounds because that's what they too often deal with in their community. They have all been impacted by gun violence in some way, and now they have the knowledge and skill to increase a victim's odds of survival.

Another example is an LWSH student who learned to identify stroke symptoms. When he recognized that his grandmother was having a stroke, he called an ambulance immediately. His grandmother received timely treatment for the stroke in the ambulance on the way to the hospital, and it greatly improved her outcome.

“There are lots of stories like that,” added Obrenski. “Students are working in the hospital, both as interns and in the summer, and graduates of the school are now employed in the hospital. Students and their families and communities are benefiting from their healthcare knowledge and employment opportunities.”

The community-focused aspect of MetroHealth is central to the partnership’s success. People of color face the effects of racism every day, and societal and economic inequities are apparent in their poorer health outcomes.⁷ Adding to the problem, mistrust of the medical field is more common among Black and Latinx people than white people, often as a result of discrimination.⁸ By enrolling and then employing students from the community, the partnership is helping to address some of the inequities and rebuild trust.

“We are trying to create pipelines out of poverty,” said McPherson. “It starts with students from the community having meaningful, hands-on experiences in the healthcare field. That leads to building valuable skills that can be applied to a job or career that can economically sustain a household, and that creates better, healthier communities. That’s the golden ticket, that’s the pipeline, and it starts with kids from within the community.”



Beyond the health-focused curriculum, the partnership provides wraparound services and other components to help every student succeed. “Once you’re here, you are part of the MetroHealth family,” asserted Short. Many of the students will be the first in their family to attend college. Part of the partnership’s goal is to make sure students have an after-graduation plan—and a plan B. The partnership provides them with help, even after graduation, to navigate uncharted territory through mentors who have had similar experiences.

Building relationships and trust with parents and families is another important component. Students have big decisions ahead of them, and the mentoring program and professional development are more successful when families are on board, too. Short shared an example of MetroHealth’s IT Workforce Development Program. Some parents were not tech-savvy and did not understand the possibilities of this program; during COVID-19, they wanted to pull their children out of it. Short explained that students who completed the IT program would graduate with three separate and valuable IT certifications worth 17 college credit hours, giving students a \$40,000 annual earning capacity right out of high school. Helping families understand the opportunities the IT program opened up for students was essential.

MetroHealth personnel have attended parent-teacher conferences and helped families access available resources and services, including workforce training classes. “We believe if a student is in a distressed situation at home—food insecurity, parents working several jobs, students providing sibling care—there will be problems in the classroom. There are resources MetroHealth can bring to help these students and families,” said Short.

Those who helped establish and who continue to work with the program are proud of its benefits for students and the community. Chaney, an LWSH teacher, is proud of the way the program is training students from the neighborhood, giving them knowledge, skills, and opportunities to serve and give back in their own community. “The partnership sees services that the community needs and trains students to fill those gaps in healthcare needs, to serve those who look like them and live in their community.” She noted that there are about 20 former and current students working at MetroHealth in certified healthcare positions as well as food services and other departments.

Gordon witnessed a freshman class in a cadaver study analyzing blood to determine how a person died and was impressed by the science and math skills used in the activity. Other students were learning how to take vitals on a fussy robotic patient. “Experiential learning is a great motivator,” he said. “Students were deeply engaged, inspired, and interested in their work. In this program, students are engaged in productive tasks worth their time and struggle, preparing them for careers. And MetroHealth gets the advantage of having young people ready to fill important job openings in a healthcare staff shortage.”

“The thing about MetroHealth that sets it apart is also a challenge in replication because of the mission of the hospital,” said Obrenski. “The hospital is concerned about not just the physical health of the people they serve, but really addressing all of the determinants of health in a more holistic way. That’s what makes this program successful. You can’t replicate this with just any hospital or organization. You need an administration that is committed to the larger mission. That’s a really important component and something that I think gets lost. I’ve heard them talk about the nuts and bolts of the program, but to me, that commitment—that’s where the secret sauce is. And now, with the opening of the new MetroHealth Glick Center, we are hopeful that this important program can be expanded to include more students.”

On a cold Wednesday morning in January, Cleveland’s LWSH juniors were in the hospital’s professional learning center. The presentation was on nursing: the various types of nursing roles and the education requirements for what is currently the highest-demand job in healthcare.

And in the science lab, just before the seniors in white lab coats and hospital badges went to their internships for the morning, McPherson ended the announcements and her spirited pep talk with a request of the students: “I need an affirmation word for today.” A young lady shyly raised her hand and held up a copy of her recent report card. “My word for today,” she said, “is PROUD.” □

For the endnotes, see aft.org/ae/spring2024/hummer.

Empowering Futures

How Salem's Comprehensive CTE Programs Are Shaping Students' Lives



JAIMÉ CAMPOS / SALEM NEWS

By Mario Sousa

As an immigrant scholar who arrived in the United States in the mid-'90s at 12 years old, I was steered toward career and technical education (CTE) programs due to presumptions about me as a bilingual immigrant. Regrettably, that meant I was not exposed to college options and had limited interaction with my high school counselor. Like many other multiple language students, the message I received was that college was not a viable path for me. The only postsecondary options I was introduced to were direct-to-industry and union apprenticeships. This exposure, along with employability and entrepreneurial skills, was provided by my CTE instructors, who played a critical role in preparing me for life after high school. I ventured into entrepreneurship during my sophomore year with my instructors' support after completing my first year in the vocational program. They guided me in launching my own construction business in high school and promoting it to all teachers.

Mario Sousa is the director of career and technical education at Salem High School in Salem, Massachusetts. Previously, he was a lead carpentry teacher for Somerville Public Schools and operated a successful construction company for 12 years.

This endeavor became a cornerstone of my professional experience and led to 12 successful years in construction company management.

Subsequently, I had the opportunity to become a substitute teacher for the very program I had graduated from, and this unexpected experience was a turning point in my career journey. I decided to pursue a degree in occupational education. My initial college experience was marked by challenges, including learning how to navigate college applications, needing remedial courses to bridge academic gaps, and adapting to online learning platforms. Nonetheless, I persisted and ultimately obtained my degree while teaching carpentry to students who also needed the access to postsecondary planning that could have greatly benefited me. My journey strongly influenced my commitment to providing CTE that supports all students in maximizing their postsecondary education and career options.

In today's modern educational landscape, CTE is a powerful force that can transform students' paths to success. As my story shows, those paths are no longer confined to a rigidly linear trajectory. Through CTE, students receive a personalized approach that aligns with the ever-evolving needs of our global

economy and provides them flexibility and support to achieve their educational and career aspirations. To do this successfully, CTE programs feature standards-based course content, career pathways guided by industry professionals, and evaluations that foster continuous improvement. In this article, I explore the role of these elements in a comprehensive CTE program at Salem High School in Massachusetts.

Bridging Academics and Practical Skills in Salem

In the past, vocational education often focused on preparing students primarily for direct entry into specific industries, with limited exposure to other career pathways.* However, contemporary CTE programs provide a highly comprehensive education that goes beyond vocational skills. Students enjoy broader opportunities and are actively encouraged to prepare for diverse pathways, including direct entry into industry or union apprenticeships, or to pursue higher education. They are exposed to advanced coursework and receive instruction in safety practices, embedded academics to strengthen core knowledge, entrepreneurship lessons, employability skills development, and computer literacy and applications. The aim is to provide students with a robust foundation of soft and transferable skills, empowering them to excel in various careers and adapt to evolving job markets.



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CTE is a dynamic bridge between academic learning and practical skills, addressing the growing need for a workforce equipped with both knowledge and hands-on expertise. A fundamental aspect is its integration with academic standards. These standards in CTE curricula underscore the belief that technical expertise and academic proficiency are mutually reinforcing, working in tandem to give students a broader skill set.

In our school, we have seen how this dynamic bridge provides

students with an array of postsecondary options and prepares them for the modern workforce. Salem High School, one of 11 schools in Massachusetts's Salem Public Schools district, boasts a diverse student body of about 900 students with various racial and ethnic backgrounds and various needs. The student population is 49.7 percent Hispanic, 34.7 percent white, 8.2 percent African American, and 3.1 percent Asian, and over half of all students (64.9 percent) are classified as low income. Just over a third of students (34.7 percent) report that English is not their first language, 15.7 percent identify as English language learners, 24.2 percent receive support for disabilities, and 72.8 percent are categorized as high-needs students.¹ Salem High School embraces this diversity. We are committed to providing an inclusive and supportive learning environment to cater to all students' unique needs and aspirations.

Salem High School's comprehensive CTE department stands out as a unique vocational program in Massachusetts, offering an educational model distinct from the state's regional technical school approach.[†] Salem students follow a comprehensive daily schedule that seamlessly integrates academics (including advanced coursework), electives, and CTE classes. They begin with a ninth-grade exploratory program, which offers a comprehensive introduction to our career and technical areas through an engaging project-based curriculum. Students gain insight into various fields through our 10 programs: Automotive Technologies, Building and Property Management, Carpentry, Culinary Arts, Early Education and Care, Electrical, Graphic Design, Marine Services Technology, Medical Assisting, and Programming and Web Design. This early exposure helps them make informed choices about their educational and career paths. Freshmen also engage in postgraduation course planning through the school counseling office.

After this initial introduction, students, or "scholars," as we call them, choose one area of concentration, plus two alternative concentrations in case their first choice is oversubscribed. While it is possible for scholars to be placed in a second- or third-choice program, placement by nonselective lottery ensures that every scholar has an equal opportunity to secure their first-choice program. Those who do not are placed on a waiting list so that as many students as possible can explore their preferred areas of study.

Once accepted, our scholars begin three years of increasingly in-depth study within their chosen field. They take a carefully structured sequence of technical courses—complemented by detailed syllabi and hands-on work experiences designed by the program teachers in collaboration with advisory boards—that facilitates their progression to advanced proficiency. Their educational activities emphasize higher-order reasoning, continuous improvement, professional development, and problem-based learning. Additionally, we prioritize career planning through workshops and career software tools like MEFA Pathway and Pathful, fostering self-assessment, exploration, and goal setting.

*For more on the history of CTE, see "The Shaping of CTE in Massachusetts and Beyond" at aft.org/ae/spring2024/sousa_shaping.

[†]To learn about Massachusetts's regional technical schools, see "From Margins to Mainstream: Bringing Career-Connected Learning to Scale" on page 4.

Our CTE programs also feature postsecondary linkages through Massachusetts's Commonwealth Dual Enrollment Partnership and optional pathways with endorsements (which indicate a student has completed a CTE course sequence). Salem now has several specialized fields of study or pathways, including pharmacy tech in our Medical Assisting program and K-12 education in our Early Education and Care program. These pathways represent alternative or specialized tracks, allowing students to make choices aligned with their interests, goals, or aptitudes. Endorsements within these pathways focus on specific skills, knowledge areas, or industries and provide students a more customized and relevant learning experience.

Contemporary CTE programs provide a highly comprehensive education that goes beyond vocational skills.

Throughout their CTE coursework, scholars have opportunities to earn nationally recognized certifications and accreditations in the automotive (ASE), hospitality (ServSafe), medical (CCMA, CPR/AED, first aid, OSHA), and technology (Adobe, CompTIA Security+, Google Data Analytics, ISC2 Certified in Cybersecurity) fields, among others. They also gain essential postsecondary education and career skills, including emotional intelligence and critical thinking. Crucially, every CTE scholar pursues a clear pathway toward industry engagement with options for postsecondary education to achieve an industry certificate, associate degree, or higher. Our well-established articulation agreements with colleges and technical institutes both locally and across the United States ensure a seamless transition for our students pursuing their higher education and career goals.

As subject matter experts-turned-instructors, educators in CTE play a pivotal role in fostering all of these opportunities. Salem High School has utilized networking to draw experienced industry professionals from automotive dealerships, hospitals, and restaurants into our CTE programs. Their dual expertise ensures that students receive a comprehensive education beyond traditional classroom learning. Moreover, the practical nature of CTE programs often resonates with students, resulting in increased engagement in and enthusiasm for their studies. To find highly credentialed industry professionals willing to educate high school scholars, Salem recognizes years in industry as years in education for competitive pay and to acknowledge the value of these individuals' knowledge and expertise. Addition-

ally, Salem High School assists with continuous professional development so that CTE educators can stay current in teaching methodologies and the dynamic changes within their industries.

Continuous Improvement

In the ever-evolving CTE landscape, continuous improvement is essential to meet the needs of scholars and the demands of the modern workforce. We enhance our program through regular evaluations, active advisory group engagement, integrating technology and academic curriculum standards to adhere to performance targets, and improving program accessibility for our students. This reflects our unwavering dedication to providing all students with a comprehensive and inclusive CTE experience.

Evaluation

A key component of Salem's continuous improvement is an evaluation process that involves all CTE program stakeholders. This collaborative approach maximizes the effectiveness of our educational programs, aligning them with the needs and expectations of students, families, educators, industries, and higher education institutions. The collective wisdom of these stakeholders is pivotal in shaping CTE programs that are dynamic, relevant, and responsive to both education and industry.

As part of the evaluation process, we survey all CTE scholars at the end of each school year, particularly emphasizing the outgoing senior class. We follow up with our graduates at six months, one year, and three years postgraduation. The evaluation thoroughly examines students' experiences with our CTE programming, focusing on seven areas:

- 1. Teaching and learning.** We prioritize providing students with relevant, timely, and holistic learning experiences.
- 2. Postgraduation readiness.** This core focus ensures our program equips students to choose between entering employment in their program's industry or pursuing postsecondary education.
- 3. Equitable access.** Committed to providing every student with equal opportunities to engage in high-quality CTE programs, we prioritize CTE education and college and career planning initiatives starting as early as middle school. Our nonselective lottery system reflects our dedication to fostering a diverse and inclusive educational environment.
- 4. Safe, healthy learning environments.** Our learning environments are designed to foster optimal conditions for student growth and development.
- 5. Postgraduation planning.** We proactively engage students in thoughtful decision-making aligned with their future goals.
- 6. Data-informed strategies.** Our commitment to continuous improvement involves data-informed strategies to enhance the overall CTE experience.
- 7. Compliance/regulatory requirements.** We diligently observe and adhere to statutory, regulatory, and policy standards.

Through this rigorous and comprehensive evaluation process, we aim to elevate our CTE programs' quality and effectiveness. In addition, we actively seek feedback from our students' employers. This ongoing assessment allows us to adapt and improve our programs to meet the evolving needs of both our scholars and the industries they enter.

Advisory Group Engagement

Our evaluation process is facilitated through a comprehensive local needs assessment, which actively involves students, parents, staff, advisory board members, and workforce development boards. By engaging these critical voices, we ensure that our CTE programs remain aligned with industry standards and continue to provide enriching educational experiences for our students and the broader community.

Collaborating with the MassHire North Shore Workforce Board² and Salem High School's CTE advisory boards has significantly heightened the impact of our CTE programs. The MassHire North Shore Workforce Board is composed of influential business leaders appointed by Salem's mayor on behalf of the 19 communities that make up the North Shore region, while Salem High School's CTE program advisory boards are composed of business leaders along with union and postsecondary representatives aligned with each CTE program. These advisors collaborate with educators and provide valuable input on industry workforce trends, necessary credentials for immediate employment, and articulation agreements with colleges. They are also instrumental in providing work-based learning experiences and postgraduation opportunities for CTE scholars. Close partnership with these groups allows us to customize CTE offerings to precisely match the local job market's specific requirements.

We continually adapt our programs based on feedback from our advisory boards to align with our region's workforce needs. One recent example is our carpentry program. Before 2021, this program focused heavily on cabinet-making and woodworking. Salem High School realigned certifications and curriculum for residential carpentry after establishing a comprehensive advisory board with privately owned businesses and union business representatives/organizers outlining in-demand needs on the North Shore. Now, carpentry students learn to use technology to create and interpret plans and develop skills in hand and power tools as they make custom furniture. This collaboration, an indispensable element of contemporary education, highlights the adaptability and responsiveness of CTE to the dynamic nature of the job market.

Technology and Academic Frameworks Integration

In our pursuit of quality CTE programming and access for all students at Salem High School, we are dedicated to ongoing reviews within our School Improvement Plan. The curriculum used in each program is chosen with feedback from industry and advisory partners and aligned with the Massachusetts Curriculum Frameworks,³ emphasizing a thorough exploration of industry-specific elements. These frameworks are currently undergoing a multiyear process of enhancement and alignment with industry needs.

Technological advancements are instrumental in shaping workforce needs, and the influence of technology on our CTE curriculum development is twofold. First, the Massachusetts CTE Frameworks focuses primarily on industry-specific technical standards. This technology integration in CTE ensures that scholars have the latest skills and knowledge demanded by contemporary workplaces. Salem High School has invested heavily throughout all programs on cutting-edge tools and technologies for our scholars' education. Recent investments include

restaurant-grade induction cooktops and combination ovens, an automotive alignment rack and tire machine, alternative energy trainers, and two virtual dissection tables.*

Second, the frameworks highlight digital literacy as a dedicated avenue for addressing the impact of technology on education to ensure that CTE students are proficient academically and have the digital literacy skills to succeed in a technology-driven world. Integrating technological advancements into our CTE curriculum positions graduates as well-rounded individuals capable of navigating modern workplaces, where digital proficiency is increasingly vital.



Integrated reading and writing strategies also have a paramount role in the embedded academic strand of the Massachusetts CTE Frameworks—and analyzing our state testing data revealed this is an area that needs our attention. To address this need, we prioritize integrating embedded academics into all aspects of learning in the CTE classroom. CTE educators utilize common planning time with academic coaches to align program curricula with reading and writing activities and assessments. They also review data to identify achievements and deficits in scholars' skill sets and determine if course activities and summative assessments align with Salem High School's expectations for academic rigor.

Improving Program Accessibility

Another identified opportunity for improvement was in making CTE accessible to all students. Improving accessibility requires collaboration with multiple school departments—specifically with counseling and special education. This could include refining shop-based and related curricula, as in the case of Omar. Omar, a scholar enrolled in a Life Skills sub-separate electrical program, had limited manual dexterity—so Salem purchased a circuit kit that allowed him to participate in a wiring unit alongside his peers. Creating these opportunities involves attention to detail in lesson planning,

*In addition to the Massachusetts CTE Frameworks, I have found it helpful to review other states' standards. For details, see "Resource Alert: State CTE Standards Report" at aft.org/ae/spring2024/sousa_standards.

understanding accommodations, conducting assessments, and actively contributing to developing students' individualized education programs. This departmental collaboration extends throughout our students' college and career planning journey and always includes transferable skills aligned with their interests. By addressing this identified area for enhancement, we show our commitment to fostering a supportive learning environment for our scholars.

Challenges

There are notable challenges in implementing CTE programs. Success requires a concerted effort to alter perceptions, address resource constraints, adapt to industry changes, reduce student representation gaps, and maintain program quality and consistency. It is pivotal to address these challenges by developing effective solutions to ensure sustainable integration of CTE into educational systems.

Salem High School's CTE program provides a personalized experience that integrates academic knowledge with practical skills.

Altering Perceptions

One prevalent challenge is the perception and stigma associated with CTE that stem from a historical bias favoring traditional academic pathways over vocational or technical education.⁴ To combat this, educators and policymakers need to reshape the narrative around CTE, emphasizing its value in providing academic and practical skills crucial for success in various career paths.

In Salem, while this perception is on the decline, some community members still believe CTE programs are for students who are not successful in core academics and cannot succeed in higher education. This bias can result in a lack of interest and participation in CTE programs. We have invested in educating our students about their postsecondary opportunities in Salem. We highlight articulation agreements with colleges that recognize scholars' CTE credentials as college credits, include higher education-related careers in our public newsletters to families, and expose students to college panels alongside career and union panels.

Addressing Resource Constraints

Another significant challenge is resource constraints—including limited funding, outdated equipment, and inadequate training opportunities for educators—that potentially compromise the quality of CTE programs. Partnerships between educational institutions and industry can be harnessed to secure funding,

mentorship programs, access to modern equipment, and other needed resources. As an example, our current partners, such as Salem State University, are increasing opportunities for an educator pathway at Salem High School that includes college credit through early college. Another example is a business partnership that allowed us to double the amount of equipment accessible to students in the electrical program. And we continue to advocate for increased government funding for CTE initiatives, which is vital to ensure equitable student opportunities.

Adapting to Industry Changes

Aligning CTE programs with rapidly evolving industry needs poses an ongoing challenge, given that certain sectors require constant updates to curriculum and resources. Educators and industry professionals can mitigate this challenge by establishing regular communication channels to stay informed about industry trends. Our CTE advisory boards are instrumental in ensuring that our curricula and resources align with industry standards and that students have access to education and certification opportunities for the jobs of tomorrow. We have also implemented flexible and modular program structures that allow for easier curriculum updates.

Reducing Student Representation Gaps

Despite the numerous benefits students gain from participating in CTE programs, certain demographic groups—such as women and individuals from underrepresented racial and ethnic backgrounds—still face visibility challenges in specific CTE fields. This lack of representation may be influenced by stereotypes, limited awareness, and systemic barriers that impede access. Inclusivity in CTE is crucial to addressing socioeconomic disparities and ensuring that all students have equal access to educational and career opportunities. A diverse and inclusive CTE environment prepares individuals for success in different industries, contributes to innovation, and effectively addresses the varied needs of the labor market. Recognizing and addressing representation gaps and implementing targeted inclusivity initiatives are essential to fostering diversity and inclusiveness in CTE.

Salem High School actively seeks opportunities for diverse student representation in all programs. This means dismantling barriers and creating environments that inspire individuals from diverse backgrounds to explore career pathways. First, our CTE department is among the district's most diverse, including educators who are nontraditional by gender, are multilingual, and represent multiple ethnicities. Additionally, we carefully consider inclusive representation in our educational tools, such as our Medical Assisting manikins and the baby simulators in Early Education and Care. Finally, all our advisory boards are highly inclusive and representative of Salem High School's student body. By actively breaking stereotypes, addressing biases, and fostering diversity, CTE can contribute to overcoming traditional gender or cultural dominance in specific fields. Initiatives aimed at enhancing diversity in CTE—such as targeted outreach, awareness campaigns, mentorship programs, collaborations with community organizations, and including diverse role models and success stories in curricula—help us create a more inclusive educational setting.

Maintaining Program Quality and Consistency

Ensuring the quality and consistency of CTE programs across different regions is a multifaceted challenge that necessitates standardizing curricula and certification processes. Government bodies are crucial in establishing and enforcing these standards, requiring collaboration between different levels of government, educational institutions, and industry representatives to create a cohesive and nationally recognized framework for CTE. Governments play a pivotal role by offering adequate funding, establishing supportive policies, and emphasizing the significance of CTE. Educators must continually update their skills and collaborate with industry partners to ensure their programs remain relevant. Industry leaders contribute substantially by providing internships, apprenticeships, and insights into the skills required in the workforce. By fostering collaboration among these stakeholders, CTE implementation challenges can be reframed as opportunities to establish a resilient and effective CTE ecosystem.



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Another facet of maintaining quality and consistency is professional development so that CTE teachers continually update their instructional practices and subject matter knowledge to maintain relevance in their fields. To address this, Salem High School provides tuition reimbursement to take the necessary academic classes for professional licensure, connection to a mentor to navigate professional development, weekly common planning time with an academic coach to align lesson planning to embedded academics, and regular supervision and observation to provide feedback and reinforce strong teaching practices. The broader spectrum of skills and career pathways now covered by CTE necessitates a diverse teacher skill set, including technical expertise and the ability to foster critical thinking, problem solving, and effective communication in students. Additionally, the blurred boundary between vocational and academic education means that keeping up with technological advancements,

integrating digital tools into classrooms, and simulating real-world experiences are integral aspects of educators' instructional practices.

Salem High School ensures all CTE educators can attend the yearly Massachusetts Association of Vocational Administrators (MAVA) Connecting for Success conference. Multiple educators have been able to travel to other comprehensive and regional schools to observe their CTE programs and receive job alike professional development with other educators in their fields. Finally, CTE educators are continually connected to the MAVA training that applies to their programs and individual professional learning goals. These opportunities underscore the dynamic nature of modern career-focused education, where educators play a pivotal role in preparing students for the ever-changing landscape of the professional world.

Conclusion

Salem High School's comprehensive CTE program showcases our commitment to providing a personalized educational experience that seamlessly integrates academic knowledge with practical skills. Through meticulous evaluation and continuous improvement efforts, we aim to deliver a well-rounded, inclusive educational journey for all our scholars. Collaborations with regional workforce development boards and advisory boards exemplify our adaptability and responsiveness to local job markets, solidifying CTE's standing as an indispensable element of contemporary education.

My journey from immigrant scholar to entrepreneur and educator illuminates both the profound impact of CTE on students' lives and careers and the pivotal role of CTE educators. My participation in CTE equipped me with practical skills for the workforce, and my instructors were central to my career trajectory and success. Similarly, the success stories emerging from Salem's CTE programs show the magnitude of their impact on students. Our graduates share narratives of CTE experiences that propelled them into thriving careers and unforeseen opportunities. These stories show CTE's immediate impact on employability and its long-term impact on career growth and advancement. For instance, one 2023 Medical Assisting graduate is currently a student at Endicott College and works part time at North Shore Physicians Group, utilizing the Medical Assisting certificate she received in high school. In essence, the combination of hands-on skill development, critical-thinking enhancement, and real-world experience associated with this student's CTE program shaped the trajectory of her life.

While we celebrate the numerous success stories and benefits we have seen through CTE at Salem High School, we know that there are many challenges yet to address to ensure equal access to educational and career opportunities for all students. It is imperative that governments, educators, and industry stakeholders collaborate to cultivate a robust CTE ecosystem. CTE is a dynamic and responsive force that goes beyond a mere academic pursuit. It is a transformative influence that prepares students for success in an ever-evolving professional landscape and ultimately empowers them to thrive amid the challenges and opportunities of our contemporary world. □

For the endnotes, see aft.org/ae/spring2024/sousa.

Skills for the Waterways and Beyond

A Look Inside New York City's Harbor School



Ever wondered how to become the captain of a ferry or the leader of a team of engineers designing robotic submarines? New York City's Harbor School has answers for you. This unique school offers eight career pathways: aquaculture, marine biology research, marine affairs, marine systems technology, ocean engineering, professional diving, vessel operations, and welding and fabrication.

We spoke with three Harbor School teachers—Clarke Dennis, Rick Lee, and Robert Markuske—to learn about the school and how they help students develop a strong foundation for careers on and off the water. We're particularly impressed with how they maintain close ties to industry professionals and keep tabs on job trends so they know they're preparing students for growing careers.

—EDITORS

EDITORS: Tell us about the Harbor School.

RICK LEE: The Harbor School is a career and technical education (CTE) school designed to meet the growing demand for maritime-related careers through academics and hands-on learning. It is on Governors Island in New York Harbor—not far from the Statue of Liberty—and accessible only by ferry. We tailor our academic programs to themes and projects that are tangible for the students in this environment. Our mission is to develop awareness of the waterfront, the industries of the waterfront, the environmental impact of the waterfront, and the waterways and all of the commercial, environmental, and recreational functions of those waterways. Importantly, our enrollment is open to all high school students in New York City. We have more applicants than we do seats,

so students are chosen by lottery. We also have eight different CTE programs, which is unusual. Much larger schools in New York City have fewer career tracks.

EDITORS: What led you to the Harbor School? What do you teach?

ROBERT MARKUSKE: I teach marine affairs. It's a natural resource and management class with an environmental anthropology lens. We examine the human impact on the environment and try to solve complex problems through both policy and hands-on approaches. For example, my students are figuring out how to manage our food waste at the Harbor School and starting an urban farm to manage stormwater.

Prior to coming to the Harbor School, I was a park ranger on Governors Island, and I won a grant to manage a partner-



ship between the Harbor School and the National Park Service to introduce students to national parks. Then, while I was working in a national park out west, the Harbor School asked me to come teach history. I took that position in 2012, and then a couple of years ago I was asked to transition into marine affairs. Prior to the park service, I did environmental policy and activism.

CLARKE DENNIS: I've been in the welding industry for 30 years. I'm a journeyman ironworker by trade but have done a lot of welding in other industries, including ship repair and scenery building for theaters. I was recruited to work with one of the school's nonprofit partners, the Billion Oyster Project, in 2015. I ran an afterschool program for them two days a week for a couple of years, then became full-time with the school, teaching welding and fabrication as part of the marine systems technology career pathway.

RICK: I teach the ocean engineering course of study. I joined the Harbor School faculty as a math teacher in 2005 when it was just getting started. The school didn't become a full-fledged CTE school until about a decade ago. Prior to that, there were a lot of shop classes, and some courses were aligned with career pathways. In those early days, I had an afterschool robotics program. Partnering with the Stevens Insti-

“Students from my program can move right into working for urban farms, compost organizations, or environmental nonprofits.”

—ROBERT MARKUSKE

tute of Technology in Hoboken, New Jersey, we were building underwater robots. That soon became an elective class and was part of the school's transition to having an ocean engineering career pathway.

Before I became a teacher, I was a lot of things: a metal worker in small fabrication shops, a commercial fisherman in southeast Alaska, and a freelance writer.

EDITORS: In the past, too many CTE programs were not designed to prepare students for higher learning and for jobs with opportunities to advance. How do you ensure you're opening doors for students?

ROBERT: With my students, I have a three-pillar approach with a classroom component, a lab component, and a work-based learning experience. For our waste management project, I teach the science and impact of waste in our society and how waste is managed at the school. Students realize that it's a problem because schools are inherently wasteful, so then they work with other stakeholders to make our school less wasteful. Currently, my students are figuring out how to make as much waste as possible into compost. Then they are using that compost in an urban farm that they're developing. And since I'm teaching marine affairs, my students also write about what they've learned and done. Last fall, they wrote testimony and spoke at City Hall on behalf of citywide composting.

This multidisciplinary approach is inherently experiential but also grounded in and reinforced by academic skills. It prepares kids for both careers and college. Students from my program can move right into working for urban farms, compost organizations, or environmental nonprofits—or they can go to college to study environmental policy or further enhance their academic and hands-on experiences with an associate degree in natural resource management.

I try to make sure my students understand all aspects of what they're doing. When they are planting on our urban farm, do they know the science behind what they're planting? Do they know the reason behind what they're planting? Is it a native plant? Is it what Indigenous people grew here? I think the Harbor School tries to make everything our students study multidisciplinary.

CLARKE: With welding and fabrication, we're focused on postsecondary options. I'm a product of an apprenticeship. I worked full-time and was paid while learning at night. Now I'm working with unions and the building trades to prepare my students for apprenticeships—and I'm also working with colleges to develop articulation agreements to be sure our students are ready for their welding programs. We have an articulation agreement with City Tech here in New York, and in January I took a group of students to meet with the apprenticeship coordinator for the local ironworkers' unions.

Our courses are not just hands-on. Students also learn about the different welding processes, safety, and literacy in

terms of being able to read blueprints and welding symbols. These are online assignments that my students do, and then they earn industry-recognized credentials.

RICK: Internships are a big part of our coursework. All of our seniors have internships in the spring, and we try to arrange summer internships for students after 10th and 11th grades. I've had students intern with architects, with professionals who are designing circuit boards for satellites, and with those who are using 3-D manufacturing for rapid prototyping.

ROBERT: We do a lot of networking to find these summer and senior internships. We're looking for workplace learning that draws on the content we teach, career trends in New York City, and students' interests. I recently had students intern with the Brooklyn Children's Museum, a compost facility, and an environmental nonprofit.

do scientific research." After I arranged an internship, they saw the challenges of day-to-day work. Students spent a summer working with scientists in our estuary, looking at data and making presentations. It was hard work, and they needed to see this to reassess their interest moving forward. Sometimes kids come in with a very superficial, very glamorous view of what a career is. Our job is to not only gain their interest but also show them what it really is to be in that career.

EDITORS: If you think back a decade or so, what do you wish you had known? What have you learned that may be of use to educators ramping up their CTE pathways?

ROBERT: I want to highlight that it is an incredible amount of work because our programs are predicated on career outlooks and trends. The program I facilitate has changed because of the job market. A lot of my content and projects are now geared

to keep tabs on market trends. That's one thing I would suggest to anybody who's starting a CTE program: develop partners that are not just one- or two-dimensional. You need a broad look at career opportunities for your students.

Each CTE program at the Harbor School has a professional advisory committee of academic and industry partners; staying in touch with them is how we ensure we're preparing students for good careers. I subscribe to several different industry magazines to stay ahead. Our school is a member of the American Welding Society, and I use its curriculum and test. We also have local connections to ironworkers, the shipbuilding and ship repair industry, and the theater industry (since welding and fabrication for sets is a big business in New York City).

I let students know that it's good to diversify in terms of what kind of welding job they may be doing in the future—it could be anything from wind turbines to



"I'm working with unions and the building trades to prepare my students for apprenticeships."

—CLARKE DENNIS

RICK: An important part of work-based learning is helping students research what careers align with their skills and interests. When I have students take career surveys early on, they're given a list of matching careers and I ask, "How many of these do you actually know what they are?" Education helps, but experience is key. Students may not figure out what they want to do while in high school, but we can give them tools to keep exploring and doing career research.

ROBERT: Students also need to experience "a day in the life." Some said, "Oh, I want to

toward green careers and sustainability. We have to be educated ourselves, constantly watching where career opportunities are growing. The program is up for reevaluation every five years; although that's a lot of work, I agree with that process because it ensures we regularly examine what we're teaching. We're teaching students to pursue careers, and if we're teaching toward careers that are in decline or are oversaturated, we have to know that and change directions.

CLARKE: We're trying to build an even more diverse group of advisors for our program

HVAC systems to skyscrapers. Once they become welders, they need to be flexible and jump from one industry to another as demand rises and falls.

ROBERT: I think something that you can hear in our answers is how important it is to go out in the community and see what is available. We find problems in communities and work with students on solving those problems, with a trade or career focus. For instance, Clarke and I are collaborating now. My students are trying to start a farm, but we had a problem with our

irrigation system. My kids designed the irrigation system, and Clarke's students will build the infrastructure.

RICK: Shifting gears a little, one of my lessons learned is to remember to step back. After the 9th grade survey of all of our career pathways, students select their pathway to focus on for grades 10–12. Coming into the 10th grade, do they really know that they want to be a welder, an urban farmer, or an engineer? Even if they stick with their plan A throughout high school, they may find out later it's not what they want to do. We have to provide them with specific skills and credentials and make sure they have the knowledge and skills to be able to change their minds later. Fortunately, in their hands-on experiences our students learn many transferable skills, from safety on the job to how to collaborate with colleagues. Even though this is a CTE school, it's also still a testing ground for our students—and it should be. They're kids.

EDITORS: What are you excited about in your programs?

CLARKE: We are applying for a grant from the American Welding Society for about \$25,000 to help with expanding our fume extraction so students can branch out into different kinds of metals. I'm hopeful that we'll win this year—but I'll keep applying until we do win.

We are also creating a more real-life work environment in our welding shop: each grade now has a crew chief (what was

known as a *foreman* in the past). Students are learning to take orders and direction from another person around their age. At the moment, all three crew chiefs are female. They truly earned their positions, but I'm glad it has happened because it's good in a traditionally male-driven industry for the male students to be comfortable taking orders from a female.

"Students may not figure out what they want to do while in high school, but we can give them tools to keep exploring and doing career research."

—RICK LEE

ROBERT: I am very excited that this interdisciplinary approach to solving complex problems with sustainability is becoming a trend. One thing on the horizon for us is that the marine affairs program and the aquaculture program are collaborating, along with a partner, on developing a con-

trolled environmental agricultural certificate. It's the epitome of solving a problem. We're a city, and our natural resources are being depleted; hydroponics is a way of providing communities with food. Students will leave high school with the skills to be technicians in providing communities with sustainable produce options. I'm excited about that. In addition, students are working with several stakeholders on evaluating the coastal resiliency plan for Lower Manhattan; they are engaging with professionals from multiple fields to explore solutions from different perspectives. This is really opening up career exploration. If they can tie in composting, hydroponics, and advocacy in a future plan for Lower Manhattan resilience projects, that will be pioneering.

Our school has been selected to be a pilot for the New York City Public Schools' Exploring Sustainability and Green Careers course. We have chosen a cohort of students from each of our CTE programs to learn the fundamentals of sustainability and then work with an outside organization to obtain solar installation training. Thereafter they will design and install solar panels for a drip irrigation system that uses rainwater. This embodies career exploration, training, and implementing solutions at a micro level on our campus.

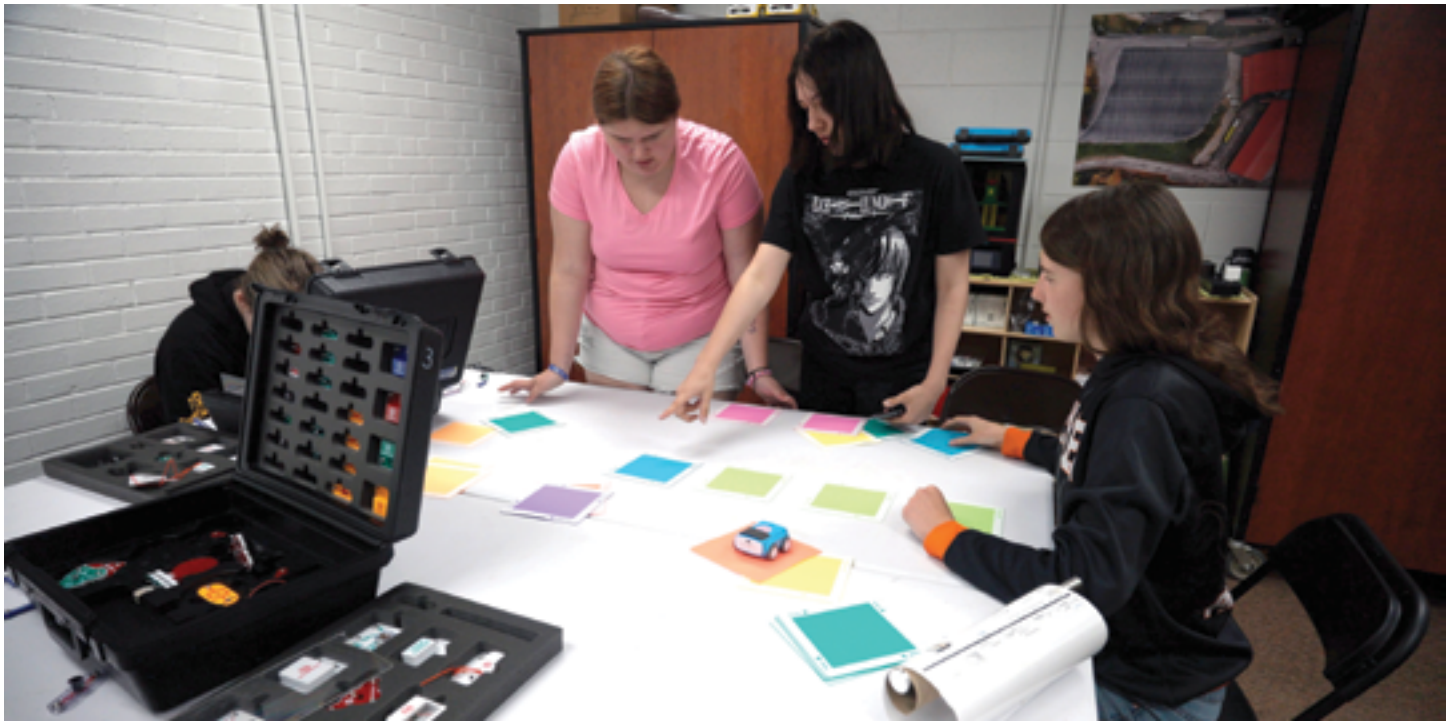
RICK: I think the offshore wind industry will provide great opportunities that potentially impact all of our programs. There are marine biologists studying the effects of having wind turbines in the water. There are policymakers examining environmental impact studies to determine appropriate regulations. It cuts through all of us, which is awesome because it also allows students to have a direct, high-need training program. We're working with the New York State Energy Research and Development Authority, which is a state agency working toward reducing greenhouse gas emissions and promoting economic growth. It's providing money for offshore wind training.

Another great opportunity is that we received funding to become a P-TECH school; this is a nationwide model in which students earn industry-recognized associate degrees and gain work experience. It's a natural extension of our current career pathways. We just had our first meeting in January, so there's lots of planning ahead—but it's an exciting development. □



Creating Career Pathways

How a Rural School District Is Meeting Students' and Businesses' Needs



By Jenny Shiplett and Erin Schumaker

Some students don't enjoy school in the traditional sense, and they don't see how it relates to their future. This can lead to poor academic performance, chronic absenteeism, and a high likelihood of dropping out. We are addressing this issue in many ways in New Lexington Schools, a small district serving the roughly 35,000 people of Perry County, Ohio. Our most important strategy is expanding career and technical education (CTE) and workforce development opportunities to promote high student engagement and help motivate students to stay in school and graduate.

Adding career pathways, adjusting school schedules to allow for exploration, incorporating a focus on experiential learning and exposure throughout K-12, instilling soft skills, building partnerships with the local career center and local businesses, and providing support and resources for students and their families have helped us increase performance and attendance and raise our graduation rate from 78 percent in 2018 to 92 percent in 2023.¹

In 2016, while examining district data, we noticed that only about 20 percent of our students were going on to college. Realizing that we have local businesses with needs and students who

aren't going to college, we asked, "What can we do to bridge that gap so these young adults can be productive and successful in careers right out of high school in their own hometown and surrounding area?" We asked businesses in the community what problems they were having finding good employees and what we could do to prepare our students for the jobs they offered. We made a list of the essential skills that our businesses said students were lacking, such as punctuality, speaking clearly, making eye contact, perseverance, and time management. We developed a soft skills program to be taught starting in kindergarten. Businesses also said that access to a driver's license and transportation were issues, so we brought back a driver's education program to the high school, free of charge, because the course outside of school was too expensive for most of our students and their families to afford.

All school districts in Ohio are required to have a business advisory council to foster collaboration that will enrich students' education and ensure employers have the workforce they need. Our council, which was awarded three-star status by the state in 2023, has grown to 62 members composed of business partners from Perry and surrounding counties. Their input helps us plan and implement the programs that will train their future employees. Right now, we're focused on our high school students, but eventually we would like to offer adult workforce development programming in the evenings.

Jenny Shiplett teaches third grade at New Lexington Elementary School and is the president of the New Lexington Federation of Teachers. Erin Schumaker is the federal programming and grants administrator for New Lexington Schools.

From Animal Husbandry to Healthcare

Our career pathways journey started with our vocational agriculture (VoAg) programming. VoAg has been part of our high school for many years. Currently, we have the second largest FFA (formerly Future Farmers of America) program in the state of Ohio.² We have a 120-acre school farm that functions as a hands-on learning lab. Students breed and take care of pigs, sheep, and rabbits. They raise goats, turkeys, and chickens. Our farm allows students who don't live on a farm or who can't house an animal to experience animal husbandry. Students are entered into a lottery to take one of the farm animals to the county fair. Students do not have to pay for the animal, but they do have to commit to taking care of the animal, its stall, and its training while it resides at the farm. They are then able to show at the fair; when they sell their animal, they keep the proceeds. The farm also has a contract with Beck's, a seed company. We are Beck's testing plot for variations of corn seeds. The kids take soil samples and study the corn yields of the different seeds. Through all of this, they earn certifications like OSHA 10 (a safety course), forklift operation, and welding along the way.

We also have potato and pumpkin patches. The elementary students have

farm field days and help plant the pumpkin patch. We also take the elementary kids on a lot of short field trips to the farm to see the sheep, pigs, chickens, and rabbits. Our high schoolers in the agricultural program teach the elementary students about the animals and how to care for them.

Our VoAg program has long been popular, so we examined how to engage more students within that pathway. We applied for and were awarded grants that allowed us to include an entry-level welding certification (American Welding Society D1.1). And, through a partnership with a local community college, our students take care of a vineyard and harvest the grapes. The local community college uses the grapes to make wine, while our students make jelly that they give away and serve at FFA banquets throughout the year.

We recently won a grant from our local Soil and Water Con-



An Insider's Look at Healthcare Careers

I'm a nurse with Genesis HealthCare System and a New Lexington Schools Business Advisory Council member. As a council member, I visit schools to talk to students about healthcare careers, and I offer students workplace tours and job shadow experiences to show them there's more to healthcare than many of them know.

When I give a tour, I take the kids around the building and have people from all departments talk to them about careers and the required schooling. That gives students a better idea of what they might want to do after high school. Students can also choose a one-on-one job shadow experience with different departments to understand what a job entails. Currently, our job shadowing focuses on high school students, but we hope to expand to middle schools so that younger students have more time to think about careers.

We've also partnered with the school district to work with high school phlebotomy

students. After students do some academic work at their school—learning anatomy and practicing on a phlebotomy training arm—they come into the hospital and work side-by-side with Genesis phlebotomists to complete the required number of successful sticks on live people for their certification. That's more than job shadowing; that's doing the job with somebody to guide them.

Our phlebotomists work with students on their technical and communication skills. A lot of this career involves explaining the procedure and knowing what to say to help patients who are afraid of needles. This on-the-job education is valuable.

For students who complete the program and earn their certification, we're working on being able to employ them as phlebotomists for local nursing facilities. Phlebotomy is a good entryway to other healthcare careers. After working with Genesis for a year, students are eligible for tuition reimbursement from Genesis for a nursing degree, so they graduate with minimal to no student debt. If they don't want to enter

nursing, they could try a position such as patient transport or radiology technician. There are many opportunities.

The school district is open to council members' input and help to guide the career pathway programs they offer students. We've recently discussed an opportunity to remodel a campus building as a clinic. Genesis provided input about the rooms and equipment needed to offer x-rays and other services.

This type of partnership between local employers and schools through business advisory councils is key for the future. Businesses struggling with employee recruitment and retention can help shape the incoming workforce, and we can give kids a sense of purpose for their future and help keep talent in our local communities. It's a win-win-win.

—Jason Adams, RN, BSN, manager, Genesis Perry County Emergency Department; member, New Lexington Schools Business Advisory Council

ervation District to build a greenhouse. We have applied for a US Department of Agriculture Farm to School grant to outfit the greenhouse with the equipment needed to grow our own fruits and vegetables year-round, which will be used in our school cafeterias. If awarded, our middle school VoAg students will lead the initiative and will help guide decision making alongside our food service entity, VoAg teachers, and middle school science teachers.

With our VoAg program thriving, we started wondering what we could do for our students who were going to the Tri-County Career Center. Tri-County is a state-approved vocational school that services several surrounding high schools, including ours, but students' interest far outstrips the school's capacity. Many of our students couldn't take various programs they were interested in because there were not enough spaces. When they were able to enroll, they missed out on afterschool activities because the center is an hour away by bus.

By partnering with Tri-County, we started our own building trades program, with electrical trades embedded in our workforce building. The district provides the materials—and we have plenty of spaces for our students. This allowed our school district to obtain state CTE dollars to help sustain the program. Our students have partnered with Habitat for Humanity to help build a house within the community. The district also has a partnership with the International Brotherhood of Electrical Workers (IBEW) for

Our career pathways journey started with our vocational agriculture programming. We have a 120-acre school farm that functions as a hands-on learning lab.

electrical trades in which students train on virtual reality headsets in a virtual electrical lab and then move to an actual lab. Students will be able to interview with the IBEW upon graduation and if accepted, will start an apprenticeship at the second-year level.

Now, we have career pathways beyond agriculture and trades. Drawing from the state of Ohio's Top Jobs website, district staff analyzed the careers that are expected to grow within our region. This analysis, as well as student surveys, helped drive the district's vision for the future.

Many of our students are interested in healthcare careers. In conjunction with Tri-County, we started a phlebotomy program, complete with draw arms and a medical manikin for training prior

Pre-Apprenticeship for a Go-Getter

I'm 18 and finishing my senior year at New Lexington High School. In the fall, I enrolled in the combined carpentry and electrical class because I thought I might want to be a carpenter. But carpentry didn't feel like a good fit. One day during class, Daryl Jones from the IBEW (International Brotherhood of Electrical Workers) visited to tell us about the electrical trades and the pre-apprenticeship we could do in the spring semester. It sounded like a great career path for me.

I started to learn more about the benefits of becoming an electrician—about the great pay and benefits and the different opportunities available if you fully commit to this path. I loved it. I was the second person to finish my online credential coursework to be eligible for the pre-apprenticeship, and the local union instantly placed me at a job site helping set up the new Facebook data center near Columbus.

Five days a week, I work on a team of six people—journeymen electricians and another pre-apprentice who is a friend, with a foreman overseeing us—doing a lot of the physical work to lay out the electrical setup for the data center. We're running conduit for the buildings that will be built, and we'll eventually be running wires through the dirt to connect to the buildings. Everything is being built from the ground up, so it's a lot of work.

I have great relationships with my team. My friend—the other pre-apprentice—and I carpool to work every day, and we are learning so much from the journeymen who have been mentoring and guiding us since we started. We learn by watching them, but they also let us do some things, helping us every step of the way, so we get hands-on experience. They don't hesitate to help us or to explain everything that we're going to do before we even get started, so I really feel comfortable working with them.

I'm really seeing how both the carpentry and the electrician classes helped prepare me for this job. When I took the electrician course, I didn't realize how much of what I was learning would actually translate to what I'm doing now. I haven't pulled wire yet, so I'm not calculating figures like we learned in class, but I'm already using what we learned about safety. And in the carpentry class, I was able to get my OSHA 10 card, which I need for this job.

When I get home from work, I still have school—I'm finishing my high school requirements online. After I graduate, I hope to be accepted into the IBEW's apprenticeship program and start electrician school one day a week while still working. One day, I would love to have my own business and be able to hire my own crew. But I'm very happy where



I am, working my way up to being a journeyman and getting as much knowledge as I can.

This year was my first CTE experience, and it has been a much better fit for me than the college-going path that other kids are on. I'm a go-getter, and I want to get my life planned out and started as quickly as possible. Now I have a great job where I'm getting paid well for my age and earning a pension already. As I work my way up this pathway, I'm going to be making more money than a lot of other kids who graduate college with student debt.

I would definitely encourage other high school students to pursue a CTE pathway, even in ninth or tenth grade. Learning a career that can start you out well in life and that pays you while you're learning is amazing.

—Chase Dumolt, senior,
New Lexington High School

to students' first live stick. We're currently developing a pathway for our students to obtain their licensed practical nurse credentials by the time they leave high school. That would allow them to obtain their registered nurse license in less time and enter the workforce earlier. This programming is possible through our new partnership

with a local hospital that is part of Genesis HealthCare System, which has locations all over southeastern Ohio. The hospital has 750 jobs, from clinicians to IT and custodial workers, that it can't fill right now. Through this partnership, our students can meet their clinical hours as high school students. We have a memorandum of understanding that allows students 16 years of age and older to have opportunities to intern in many careers within the hospital.

Based on our combined state job-growth and student-interest data, we've also expanded our CTE course offerings to include a fabrication lab, a teacher academy, media plus (which encompasses podcasting, video and photo editing, light and image processing, social media, and website design), and a drone pilot license. Our plans for the future include developing CTE pathways for advanced manufacturing, additional healthcare credentials (including respiratory therapists, x-ray technicians, and multi-skilled technicians), broadband/fiber optic technicians, and additional welding certifications.

Lessons Learned

Since we began offering CTE pathways, sustainability has been a concern. Our district is continuously looking for grants to help offset new programming costs, maintain programming, and provide or

Based on our state job-growth and student-interest data, we expanded our CTE offerings to include a fabrication lab, a teacher academy, a media plus program, and a drone pilot license.

Future Electricians Earn While They Learn

As the special projects coordinator for an IBEW (International Brotherhood of Electrical Workers) local in Newark, Ohio, and an advisor for IBEW's apprenticeship program, I work with high schools to build pre-apprenticeship programs for those who are interested in upskilling and finding their way into a trade. Being on the New Lexington Schools Business Advisory Council is a great opportunity to partner with schools to prepare the future workforce. We have a great relationship with New Lexington High School, which recently added building trades as a CTE pathway. We partnered with them to supplement this pathway with a credentialing course for students who are interested in electrical careers.

This partnership helps meet our region's huge need for electricians and apprentices. Intel, Facebook, Google, and Amazon data centers are all in our region, so we are the future Silicon Valley of Ohio. Through this program, students are receiving credits to graduation, but more importantly, they are receiving a path to a career. I love meeting students like Chase and encouraging them to learn about pre-apprenticeship and the great career opportunities available through apprenticeship.

We began the rollout of our state-recognized pre-apprenticeship program with New Lexington High School. Students complete our first-year curriculum, called the interim credentials (created by the Electrical Training Alliance), as a self-paced online course with a

virtual reality component that allows them to experience a job site virtually. Students learn about the electrical industry, apprenticeship, and employment in general, and they receive job-specific knowledge such as electrical theory, how to wire devices, and how conductors and insulators work. The national average time to complete the interim credentials is 220 hours. Chase is one of two New Lexington students who finished in less than half that time.

After completing the interim credentials, students receive a certificate and can interview for just about any apprenticeship program across the nation. Chase has interviewed for our local IBEW program; in late spring, a committee will select candidates. Chase is on track to be admitted, and we're hopeful that he'll soon be one of our new apprentices. In the meantime, he's doing great as a pre-apprentice.

Students, schools, and local businesses all benefit from the Business Advisory Council partnerships. Students and schools can learn about our career paths that help students who work with us earn over \$60,000 right out of high school. IBEW benefits by directly sharing our needs for soft and hard skills in our future workforce. This partnership also helps us intentionally bridge representation gaps and bring more equity and inclusion to our workforce. We are working directly with our schools to point more female students and students of color into our programs.

I encourage schools to consider offering pre-apprenticeships. It's an opportunity that I never heard about when I was in high school because everyone was talking about college for all. Today the conversation has shifted to "college-ready for all," which is a great direction for students. All our apprentices earn college credits as they complete challenging coursework with strict academic performance requirements. But they also get access to the trades, which is an amazing path for many, many people. It's great to be part of a partnership that helps students make the connection between their academic learning and their future careers.

—Daryl Jones, special projects coordinator, Newark Electric Joint Apprenticeship and Training Committee; member, New Lexington Schools Business Advisory Council



upgrade equipment. Additionally, the state of Ohio provides CTE funding tied to the number of students in each CTE class we offer, so that money comes in on our foundation payment to support our CTE programs. Ohio also offers reimbursement for each credential earned by the students. Some reimbursements are 100 percent of the cost of the credential, while others are a portion of the cost.

This process has been challenging and rewarding. While there have been bumps in the road, there have been valuable lessons learned. *Partnerships are key!* Whether those partnerships are with businesses or other educational institutions, they are paramount to success. *Listen! Listen! Listen!* Students have a voice, and when asked, they are happy to share what they are looking for. They have interests that can be explored and dreams that can be reached. And businesses have needs. Bring them into the conversation. They are willing to help build tomorrow's workforce. *Be intentional!* That's our superintendent's favorite phrase. We have been intentional with every move in designing and bringing this vision to life. CTE is the future. It's a way to impact students, families, and their communities in positive ways. When students are ready to take fulfilling jobs in their local communities, everyone wins. □

For the endnotes, see aft.org/ae/spring2024/shiplett_schumaker.



PHOTO OF JADE SIMPSON COURTESY OF JENNY SHIPLETT

Deeper Insights for a Future Teacher

I've known for a long time that I wanted to be a teacher. I love working with kids, and I think I have the heart for it. A lot of my friends say, "I could never do that. I don't know how you're doing it." It's definitely not for everyone. But when I heard about the Teacher Academy at New Lexington, I was excited for the opportunity to get a feel for the classroom before I move on to college.

Teacher Academy courses are fully online, offered through Central State University. My first class was Intro to Education, and I'm currently in the second class, Educational Technologies. We complete coursework independently and turn in weekly assignments. One day a week, we get to spend time with the kids in our school's daycare, which provides free care for the children of teachers.

This helps us learn whether we want to work with the very young kids or if older students are a better fit. One day every other week, we have an observation class where we get more hands-on experience in a classroom of our choice. Once a week, our teacher for that class meets with us to make sure we're on track and doing what we need to do to achieve our career goals.

I chose to observe Ms. Shiplett's third-grade classroom. I was debat-

ing between elementary or high school, but elementary classrooms are so fun, and the kids are a lot more entertaining. Typically, I work with kids one-on-one or in small groups and help out with any activities they're doing. One day, I got to plan a lesson—a scavenger hunt using math problems—and do it with the class. I'm able to apply some of the things I'm learning in my online classroom almost immediately in my observation experience. One example is my technology class, where we learned about websites, activities, and other resources that we can use with students. But the most beneficial thing for me has been getting the hands-on experience connecting with students.

My mom teaches first grade, so I already had a lot of insight into what it's like to be an elementary teacher, but now I have even more understanding. It's exhausting but rewarding. The kids get so excited to see you, and it's just so sweet to watch their faces light up when they learn something new or get the right answer to a problem.

So far, I love third grade and I'm pretty sure that's what I want to teach. But I'm a junior this year, so if I change my mind, I can choose a different class to observe next year. In the meantime, I'm working on earning enough college credits to graduate early once I leave high school. All but one

of my classes are College Credit Plus classes. They're offered to students for free not just through the Teacher Academy but through other local schools as well. Our core classes are through Hocking College, and we can also take classes through Central State University or Zane State College. I'm taking a sustainable agriculture class and an agribusiness class because I've always been really interested in agriculture, and a teacher told me the credits could count toward a teaching degree in agriculture. But even if I don't take that path, I've learned a lot from those classes, and they've helped put me on track to graduate college early and start my career that much sooner.

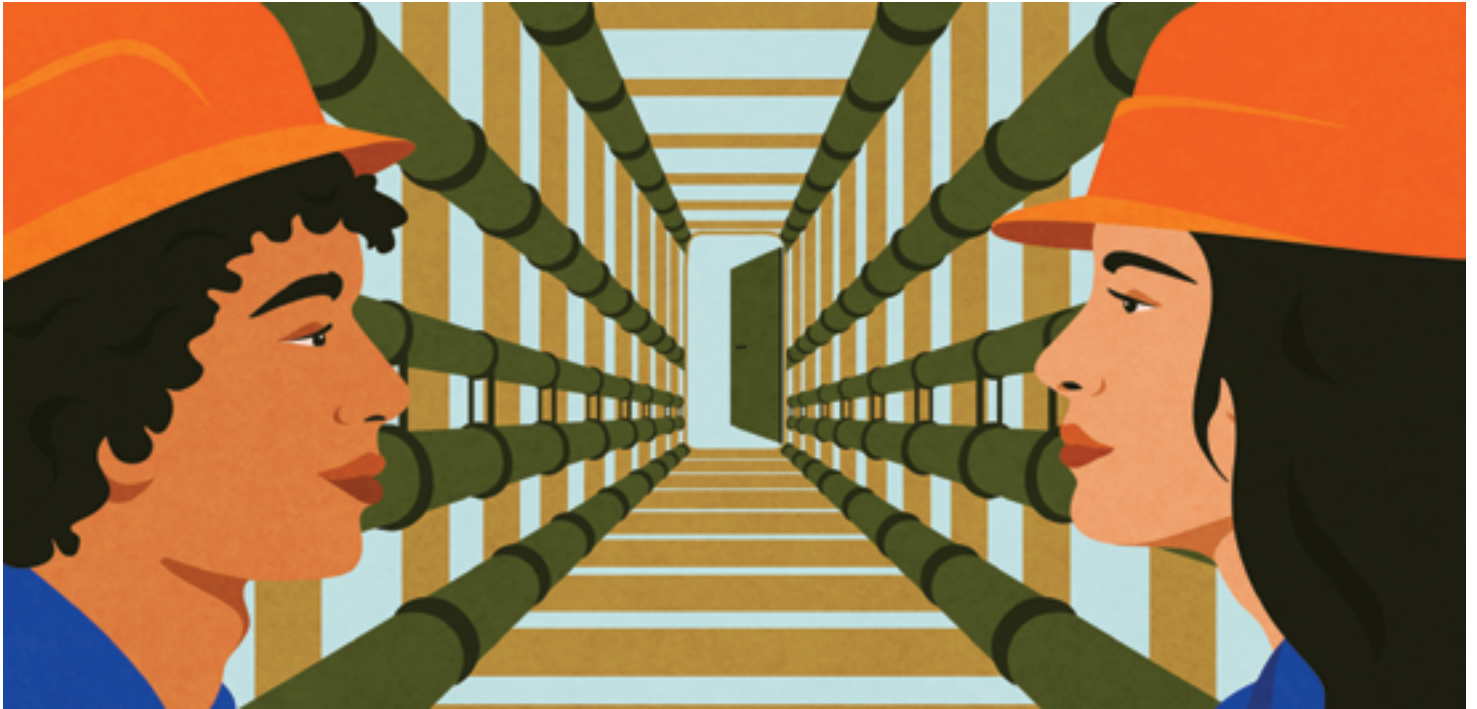
I would definitely encourage other students to explore careers this way. Take advantage of everything your school offers. A lot of kids I know are just focused on graduating top of their class but not really considering their future after high school. I think it's important that if you're interested in a career path, you just pursue it now and don't care what other people think or say. Do what's best for you and what's going to help you in your future.

—Jade Simpson, junior,
New Lexington High School



Constructing Our Future

Working Together to Prepare Students for Careers in the Building Trades



By Tom Kriger and Nicole Schwartz

Great career opportunities await students today in the US construction industry, a product of massive public investment in rebuilding American infrastructure, bringing manufacturing back to the United States, and shifting energy production to new green sources. But here is the dilemma we face: with the decline in vocational education over the past 40 years, combined with the push to send every student to college, many middle and high school students do not have access to shop classes or career and technical education (CTE) programs. As a result, they don't know these opportunities are available.

Sometimes young people find the building trades by accident, and when they do, it can change their lives. Michele Tammo Wafo is a young man from Cameroon, the youngest of 13 children. A few years back, his siblings pooled their money to send Michele to the United States for an education. But he fell on hard times and ended up living under a bridge in Austin, Texas. The only work

he could find was driving a cab. Michele's life was hard—but one day he took a fare to the plumbers and pipefitters union (United Association Local 286) training center, where he learned about a free program designed to prepare young people for Registered Apprenticeships* that lead to careers in local building trades. For Michele, that was all he needed to know. He was first in line for the next class. And the rest is history. Michele recently completed his apprenticeship and is now a licensed plumber in Austin. His employer was so impressed with his work ethic and life story that he has sponsored Michele to return to Cameroon and bring back his wife and son. A lucky coincidence brought Michele to the building trades, but there is a better way for your students to learn about our career opportunities.

Just as every good school relies on collaboration between teachers, administrators, students, and families, our ability to inform students of the career opportunities in construction and to prepare them academically rests in part on collaboration between the building trades unions and AFT members. North America's Building Trades Unions (NABTU) is a labor organization made up of 14 national and international unions and more than 330 provincial, state, and local trades councils. Together, we represent more than three million skilled craft professionals in the United

Tom Kriger is the director of education and research at North America's Building Trades Unions (NABTU). His previous positions include professor of labor studies, provost and vice president for academics at the National Labor College, and assistant to the president and director of legislation and research for United University Professions (AFT Local 2190). Nicole Schwartz is the executive director of TradesFutures. Previously, she was NABTU's Apprenticeship Readiness Program coordinator. She began her career as a middle and high school social studies and Spanish teacher with the Milwaukee Public Schools.

*Registered Apprenticeships are approved by the US Department of Labor or by a state agency; they are created with industry representatives and provide paid pathways to good jobs. To learn more, visit go.aft.org/s21.

States and Canada in our mission to increase work opportunities in the building trades, secure wages that support families, and protect the standards of our professions. In this brief article, we lay out what we see as the vital role that AFT teachers and counselors can play in helping us recruit and train what our president, Sean McGarvey, and the Biden administration have called “the infrastructure generation.”

In construction today, the building trades unions and our partner contractors confront two intertwined challenges related to the increased demand for skilled workers. This increase in demand can be traced directly to the Biden administration’s decision to invest billions of dollars here in the United States. The Infrastructure Investment and Jobs Act, which passed with bipartisan support in 2021, was designed to rebuild our nation’s badly neglected infrastructure—including schools, roads, transportation systems, and broadband access. Similarly, the CHIPS and Science Act, which passed in 2022 with bipartisan support, was enacted to bring back critical manufacturing jobs in important sectors such as electric vehicle battery manufacturing and production of the semiconductor computer chips found in all electronics today. Further, the 2022 Inflation Reduction Act contains robust labor standards, including tax breaks for developers that employ Registered Apprentices and pay them decent wages and benefits. These standards were designed to generate good-paying union construction jobs. Together, these laws are projected to create millions of new construction jobs across the United States. According to one estimate, the Infrastructure Investment and Jobs Act alone will generate 1.6 million construction and extraction jobs over 10 years, with millions of additional jobs in transportation and materials moving.¹

Thus, the first challenge we face is the need to recruit and train enough Registered Apprentices to meet the increased demand for highly skilled trades workers. A second and related challenge is to diversify the construction workforce as it expands. Simply put, there are too few women and people of color in construction today. Women, for example, make up roughly 6 percent of building trades Registered Apprentices today, a number which is going up but has been too low for too long.² But we can change our industry with vital help from AFT members. The Infrastructure Investment and Jobs Act and the other related legislation provide NABTU and the AFT with a unique opportunity to grow a construction workforce that better reflects the communities in which projects are built and that guarantees middle-class employ-

ment for generations of Americans, too many of whom have been historically underserved in construction.

How can NABTU and AFT members work together to introduce students to more pathways to career success and strengthen infrastructure in our communities? It might start with a few simple requests of AFT teachers and school counselors. We want students in all grades—from kindergartners to graduating seniors—to be aware of the robust career opportunities available today in building trades Registered Apprenticeship programs.

Together, NABTU and its 90,000 signatory contractors (who have all signed collective bargaining agreements with the building trades) invest \$2 billion annually in Registered Apprenticeship and journey-level training. Within this system, our 14 affiliated building trades unions and their contractor partners jointly operate more than 1,600 training centers and train 70 percent of all construction apprentices in the United States. Since 2017, NABTU’s affiliated unions and signatory contractors have registered an average of 73,000 new apprentices annually, making NABTU’s Registered Apprenticeship system the largest such training program in any US industry.

In our “earn-while-you-learn” Registered Apprenticeship programs, there is no cost to the apprentice for their training.

In our “earn-while-you-learn” Registered Apprenticeship programs, there is no cost to the apprentice for their training. It’s all paid for through our collective bargaining agreements, which means no student loan debt when graduates complete their apprenticeship. Construction is the only industry we know of where the current generation of workers has designated money through collective bargaining to pay for the apprenticeship training for the next generation of workers. In addition, many of our Registered Apprenticeship programs have been assessed for college credit, which means that students can pursue an accelerated associate or bachelor’s degree once they finish their apprenticeship, equipped with the college credits they earned from their apprenticeship. It’s a good deal. Our apprentices work full-time and attend classes (often college credit bearing) at night and on weekends for three to five years, depending on the trade. When they graduate, they have high-quality, portable skills that provide them with a middle-class lifestyle. With the high demand today and opportunities for overtime, some building trades apprentices are making six-figure wage and benefit packages.



By completing their apprenticeship, workers achieve *journey-level* status. As journey-level workers, building trades union members can continue to receive training at no additional cost to themselves for the duration of their careers.

Our apprentices work full-time and attend classes (often college credit bearing) at night and on weekends for three to five years, depending on the trade.

Collaborating for Brighter Futures

What NABTU has in common with the AFT is a commitment to excellence in education, training, and equitable opportunities for young people. Given the new demand for electricians, iron workers, construction laborers, painters, plumbers and pipefitters, bricklayers, elevator constructors, insulators, and operating engineers, we need AFT teachers and school counselors to spread the word among their students and communities that union construction is a viable and well-paying career, especially for young women and students of color. This “word spreading” could include positive images of female construction workers and those from communities of color. You may be familiar with the expression “If you can’t see it, you can’t be it.” We need elementary and middle-level teachers and counselors to explain to students that our career opportunities are real and attainable for everyone.*

At the secondary level, we request that teachers and counselors make their students and advisees aware of the opportunities available today. And we need them to steer interested students into classes, such as applied math or CTE construction skills classes, that will prepare them to successfully enroll in building trades Registered Apprenticeships after they graduate.

Our last request of AFT teachers and counselors is to advocate for the integration of the Multi-Craft Core Curriculum (MC3) in their schools.† The MC3 is a comprehensive, 120-hour, pre-apprenticeship curriculum that is currently offered in approximately 75 US high schools as part of Apprenticeship Readiness Programs (ARPs).

In 2007, NABTU spearheaded efforts to develop these programs, which can be offered in adult reentry programs, high schools and community colleges, and programs for justice system-involved individuals. The MC3 was designed in 2008 for use in ARPs to prepare young people with the professional skills necessary for successful entry into construction Registered Apprenticeship programs, based upon an informed choice about the particular trade they want to pursue. The MC3 teaches students construction skills and knowledge, including an introduction to blueprint reading, construction health and safety, tools, materials, and—most importantly—construction math to improve their chances of successful enrollment in Registered Apprenticeship programs. These programs are designed to be flexible and meet the needs of the participants. Since 2016, 22,000 participants have successfully completed the MC3, of which 77 percent identified as people of color and 20 percent identified as women.

In 2022, NABTU and other industry stakeholders created a new organization called TradesFutures to continue the work of refining the MC3 and creating new ARPs in partnership with community-based and educational organizations—including the AFT. As we see it, the MC3 is the critical link between two of our nation’s premier education systems: the US public school system and the building trades’ privately funded, high-quality Registered Apprenticeship system. By working together, we can rebuild our nation’s infrastructure and our middle class at the same time.

As AFT members know well, we need to ensure young people have full access to career opportunities that will provide them with the ability to support themselves and their future families. The current generation of students will encounter a future many of us have never imagined. They are interested in doing good in their communities while also making a good living. We believe the building trades offer young people opportunities to do both. There has never been a better time to capitalize on federal and private investments in infrastructure to lift up our local communities and provide students with the tools to build a future they can believe in.

Let’s help them build this future together!

For the endnotes, see aft.org/ae/spring2024/kriger_schwartz.

*NABTU also supports the recruitment and retention of our female members by sponsoring Tradeswomen Build Nations, the largest conference of women in construction in the world. In addition, TradesFutures has funded childcare pilot programs in New York City and Milwaukee, addressing one of the fundamental barriers to women in the construction industry.

†To learn more about using the MC3 in schools, see go.aft.org/8sp.



Granite City

Building Partnerships Across the Rural-Urban Divide



By Jackson Potter

As the vice president of the Chicago Teachers Union (CTU), I used to assume that many of our big urban teaching realities were a world apart from the concerns of educators in smaller rural towns on the Illinois and Missouri border. However, a recent experience challenged that assumption. Now I see that our urban and rural locals face many of the same challenges—and so we should be working together. Activism is in my DNA (I led a walkout of my high school in 1995 to highlight the need for equitable school funding statewide), so when I see a need, I start by exploring the problem and identifying potential campaigns and activities. Then reality settles in. My plate is full in Chicago—can I really add urban-rural partnerships into the mix? While I haven't been able to devote the time I'd like, I have been taking advantage of opportunities to learn.

In the fall of 2022, our Illinois Federation of Teachers (IFT) convention was held in St. Louis, Missouri (the St. Louis metro area spans Missouri and Illinois). Wanting to get to know nearby locals in Granite City and Madison, Illinois, I arrived early. And thanks to my fellow IFT executive board member Chuck Noud—a music teacher and the president of the Granite City Federation of Teachers (AFT Local 743)—I was scheduled to teach a civics

lesson at Granite City High School before the convention officially began. Ahead of my visit, Noud described Granite City as “a community in flux that has experienced a lot of changes over the years, resulting in economic decline and presenting opportunities for a creative resurgence. We see large economic growth in surrounding areas.”¹ Granite City currently has a population of nearly 30,000, down from a high of just over 40,000 in 1970 (before a recent decline in industrial plants, and therefore jobs, began).²

An avid biker—and a believer in getting to know an area by experiencing it—I decided to bike from my hotel in St. Louis to Granite City High School. It was pitch black when I started riding on the river trail out of St. Louis at 6 a.m. Soon, I was surrounded by construction yards, encampments for unhoused people, steel manufacturing shops, and timber salvaging operations on both sides of the trail. It was the most industrial section of bicycle path I'd ever seen—until I got closer to Granite City. After dodging numerous gravel sections, dump trucks, and semis loading up and shipping out, I crossed a bridge and reached the Illinois side of the Mississippi River.

Almost immediately, my senses were overcome by the intensity and magnitude of industrial activity. The streets were lined on both sides with warehouses, a US Steel Corporation mill about a mile long, a coke processing plant, refineries, concrete production, railroad depots, lumber and millwork facilities, and more. Mixed in were small bungalows—a residential-industrial remnant of how many mill towns in the United States were

Jackson Potter is the vice president of the Chicago Teachers Union (CTU), AFT Local 1. A former high school teacher, he was a founder of CTU's Caucus of Rank-and-File Educators.

developed. Steel jobs have been part of Granite City's identity since 1895,³ soon after the nascent industry was boosted by the McKinley Tariff Act of 1890.⁴

Granite City has experienced its share of the old and new economies. Shuttered plants have been replaced by hospitals and retail jobs, and there has been an influx of Black, Latine, and Asian families taking the lower-paying jobs left in the wake of deindustrialization and divestment.⁵ While the city's population is still about 80 percent white,⁶ the high school's student population is now about 64 percent white, down from over 70 percent in 2019.⁷

Although all the students and their families share similar economic interests, class solidarity in Granite City is being challenged by these changing racial demographics and job scarcity.⁸ In 2024, the US Steel mill that employs about 1,400 people is at risk of significantly reducing production due to a pending sale of the company to Nippon, a Japanese steel manufacturer.⁹ The plan still involves an earlier effort to repurpose the two blast furnaces that will likely result in 1,000 people losing their jobs.¹⁰



In this community, saving jobs is a top priority, even though another interest all the students and families share is environmental. More than a century of steel production means more than a century of pollution, and the Environmental Protection Agency has noted very high rates of cancer in the area.¹¹

Arriving at Granite City High School, I was struck by both how close the school is to the steel plant and how racially divided the classes were. As is true in high schools throughout our country,¹² white students were disproportionately enrolled in the higher-level honors and AP courses,¹³ and students of color were disproportionately in the regular and remedial courses.

The civics lesson I had been invited to teach was for an AP economics class. I chose a lesson about power that the CTU uses with its summer organizing interns (who are CTU members seeking to boost their advocacy and activism skills). It centers on an interactive discussion in which students grapple with and define power. AP economics students already have a macro understanding of power; they are studying economic power, concentrations of wealth, and supply and demand. Part of our discussion personalizes power: Who has it? Who doesn't? What are their experiences of power? How do they distinguish the powerful and powerless—and why? Given how few students of color there were in this class, it was striking when a Latino student shared his experience of being exploited at work. He said that he often has to “deal with verbal abuse and arbitrary demands, low pay, and preferential treatment of some employees over others.” None of the white students had a comparable example to share.

Through this discussion, we established a shared definition of power focused on organized money or organized people. Students soon saw that the ability to make and act on decisions is key: you can't put money under a blanket and expect to have power, and you can't not interact with people and expect to have power. Then, we considered examples of people who have or had power, from Elon Musk to Martin Luther King Jr.

In the next phase of this discussion, I asked students what they would do if they had a great deal of power. Like other classes in which I've taught this lesson, the students in Granite City started thinking very small, like buying a nice house. As I challenged them to think bigger, soon they were demanding affordable housing for all, free universal healthcare, free college, and so on. After egging them on for about 10 minutes, I shifted gears abruptly, making it clear that they have no power—I have it. Then I told them what I was willing, and not willing, to do. I took on a bullying persona like a CEO of a Fortune 500 company, telling them they had to stay in the room, simply because I said so. After a few minutes of this bullying behavior, a student grasped that they had to stand up and organize themselves to take power from me.

The lesson wraps up with a debrief: Why were they reluctant to stand up to me? What aspects of our social conditioning were holding them back? Why do powerless people accept abusive, controlling behaviors and take so long to decide to organize in order to create some power for themselves? What would it take to wield power collectively? This activity always generates an intense and memorable conversation for most students (and adults).

For these students in Granite City, it was a good opening exercise to inspire them to consider what's possible. Now, they need to connect to a local challenge in which they see how exercising their agency looks and feels in motion. They should be asking tough questions of decision makers and figuring out how to organize people to advocate on the street and in the boardrooms. So one question I left with that day was obvious: How can we, as educators and union activists, help them help their community?

In the following months, the more I thought about the CTU's work in Chicago and the challenges facing Granite City, the more I saw how much our needs and goals overlap. Then more specific questions came to mind: Can we teach students in Granite City to become advocates for both saving steel mill jobs and reducing pollution? Can we give them the skills and tools they need to form diverse coalitions to bring about the just transition to a green economy that will be critical for their futures? Can the common causes of saving jobs and improving health and the climate become enough to form strong bonds between the longstanding white families in the area and the more recently arrived families of color?

Lessons from the CTU's Freedom School

It may seem like our big city locals are a world apart from our rural ones, but efforts by the CTU to build coalitions across diverse community and labor networks show how powerful partnerships can transform our landscapes.¹⁴ The CTU's current drive to provide educational and economic opportunities while addressing the climate crisis is a good example.

In the fall of 2024, the Chicago Public Schools will open up a citywide public engagement process to create a 10-year facilities master plan. The CTU has big plans to impact the district's vision. In the 2022–23 school year, we started a campaign to convert all 600

district schools to green, sustainable, and anti-racist schools that convey love and liberation for our students and families. That objective requires anywhere from \$15 to \$25 billion to ensure all students are transported by electric buses (instead of diesel) and all schools are powered by solar, have heat pumps, possess gardens and green space, and are free of PCBs, lead paint, lead pipes, and asbestos. If achieved, this ambitious plan will provide countless opportunities to partner with the trades and form career and technical education (CTE) programs to ensure that our students, nearly 90 percent of whom are students of color (with 47 percent Hispanic and 36 percent African American students¹⁵), gain valuable insights and skills to participate in the green economy. Already we are seeing results from our advocacy, pushing the district to apply for and win a \$20 million federal grant to manufacture the first in-sourced electric buses in Chicago's history.¹⁶ Imagine school renovations that require contractors to hire and train people of color in economically distressed parts of the city. And imagine CTE programs that provide apprenticeships for students in solar panel design and installation, allowing them to improve their school facilities and nearby residential housing units.

Starting to bring this vision to life, in the summer of 2023 the CTU ran its first Freedom School with 16 students and 5 educators from schools across the city. Over two weeks, they engaged in a series of learning adventures about environmental issues and their impact on communities throughout Chicagoland.¹⁷ The participants developed action plans for refurbishing their own schools and reimagining buildings across the city. On the final day, June 23, 2023, students met with the heads of the school district and the school facilities department and then the mayor and the deputy mayor of education to share their proposals. In early July, three student leaders from three different schools testified at a Board of Education meeting about their experiences at the Freedom School. They detailed the specific needs of their schools and the importance of including them and their communities in the development of the new master plan.

The idea for our Freedom School emerged from the work we've been doing the last two years through our Climate Justice Committee. This is where CTU members forged our vision for a green, healthy, sustainable, anti-racist school district that improves the facilities where we teach and where students learn, starting with the communities that have endured the greatest systemic inequities, such as environmental racism.¹⁸

Two critical issues are removing lead paint from our schools and adding solar panels. In addition, we have several hot zones for pollution, mainly in communities of color. This is an ongoing legacy of environmental racism.¹⁹ For decades, industrial zones, bus depots, highways, landfills, and other sources of pollution were intentionally placed next to Black and brown neighborhoods when people of color had no other housing options because of redlining.²⁰

For our Climate Justice Committee, key questions are: How do we center the communities that have been harmed the most to receive the greatest school renovations and healthiest environments? How can we offset some of the historical damage and environmental racism that those communities have experienced and continue to endure? How can we ensure this is a coalition effort with community organizations involved? Knowing that students are very interested in climate change and environmental racism, how do we involve students in their own school communities as advocates?

The Freedom School was intentionally designed to build connection and coalition between Black- and brown-led environmental justice organizations, our students, and our members throughout the city. For instance, on a field trip to the South Side's Altgeld Gardens community, students met with Cheryl Johnson, the daughter of the late Hazel Johnson, who is known as the mother of the modern environmental justice movement.²¹ Altgeld Gardens has been referred to as the Toxic Doughnut, in large part because of the steel manufacturing that used to be in the area.²² It's a public housing community with almost entirely Black families, and there's a Black-led organization, People for Community Recovery (which Hazel founded and Cheryl now leads), advocating for the corporations that polluted the area to now clean it up. In addition, they are demanding restitution for the families who have suffered. For students, it was striking to grasp how a community that has been repeatedly poisoned for decades is standing up for itself.

Along with studying environmental challenges, we wanted students to reconnect with nature, even in our urban environment. We did a camping trip in Big Marsh Park, a relatively new addition to the Chicago Park District system. Big Marsh first opened in 2016 and was erected out of the rubble of the industrial dumping ground in the Lake Calumet area that used to house the nation's largest steel factories. It is now an incredible urban wildlife oasis where students hiked, biked, engaged in birding, and listened to dozens of coyotes howl throughout the night. It was also the first camping trip for 15 of the 20 participants. The students really had a memorable experience that reinforced the importance of preserving and conserving nature, including by converting to green energy.

To help develop their plans for greening their school facilities, students interviewed district officials who walked the group through a school building so students could gain insights into the challenges of renovating and greening our facilities, which average 82 years old.²³ To prepare for this walkthrough, students read a *Chicago Tribune* article stating that 70 percent of schools had at least one water fountain that tested positive for lead.²⁴ They used that information to ask the district officials pointed questions.

Our 2023 Freedom School was just a proof of concept. In the summer of 2024, we'd like to expand from two weeks to six weeks of youth programming so students can engage in deeper explorations, such as doing assessments of their school buildings and comparing communities with newer infrastructure to those that have been allowed to deteriorate. We'd like students to gain hands-on skills in infrastructure by examining HVAC systems, paint (especially peeling lead paint), and plumbing. Equally important, we'd like them to gain skills in meeting with community organizations, especially those that have been doing this work for a long time in frontline communities like Altgeld Gardens.

Ultimately, our Freedom School will be a strong pipeline for youth leaders who can build coalitions, conduct needed research, and be advocates for the green, anti-racist vision we share. And the more I reflect on what our initial Freedom School accomplished, the

Community challenges are opportunities to build coalitions around shared goals.



more I think back to that AP economics class in Granite City. Those students are facing the same fundamental economic and environmental crises playing out in Chicago's most polluted areas. For the CTU, our experience with the Freedom School was transformational because it gave us insights into how we could build CTE pipelines and fortify our labor tables. It also served as a model for building regional solidarity across rural and urban counties. Imagine not just a Freedom School in Chicago each summer, but Freedom Schools all across Illinois sharing the goal of creating green, healthy, sustainable, anti-racist schools that prepare youth for good green jobs and community activism. Fortunately, our state offers a Freedom School grant²⁵ that's fairly easy to win. So while this is just a vision at the moment, it's one that many of our locals could realize.

Imagining a Brighter Future for Granite City

It's not an exaggeration to suggest that the health of democracy and the planet itself may depend on our ability to bridge the urban-rural divides within our states and across the country for the sake of winning green, sustainable community schools and infrastructure.

The combined threats to Granite City's economy and environment present a once-in-a-lifetime opportunity to form a coalition-based effort to convert to green schools, clean up polluted areas, and look ahead to a just transition to greener, cleaner jobs. But Granite City can't form the type of strong coalition needed without being able to build across communities—including across unions and racial divides, and across longtime and new residents—and to see past our differences.

In Chicago, the CTU's base of strength is the incredible relationships with our students and their parents and other caregivers, relatives, and neighbors. When there are challenges in a community—like Granite City's steel mill announcing plans to transfer 1,000 jobs out of state—that's an opportunity for us as the teachers union to expand our base by connecting to the affected students, families, and unions. It's also an opportunity to expand our thinking. When we form new coalitions, we anchor them in new, shared conceptions of improved conditions. Keeping what we have is not inspirational or adequate.

Educators in Granite City could accomplish a great deal by adopting this mindset. With climate change dominating young people's concerns in national polls,²⁶ with community health in Granite City at risk from industrial pollution, and with the threat of losing up to 1,000 good-paying union jobs, the only path forward may be to develop a new vision for a just transition to greener, cleaner, good-paying union jobs. Imagine partnering with the state of Illinois and putting pressure on the next owner of the steel mills

to do right by the workers and their communities. Instead of letting the owners transfer jobs and pollute another community, a broad, strong Granite City coalition could make offers that are appealing. For example, it might be hard to quickly reduce the factory's direct environmental impact, but the next owner can sponsor and help apply for a government grant for new electric school buses. It could start actually paying local property taxes into the adjacent school districts, instead of taking subsidies that deprive the schools of essential resources.²⁷ Both Granite City and Madison County have endured over a century of contamination without seeing tax benefits accrue to schools or communities. Additionally, despite the fact that Madison also sits next to the plant, it does not receive any of the property tax revenue to support schools or services. A win for the community would be to force US Steel's successor to become a great community partner instead of a cut-and-run avatar for capital flight. But that's just one idea from an outsider.

As we build bridges across locals, it's important to focus on sharing strategies and tactics—like building diverse coalitions to rally around shared goals—and keeping the goal setting local. Learning more about Granite City, and nearby Madison, in the months after my visit, I saw more and more opportunities for coalition-based progress.

Getting to Know Madison County

Madison County, which includes Granite City, trends conservative in its voting history; Trump won by 15 points in 2020. In 2022, Madison County voters gave Republican candidates a clean sweep of the seven key offices at the state level.²⁸ However, an amendment of the state constitution on the ballot to establish the right to collective bargaining and union organizing, the Workers' Rights Amendment, passed the county by a solid 55 percent majority.²⁹

This support for unionization shows an opportunity to turn the tide politically. The Workers' Rights Amendment's success suggests that there is an alternate path to motivating the Democratic base while simultaneously providing movement infrastructure to grow it.

In contrast to Granite City, neighboring Madison (a small town of about 3,000 people split between Madison and St. Clair counties) has a majority Black population and is also a much more reliable base of support for Democrats. Currently, both teacher union locals are working with the steelworkers to stop the deindustrialization of the area. This could evolve into a broad, diverse coalition of all union members in the region—including educators—and their networks, such as students whose family members fear deindustrialization and restaurant owners and workers who depend on customers with good-paying jobs.

Whereas manufacturing jobs are often associated with urban America, they constitute 15 percent of rural earnings—far more than the 9 percent of urban earnings nationally.³⁰ As one labor scholar explains, "there are more factory workers than farmers in rural America. And many of these rural factories employ a racially diverse workforce."³¹ That's true in Granite City—and it gives Granite City another strength to build on. According to Dan Simmons, president of United Steelworkers Local 1899 in Granite City, 60 percent of his members are white men, 25 percent are Black men, and the remaining 15 represent other groups. (There are very few women of any race working in the mill.) Simmons described steelwork as providing a standard of living that is a "little better off than the surrounding industry."³²

Wanting to better understand the challenges and opportunities in Granite City, I spoke to him at length, listened to his ideas, and tossed out ideas based on the CTU's coalition-based work. Simmons has consistently welcomed the possibility of a teacher and steelworker coalition to hold the company owners—and the state—accountable to the needs of the larger community. The local teacher unions, along with the Illinois Federation of Teachers, and the United Steelworkers plan on issuing a letter to the company and Governor J.B. Pritzker calling on them to protect the workers by providing guarantees of a just transition and financial support to ensure their families, the schools, and all taxing bodies are held harmless by the profiteering of the steel corporations.

As I got to know Madison County, one factor that could inhibit such a diverse coalition stood out: where diverse communities had, and had not, formed. My initial experience in the disproportionately white AP economics class alerted me to this concern, then other indicators soon came into view.

When Noud, the Granite City Federation of Teachers president, grew up in Granite City, it was an overwhelmingly white working-class community with a wide range of high-paying unionized jobs. Now he and his fellow teachers are facing a rapidly changing student body who are living and learning in a very different context, both economically and culturally. The school system is projected to be over 40 percent students of color in the next year, while over 98 percent of the teachers are white.³³ This is concerning given the well-established research showing the benefits of a diverse teaching force, and particularly of students having teachers who share their racial and cultural background.³⁴ And, the climate and culture of the high school has received low marks by students and staff in the state's school climate surveys.³⁵

According to a recent study by the *Chicago Tribune* and ProPublica, Granite City has a significant number of students ticketed and fined in the state for disciplinary violations, 70 in all.³⁶ The district has not released data to the media breaking down those numbers based on racial demographics. However, it's likely to follow school suspension and expulsion data. The percentage of students of color in the district has gone from 29 in 2018 to 36 in 2022,³⁷ whereas the percentage of students with in- or out-of-school suspensions who are of color has risen from 44 percent in 2015 to 55 percent in the 2021–22 school year, according to the Illinois State Board of Education.³⁸ So, as Granite City has become more diverse, the percentage of disciplinary infractions has fallen even more disproportionately on students of color.

But the situation is far from bleak. As Noud and I discussed these challenges, he emphasized that the community has become resilient from prior periods of plant closures, though he also fears they may share the fate of other rust-belt communities, such as loss of tax revenue, property values, and population. Still, he said, “These are difficulties at times, but ... our faculty and staff are focused [on] and geared towards giving our students the best education we can.”³⁹

Imagining a Way Forward

Reflecting on this conversation, I came back to one of the CTU's key lessons from coalition building in Chicago: keeping what we have is not inspirational. Imagine diversifying Granite City's educators, ensuring they reflect the student body and their diverse families—many of whom make up the workforce at the steel mill and surrounding retail stores. This would greatly strengthen the

potential for developing a strong coalition across Madison County and, in my opinion, is the only way to achieve a shared goal, whether that goal is merely to save 1,000 to 1,400 jobs or to make a just transition to green schools, green jobs, reduced pollution, and a healthier, more connected community.

Fortunately, I didn't have to look far to find local expertise in diversifying the educator workforce. Madison, the small, predominantly Black town, is succeeding in this work. According to Madison Federation of Teachers President Joshua Webster, his local has undertaken an effort to diversify the teacher ranks of their schools through partnerships. And the district has been very supportive because four out of five administrators are African American. Webster's local has partnered with several of the local teacher preparation programs, including Southern Illinois University Edwardsville, Harris-Stowe State University, and McKendree University. They also work directly with a statewide program, Grow Your Own, to increase the number of Black and Latine student graduates pursuing careers in education. As one of the few Black teacher union presidents in the state, this is one of his top priorities—though he still has a long way to go. Currently, 90 percent of the students are Black and only 35 percent of the teachers are Black.⁴⁰ But crucially, students do see themselves among their teachers, making Webster's efforts to grow the number of Black teachers in their districts so critical.

Thankfully, Webster says, “These administrators know that students' environment and home life goes hand in hand with education.”⁴¹ That's why they supported having white educators participate in the IFT's trauma training; it helped them better understand, communicate with, and empathize with Madison's students. Imagine what this training could do for Granite City. And imagine the goodwill Granite City educators could build if they proposed a diversification plan that focused on the changing student body while respecting the hard work of the existing teachers. For instance, they could demand a diverse teacher training pipeline, showing the forward thinking necessary to build trust and confidence with future coalition partners while allowing the change to happen through normal vacancies.⁴²

Given how I've seen work with partners grow and expand in Chicago, I was not surprised to learn that Webster's local has also been actively involved in shifting the political landscape of the county. “By working with local clergy and civil rights organizations, ... our

When coalitions are large, diverse, and determined, they win.



The health of democracy and the planet may depend on our ability to bridge urban-rural divides and win green, sustainable infrastructure.

with maintaining and growing pro-labor policies for the region. Such coalition forces will be increasingly necessary to combat existential threats that face unions and the larger community on the horizon—like those that face steelworkers in the area.⁴⁴

Webster's work in Madison is a great foundation for a much larger regional coalition. Imagine Webster, Noud, and Simmons mapping out which communities they can each bring to the table—not just their members, families, neighbors, and students but also everyone who voted for the Workers' Rights Amendment. And imagine that broad, diverse, strong table negotiating its own new vision for their region. Now that's inspirational.

There are times when this work feels impossible, and there are setbacks. But the CTU's work over the last decade has shown me that when coalitions are large, diverse, and determined, they win.⁴⁵ Sometimes quickly, sometimes with protracted struggle. They win.

This is true in rural areas too. Consider McDowell County, West Virginia. In the early 2000s, the loss of unionized coal jobs upended a solidly middle-class standard of living. Families faced sky-high unemployment, crushing drug abuse, and diminished life expectancy. In 2011, AFT President Randi Weingarten and former West Virginia first lady Gayle Manchin developed a project called Reconnecting McDowell to address economic dislocation and poverty through a broad coalition of alliances and policies. Today, over 125 national, state, and local partners have helped establish free broadband for all schools, dental care for families, enhanced clinical interventions for students, and affordable housing for teachers. As a result, high school graduation rates and academic outcomes have improved.⁴⁶ McDowell demonstrates that places like Granite City, according to Weingarten, "can thrive again, that all children regardless of demography or geography can thrive."⁴⁷

As in Chicago and Granite City, McDowell County has a history of industrial pollution. For McDowell, a critical problem is water quality after decades of coal mine operators neglecting their obligation to protect waterways.⁴⁸ But now, thanks to a partnership between Reconnecting McDowell and the West Virginia Department of Environmental Protection's Project Water Education Today, fourth-graders in McDowell are learning about how to be good stewards of their local waterways. Visiting a riverside park, they studied aquatic life under microscopes and went into a soil tunnel to see the water's impact.⁴⁹ This is not (yet) as elaborate as the CTU's Freedom School—but it's a start, and one that Granite City could readily adapt.

local has been instrumental in registering voters, canvassing, and getting out the vote," Webster said.⁴³ He has also developed strong relationships with statewide legislators and local politicians through our IFT field service director (a staffer who supports local leaders with contract negotiations, grievances, and community partnerships). Webster sees this activity as central to building a diverse educator workforce in the future, along

While Reconnecting McDowell is a particularly ambitious project, much can be accomplished with just a handful of partners. For example, when the AFT learned that the semiconductor manufacturer Micron is building a new plant in Syracuse, New York, it spurred a partnership with local school systems and teachers unions. Now, there's a collaborative effort underway to prepare students for engineering and technical careers at Micron—and to offer professional development to teachers to teach this innovative content.* With the Biden administration passing the CHIPS and Science Act,⁵⁰ the Inflation Reduction Act,⁵¹ and the Infrastructure Investment and Jobs Act,⁵² these opportunities will grow exponentially if we take advantage of them.

Teachers in Granite City and Madison, and steelworkers in both towns, are facing crises that they can turn into opportunities. Demographic changes, deindustrialization, and generations of pollution can become the catalyst for people to band together and fight for a just transition to green schools and green jobs for all.

This work begins with us.

By living next to, growing up with, and developing deep relationships with students and families their entire careers, teachers occupy a key intersection for hope and transformation. Solidarity may not be enough to surmount the considerable obstacles on the horizon, but nothing short of a multiracial coalition can address the current challenges.

I was raised by labor lawyers who were active in the union movement, working to make a more just society. I don't believe that any progress will be made in isolation. To address racial and economic inequities, to ensure LGBTQIA+ students and families feel safe and have equal rights, to offer opportunity to all, we have to work together. We have to form coalitions and launch campaigns that stretch beyond our comfort zones and our traditional communities. That's how movements grow.

There is a longstanding critique of teachers unions as being more concerned about adults than students. That's not true. We bargain for the common good. We're trying to advance the interests of young people, from securing basic classroom supplies to expanding CTE for green jobs. Still, if we're not explicitly doing things as unions alongside young people, it will be easier for anti-union extremists to separate us from our base—to separate educators from their students and communities.

In Madison County, if it's just the teachers union presidents of two locals fighting a giant industrial behemoth, they'll lose. If it's every member of those teachers unions, the young people in their classrooms and their families, and the steelworkers, then they'll have a large community that feels empowered and understands their agency—and they'll win.

I can't think of a single movement that was able to reach its heights without student involvement. We saw that with the civil rights movement, and now we're seeing it with efforts to win more environmental justice. I think young people are the conscience of the country. And I think Dr. King put it best regarding the Children's March in 1963: young people are not just receptacles that are influenced by adults; children have their own beliefs, ideas, and needs.⁵³ Like King, we must have the courage to let them lead. □

For the endnotes, see aft.org/ae/spring2024/potter.

*To learn more about this partnership, turn to "Advancing Tech Dreams" on page 21.

How to Bring Antiracism to Life in Teachers Unions and Beyond



Fostering educational justice coalitions, with parents and community organizations deeply embedded in Black, Latine, and Indigenous communities, has been central to the Chicago Teachers Union's success, so I was highly motivated to help the Illinois Federation of Teachers (IFT) develop its 2021 *Antiracism Organizing Guide* (available for free at go.aft.org/ixj). Occasionally, union members who are new to coalition building will ask why we have to focus on antiracism. While the civics teacher in me prefers to challenge white supremacy and our roots as a settler colonist society—from stealing Indigenous lands to enslaving people to redlining—the IFT's guide is easy to use and direct. As it explains:

[Antiracist work] is imperative to us winning. Race baiting has always been used as a strategy to divide workers and push anti-labor, corporate interests. Racial solidarity is our strategy to build power and dismantle oppressive systems that exploit working people.¹

I hope everyone will embrace antiracist work in order to, as the guide says, “create a world where we can all live fully in our humanity.”² The union movement was built upon the need for “Black and white to unite and fight,”³ and it can only grow through a similar approach.

Along with offering examples of how several IFT locals—including the Chicago Teachers Union and Granite City Federation of Teachers—are advancing antiracism, the guide shares several ways to bring antiracism into standard union processes and practices. The box below provides excerpts from page 5 of the guide to show some of the ways that all teachers unions could engage in this work.

Antiracist work starts with examining the many systems, policies, and practices of a workplace and union. Are they producing racist outcomes? Do they center the needs of the most marginalized, excluded, and exploited?

- **Recruitment, hiring, retention, and promotion**

What processes are used to recruit and hire candidates? Is the candidate pool diverse? Are there internal systems to ensure that there is intentional outreach to historically marginalized groups? Are there support systems in place for diverse candidates to succeed and thrive in your workplace? Are BIPOC [Black, Indigenous, and people of color] members disproportionately assigned to less desirable work that is compensated at a lower rate?

- **Union leadership**

Does the leadership of your local/council/chapter reflect the diversity of your membership? The community you serve? Are there opportunities for engagement and participation for all members? Are the contributions and participation of all members welcomed and valued? How does the local/council/chapter encourage or discourage the engagement and participation of underrepresented groups?

- **Curricula**

Do students see themselves in positive and affirming ways within the curricula? Do they have an opportunity to “see” and learn about other cultures and their

contributions to society? Do the curricula encourage students to critique and challenge systems? Does it encourage students to ask questions or just answer questions?

- **Discipline policies and procedures**

- » **Students:** Are Black students, students with disabilities, or queer students disciplined more frequently or more harshly than their peers? Do students have more access to police than to social workers, counselors, or psychologists? What about dress codes: Does the district discourage certain hairstyles and styles of dress that are commonly associated with nonwhite cultures?
- » **Members:** Are folks of color or LGBTQIA+ folks disciplined more frequently/harshly? Does the code of “professional dress” adhere to white standards? Do certain rules impact marginalized staff more than others? Are rules fairly applied?

- **Class/student assignments**

Are Black and brown teachers more often assigned “those kids”? Do Black and brown teachers have less access to teaching higher-level courses (i.e., Advanced Placement and honors)? Are Black and brown students underrepresented in Advanced Placement and honors courses and overrepresented in remedial courses? How is student placement in these courses determined?

Teachers unions that engage and act upon these ideas—as well as the others that are offered in the IFT's guide—will be well prepared to help build the broad, diverse, and antiracist coalitions that are necessary to meet our students' needs.

–J. P.

For the endnotes, see aft.org/ae/spring2024/potter_sb.

Climate Justice for All

Pursuing a Just Transition in the Education Sector



By Todd E. Vachon

On Sunday, October 28, 2012, teachers across the Northeast were glued to their television sets to watch the latest weather forecast about the approaching hurricane. Schools would be closed Monday. Emergencies were declared, line crews were summoned, shelters were prepared, and command centers were opened. New York City made the unprecedented decision to stop all subway service.

As feared, Superstorm Sandy arrived with a vengeance the next evening, knocking out power for eight million people across 17 states, destroying countless homes, rendering the NYC subway system nonoperational, and closing all 1,750 of the city's schools for a week. Dozens of damaged schools remained shuttered even longer, forcing students to share buildings with other schools, sometimes in distant boroughs of the city. Over 100 deaths were attributed to the storm, including at least one teacher. As with previous extreme storms such as Hurricane Katrina that hit the Gulf Coast in 2005 or later storms like Hurricane Maria that ravaged Puerto Rico in 2017, it was the working class and poor—the frontline communities—who were hit first and worst.

Todd E. Vachon is an assistant professor of labor studies and employment relations at Rutgers University, the director of the Labor Education Action Research Network, and the author of Clean Air and Good Jobs: U.S. Labor and the Struggle for Climate Justice. He is also an American Federation of Teachers New Jersey vice president for higher education.

Nine years later, New York and New Jersey were devastated again by Hurricane Ida while still continuing to shore up infrastructure ruined by Sandy. The National Oceanic and Atmospheric Administration places the total cost of Superstorm Sandy at over \$70 billion¹—possibly the costliest to ever hit the region, making it the most economically devastating event to hit New York City since the terrorist attacks of September 11, 2001.

While individual weather events like Sandy cannot be directly attributed to climate change, their likelihood, frequency, and intensity are all increased by climate change. As the Earth warms, storms that used to happen once a century are now happening more frequently, and the impacts on students, teachers, and communities are devastating.² This article explores some of the causes of the climate crisis, including its relationship to social and economic inequality, and what educators can do—and many already are doing—through their unions to promote climate justice and equity in their schools and communities. Perhaps your local union will be the next to take bold climate action and become a part of the solution by helping to forge your own local Green New Deal and joining the national effort.

The Problem: Dual Crises of Ecology and Inequality

The world is in the midst of two simultaneous and interconnected crises: a crisis of ecology and a crisis of inequality. Climate change is negatively affecting human health and quality of life and is dis-

proportionately impacting marginalized populations. At the same time, socioeconomic inequality has increased dramatically. The top 1 percent of earners now take home 22 percent of all income in the United States, the top 10 percent own 70 percent of all wealth, and real wages for American workers have been stagnant for decades.³ These economic disparities are amplified along the lines of race, gender, and citizenship status.

Climate change is caused predominantly by the burning of fossil fuels such as oil, gas, and coal, which emit greenhouse gases (GHGs) into the atmosphere, causing the planet to warm.⁴ As the planet warms, local climates are altered, leading to more frequent and intense storms, more wildfires and droughts, accelerated melting of arctic ice, rising sea levels, and the mass extinction of species that cannot adapt rapidly enough to the rate of climatic change.

Rising economic inequality is due to a variety of factors, including declining unionization; tax cuts for the super-rich; labor market deregulation; the replacement of full-time, permanent jobs with part-time and temporary work; a weak social safety net for working families; and the increased financialization of the US economy.⁵ All of these factors accelerated around 1980 with the rise of free market fundamentalist (aka neoliberal) leadership in the federal government.⁶ Rising inequality^{*} has been associated with increased social and health problems, lower life expectancies, decreased child well-being, a decline in trust in public institutions—including schools and governments—and an erosion of support for democracy itself.⁷

The figure below illustrates the simultaneous rise of GHG emissions and income inequality between 1950 and 2018. Global emissions increased more than sixfold during this period, from just under 6,000 million metric tons of carbon dioxide (MMTCO₂) in 1950 to 36,000 MMTCO₂ in 2018.⁸ At the same time, the share of all income earned by the top 1 percent of earners in the United States more than doubled from a low of 9 percent in 1978 to over 22 percent in 2018.⁹ According to Oxfam, the world's top 26 billionaires now own as much as the poorest 3.8 billion people on Earth, and the richest 10 percent of humans are responsible for nearly half of all carbon emissions caused by consumption.¹⁰

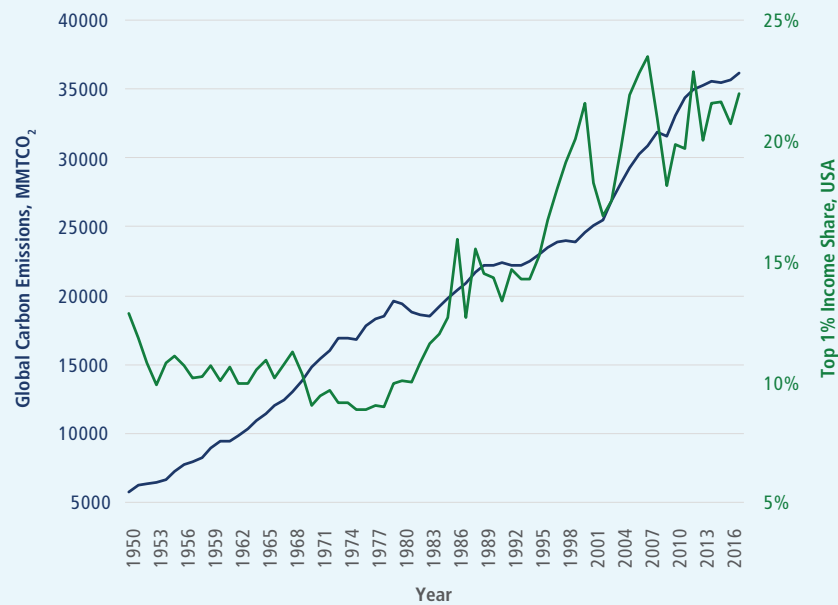
In addition to consuming considerably more than the average person, many billionaires derive their wealth directly from owning fossil fuel corporations, many of which have funded climate change denialism to prop up their corporate profits.¹¹ Billionaires of all backgrounds also invest heavily in financial instruments that promote the extraction, production, transportation,

and consumption of fossil fuels. A 2022 report from Oxfam finds the investments of just 125 billionaires produce 393 MMTCO₂ emissions every year.¹² That's equal to the total emissions generated by the country of France. On average, one billionaire's investments' annual emissions are a million times higher than a person in the poorest 90 percent of the world's population.¹³

Many of these same billionaires have also spent large sums of money combating union drives as well as influencing politics to weaken labor protections. In other words, many of the top contributors to the climate crisis are also the strongest anti-union forces and promoters of policies such as “right-to-work” laws, which reduce worker power, suppress wages, and increase income inequality.¹⁴ According to the Bureau of Labor Statistics, just 10.1 percent of US workers are currently represented by a union—down from a high of 35 percent in 1953. The number is even lower when looking at the private sector, which has a unionization rate of just 6.1 percent.¹⁵ Much of the decline has been due to the erosion of jobs in the once highly unionized manufacturing industry and the massive increase of employment in industries that are not highly unionized due to weak labor laws and vigorous anti-union campaigns by hostile employers, as we have seen with Amazon and Starbucks.¹⁶

At the same time, as a result of the legacy of racism and discriminatory hiring practices, workers from historically marginalized communities, particularly Black and Latinx workers, have been systematically deprived of opportunities to share in the prosperity generated by the fossil fuel economy. Adding insult to injury, these same workers have disproportionately borne the burden of the pollution created by the fossil fuel and other toxic industries.¹⁷ For example, a recent study in the *Proceedings of the National Academy of Sciences* finds that air pollution exposure in the United States

Rising Greenhouse Gas Emissions and Income Inequality, 1950–2018



SOURCE: FIGURE CREATED BY TODD E. VACHON BASED ON DATA FROM “CO₂ EMISSIONS” BY HANNAH RITCHIE AND MAX ROSER AND “STRIKING IT RICHER” BY EMMANUEL SAEZ. SEE ENDNOTE 8 FOR DETAILS.

*To learn more about the societal costs of rising inequality, see “Greater Equality: The Hidden Key to Better Health and Higher Scores” in the Spring 2011 issue of *American Educator*: go.aft.org/sck.

Climate disasters cumulatively increase inequality in schools and communities.

is disproportionately caused by the non-Hispanic white majority but disproportionately inhaled by Black and Hispanic minorities.¹⁸ On average, non-Hispanic white people experience a “pollution advantage” of about 17 percent less air pollution exposure than is caused by their consumption, while Black and Hispanic people, on average, bear a “pollution burden” of 56 percent and 63 percent excess exposure, respectively.

Students, educators, schools, and universities are not immune to the consequences of unchecked climate change and runaway inequality. A study from the National Bureau of Economic Research found that a 1-degree-Fahrenheit hotter school year reduces that year’s learning by 1 percent and that hot school days disproportionately impact students of color, accounting for roughly 5 percent of the racial achievement gap.¹⁹ Each fall, during the height of hurricane season, extreme weather increasingly disrupts back-to-school plans across the country, with closures affecting more than 1.1 million students in 2021.²⁰ In 2022, the US Government Accountability Office released a report on the impacts of weather and climate disasters on schools, finding that over one-half of public school districts—representing over two-thirds of all students across the country—are in counties that experienced presidentially declared major disasters from 2017 to 2019. Recent research in the journal *Scientific Reports* finds that school closures due to wildfires in California generate significant negative impacts on academic performance among students.²¹ The connection between the increasing number of hot days and disaster-related school closures and lost learning are just two examples of how climate change is already affecting education.²²

The impacts of unmitigated climate change also cause severe damage to educational infrastructure. A 2017 report by the Pew Charitable Trusts found that nearly 6,500 public schools are in counties with a high risk of flooding, and a study in the journal *Nature* found that the nation’s flood risk will jump 26 percent in the next 30 years.²³ An assessment by the Center for Integrative Environmental Research at the University of Maryland finds that extreme weather events, such as flooding and wildfires, place immense

strain on public sector budgets at the state and local levels.²⁴ Such budgetary constraints put considerable stress on school budgets and create significant challenges for unions going into bargaining over wages, hours, and working conditions for their members.

Between Hurricane Katrina in 2005 and the West Coast wildfires of 2022, there were over 200 “billion-dollar weather and climate disasters,” totaling over \$1.8 trillion in damages.²⁵ As disasters become more frequent and more forceful, there is an increased understanding that the impacts are unequal. Schools and communities across America have testified to the ways disasters compound, cumulatively increasing inequality and disadvantage. The good news is that there is an important role that students, educators, our local unions, and community allies can play in addressing the dual crises of climate change and inequality.

The Solution: A Just Transition

The extreme inequality and poverty in our very wealthy society are morally reprehensible. They are also the result of decades of intentional policy decisions that have concentrated income, wealth, and power in the hands of fewer and fewer people, who then use that money and power to further expand their money and power. In short, the current rules of the game are not designed to ensure the greatest good for the greatest number of Americans, but rather to ensure the greatest profits for the wealthiest and most powerful Americans. Reversing this trend and centering the common good—putting all people’s economic, social, mental, and physical health before corporate profits—will require significant changes to the way our economy operates. Confronting the climate crisis offers a potential pathway for making some of the important changes in our economy that are needed to recenter the lives and well-being of people. We can right economic wrongs and create good jobs with fair wages and benefits while “going green,” but only if we now make intentional policy decisions that focus on equity, inclusion, and justice.

The concept of a “just transition” attempts to do just that by reducing fossil fuel dependence while simultaneously investing in communities and people by creating good job opportunities that offer living wages, health and retirement benefits, opportunities for promotion, and union representation for displaced and historically marginalized workers. The idea originates from the work of the late American labor and environmental health and safety activist Tony Mazzocchi of the Oil, Chemical and Atomic Workers union.²⁶ Broken into its constituent parts, “transition” refers to “the passage from one state, stage, subject, or place to another,” and “just,” in this usage, is the root word for “justice,” meaning “acting or being in conformity with what is morally upright or good.”²⁷ In other words, a just transition combines the often-conflicting projects of economic transition and the pursuit of social justice into one unified endeavor.

When confronting the problem of climate change, the potential for injustice is great, particularly if decisions are made solely by economic elites and grounded in the logic of neoliberal capitalism. This logic of unregulated free markets has led to the accumulation of wealth at the top while working- and middle-class families struggle, and it is at the root of the false choice between having good jobs or having a healthy environment that many blue-collar workers are confronted with.²⁸ The same logic has led to the construction and operation of polluting facilities in poor



and predominantly nonwhite communities across the United States, while historically excluding the very same populations from access to the job opportunities within or only offering the most dangerous occupations to local workers of color.

The very notion of a just transition challenges the powerful neoliberal ideology that has dominated US governance since the late 1970s. It instead offers a vision of economic democracy, including public investments to account for the full social costs and benefits of environmental and economic policies to create the most just—not necessarily the most profitable—outcome for all. Instead of offering a false choice between good jobs and a healthy environment, a just transition puts people before profits by pursuing both clean air and good jobs at the same time. The education sector has a large role to play in creating a just transition, not only through teaching and learning but also by transforming our facilities and operations to address climate change and in the process creating good career pipelines and reducing inequalities.

As educators, we have a responsibility as the stewards of the next generation to help ensure that we pass along a livable climate with a fair economy to our students and all future generations. It is for this reason that the AFT has adopted several resolutions on climate change in recent years, including “A Just Transition to a Peaceful and Sustainable Economy” (2017),²⁹ “In Support of Green New Deal” (2020),³⁰ and “Divest from Fossil Fuels and Reinvest in Workers and Communities” (2022).³¹ Nationally, at the state level, and locally, the AFT, in partnership with student activists and community groups, has been a leader on confronting the climate crisis, but still more can and should be done to promote a truly just transition. I spoke with a dozen educators and students from around the United States who have been engaging in this work through their unions and in their schools and universities. These conversations inform the recommendations outlined below.

Pursuing a Just Transition in the Education Sector

Like all sectors, public schools, colleges, and universities have played their part in contributing to climate change. According to the Aspen Institute, there are nearly 100,000 public preK–12 schools in the United States. They occupy two million acres of land and emit 78 MMTCO₂ annually³² at a cost of about \$8 billion per year for energy. Our public school buildings are about 50 years old, on average, and far too many operate outdated and inefficient HVAC equipment, have poor insulation, and have electrical and plumbing systems in desperate need of repair.³³ While the problem is widespread, it is even more pronounced in low-income communities and communities of color.³⁴ Public schools also operate the largest mass transit fleet in the country with nearly 480,000 school buses on the road.³⁵ There are an additional 6,000 two-year and four-year public higher education institutions throughout the United States that are also in need of energy efficiency improvements.³⁶

Given their environmental impact, schools, colleges, and universities are an excellent place to begin forging a just transition through investments in green schools that would reduce GHG emissions and pollution exposure while creating good jobs that can address systemic inequalities along the lines of race, class, and gender. This involves installing renewable energy generation and storage systems, renovating existing school buildings to improve efficiencies, constructing new green buildings, securing

strong labor standards, ensuring an open and democratic process for all stakeholders, and requiring local and preferential hiring to ensure that local communities and displaced workers benefit from the jobs that are created in the process.

Constructing Healthy Green Schools

So what are the elements of healthy green schools? Green school projects include installation of solar panels or other renewable energy sources; improving heating, cooling, and ventilation systems (e.g., installing heat pumps); constructing new energy efficient buildings or making retrofits to existing buildings (e.g., new doors, windows, and insulation); installing battery storage for renewably generated electricity; creating microgrids that can support communities during power outages; modernizing lighting; switching from diesel to electric vehicle fleets; automating building systems (including smart thermostats and sensors for lights and faucets); and creating more green spaces.³⁷ These investments not only reduce the carbon footprint of schools but also save money on energy costs and reduce unhealthy pollution.³⁸

These sorts of investments are not cheap. To cover the costs of these investments, Representative Jamaal Bowman and Senator Ed Markey have introduced Green New Deal (GND) for Public Schools legislation that would invest \$1.6 trillion over 10 years to fund green upgrades—but that bill is not yet passed.³⁹ Thankfully, the Inflation Reduction Act (IRA), which was passed in 2022, offers many incentives for local schools to make these upgrades now while we continue to fight for GND for education.⁴⁰ In particular, the AFT and other non-profits lobbied for the inclusion of “direct pay” incentives in the bill that allow tax-exempt entities such as local governments, school districts, universities, nonprofits, and unions to receive direct rebates, in lieu of tax credits, from the federal government to cover a significant percent of the cost of green school projects. The IRA incentives are like grants equal to at least 6 percent and up to 60 percent of any renewable energy project’s cost. However, unlike regular grants, there is no competitive application process. If a school district makes an appropriate investment, the IRS will wire them money. The credits are applicable to the cost for fuel cells, solar systems, small windmills, qualified offshore wind, geothermal heat pumps, and energy storage. Projects that pay the local prevailing wage and hire apprentices from locally approved apprenticeship programs qualify for a 30 percent credit. Projects that meet the domestic content requirement earn an additional 10 percent credit. Projects in energy communities⁴¹ or low-income communities can earn up to an additional 10 percent credit each.⁴²

With direct pay, schools, colleges, and universities can own their clean power and maximize their cost benefits in the long run by keeping 100 percent of the savings. The rebate can be used to pay off huge portions of the project immediately, and the utility

Confronting the climate crisis offers a pathway to recenter the lives and well-being of people.

cost savings from self-generation of electricity in the long run can be used to pay off the balance.

The important thing to note about green school projects is that they must be initiated locally, through local budgeting processes, including bonding discussions, municipal capital budgets, and referenda. Education unions are strategically positioned to lead in this effort. In many cases, they already are—as we'll see below.

Confronting Social and Economic Inequality

Combating the dual crises of ecology and inequality requires prioritizing environmental and climate justice to secure an equitable distribution of environmental burdens and benefits. For example, lead in public water supplies is a tremendous health hazard to students and residents in frontline communities from Newark, New Jersey, to Flint, Michigan, and beyond.⁴³ In these communi-

ties, workers and community activists can together advocate for the repair or replacement of poisoned water pipelines and demand the cleanup of the groundwater and aquifers that feed those pipelines. Education unions and community members can also demand the electrification of vehicles to reduce student and worker exposure to asthma-causing particulate matter pollution and reduce GHG emissions.

Creating more green spaces in urban communities or constructing bike paths or walking trails can reduce auto traffic around schools, colleges, and universities. Community-owned solar, microgrids, battery storage, and resilience hubs are key ingredients to equitable climate resilience. When the regional power company's grid goes down, schools, colleges, and universities, as local anchor institutions, can provide a safe space—known as a resilience hub—for the provision of potable water, electricity for charging medical and communication devices, refrigeration for medications, and other vital services needed to save lives during climate catastrophes such as hurricanes. These facilities are most effective when the solar power is “islanded” within a microgrid, meaning it can be stored and used locally rather than being transmitted onto the regular electrical grid (which is how net-metering works in many states and localities).⁴⁴

Climate equity also means pursuing labor justice and ensuring that the new jobs created are good jobs, providing opportunities not only for workers from historically marginalized communities but also for those displaced from the fossil fuel industry.

As noted above, the IRA promotes strong labor standards by providing additional incentives for projects that offer prevailing wages, take apprentices from qualified apprenticeship programs, and use domestically manufactured materials. Prevailing wages take labor costs out of competition in the construction bidding process, giving high-road union employers a better chance of securing contracts to retrofit old schools or build new green schools. Apprenticeships create a career pathway into well-paying jobs without the burden of debt that most students accrue pursu-

ing college degrees. Sourcing building materials from domestic manufacturers also helps to support local manufacturing job opportunities. AFT locals, in partnership with construction and manufacturing unions and other community partners, can use all of these tools to ensure good jobs are created in the process of greening our nation's schools.

Perhaps most importantly, to truly advance equity and justice through a just transition plan, all voices must be equally included in decision-making. Social and economic justice campaigners operate under the simple principle that “Nothing about us, without us, is for us.” It means that decisions that significantly impact people's lives cannot be fair and just without first listening to those people and empowering them to participate in the decision-making process.

Teaching Climate Justice

As teachers, we know the power of education. Through our lessons in preK–12 schools, colleges, and universities, we are uniquely positioned to develop, engage, and prepare the next generation to be equipped to address climate change and to succeed in the green economy of the future. As the Aspen Institute's K12 Climate Action Plan states, “Educators across subject areas in school and in out-of-school programs can support teaching and learning on sustainability, the environment, green jobs, and climate change and empower students with agency to advance solutions.”⁴⁵ However, as Betsy Drinan of the Boston Teachers Union (BTU) climate justice committee said to me, “It's not just that greenhouse gases warm the planet and that causes these changes. It's also the history of energy use that caused all this inequality and the impacts of climate change cause further inequality.”⁴⁶

That is why developing and teaching climate justice curriculum, as opposed to just climate change curriculum, is an important piece of a just transition. The Chicago Teachers Union (CTU) has already begun developing content with a strong focus on climate justice and equity.⁴⁷ The BTU is considering doing the same. As Betsy told me, how we address climate change can either reduce or exacerbate inequality. Some key questions for educators and students, she said, are: “Who has the power in these decisions? How are they using that power? And who are they keeping out of those decisions? That is what will determine the outcome.”⁴⁸ Ayesha Qazi-Lampert from the CTU climate justice committee agreed and added that “climate literacy is also an organizing tool; the education reveals inequities that inspire efforts for change—it's kind of a cycle.”⁴⁹

A good starting point for interested teachers is Aaron Karp's “Educating for Climate Activism, Autonomy, and System Change,” which lays out a curriculum model that contains five content areas that aim to analyze the major forces that give rise to today's existential problems and their solutions: ecological systems, energy sources and technology, economic institutions, power structures and politics, and social movement-driven societal change.⁵⁰ The model envisions the development of literacy in each area, including their interconnections, and could be used to guide curriculum development for educators as well as courses in teacher education.

Investing in Career and Technical Education

A just transition to a more sustainable and equitable future is going to require a massive influx of skilled workers to do all of

A just transition puts people before profits by pursuing both clean air and good jobs at the same time.

the new jobs, especially in the skilled trades initially, but in other technical occupations thereafter. An investment in career and technical education (CTE) is an investment in the future, especially when it is infused throughout the entire school curriculum, dismantling the false disconnect that has often existed between academic learning and skills training. Incorporating CTE into all areas of the curriculum can create an important link between the world of school and the world of work that can motivate students to continue their education while giving them the knowledge and flexible skills that will make it possible for them to adapt to the jobs of the future.

A great example of this approach can be seen in the Peoria Public Schools system in Illinois. In 2015, the Peoria Federation of Teachers and the Greater Peoria Works campaign utilized funds from the Illinois Federation of Teachers and from an AFT Innovation Fund grant supporting the Promising Pathways initiative to modernize CTE programs.⁵¹ Among the dozen new CTE programs offering industry-recognized credentials, Peoria created a two-year renewable energy training program. And when the school installed solar panels on the roof of the building, the program worked closely with the installers to integrate the process into the curriculum with students learning everything from solar installation techniques to the monitoring of energy use and generation.

Investing in CTE like Peoria and other school districts have done allows students to learn and prepare for good jobs. Scaling successful programs so as many students as possible can take advantage of them, and move on to success in careers and life, is an important step in ensuring a just transition.

Making It All Happen

Forging a just transition in education with healthy green schools and social and economic justice requires grassroots organizing and power building. Some important steps include forming local union climate justice committees, building strong partnerships with students and community groups, bargaining for the common good, and holding decision makers accountable. These local efforts can also be coordinated nationally for maximum impact across the entirety of the education sector.

Form Local Union Climate Justice Committees

As democratic organizations, unions rely on membership resolutions to lay out positions on issues and on committees to push forward plans of action on those issues. The same is true with



climate justice work. In my own research, I have found that most teacher-initiated climate action currently underway around the country is being led by members of unions that have adopted climate resolutions and formed local union climate justice committees to advance the unions' work on the issue.⁵² Forming a climate justice committee does two things. First, it ensures that the issue of climate justice remains on the union's agenda. Second, it creates a space for interested members to engage with the issue within their union and help to drive the union's climate work at the grassroots level. It is difficult to overstate how important a climate justice committee is for any union that wants to begin engaging in climate justice work. The more such local committees that exist, the more local unions there will be pushing a climate justice agenda within their school district, college, or university, amplifying the positive impact.

Partner with Students, Community Allies, and Other Unions to Push for Change

To win a just transition for education, our local unions must forge deep partnerships with student activists, environmentalists, environmental and climate justice groups, parent/caregiver organizations, and other unions in different industries. Many education unions have already been engaging in this work, including United Teachers Los Angeles (UTLA), which has more than a dozen community partners with whom it is making climate justice demands at school board meetings and in bargaining.

College and university professors from local unions around the country have joined with students in climate strikes demanding an end to fossil fuel use by universities. In the summer and fall of 2019, after passing a local union Green New Deal resolution, the American Association of University Professors (AAUP)-AFT local at Rutgers University in New Jersey worked closely with student groups and community partners to organize a massive climate strike. As James Boyle, a student who helped organize the strike, said, "We need to acknowledge that climate change involves limits," especially when it comes to energy consumption and waste generation.⁵³ On September 20, 2019, faculty, staff, students, and community members rallied and marched together, demanded, and ultimately won commitments from the university in the following months to divest from fossil fuels and develop a strong climate action plan with timelines and targets for phasing out fossil fuel use. The coalition also emphasized the importance of using local union labor to do the construction work involved in the transition. Three years later, faculty, students, and community members came together again for a second climate action, demanding the university move more rapidly to transitioning away from fossil fuels and installing community solar and resilience hubs. Following the action, student leader Alexa Haris said of the coalition, "We need to talk about what other actions we can pursue, such as camping out on university property, holding sit-ins, and attending city council meetings and university board of governors meetings."⁵⁴

Education unions
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positioned to
lead in green
school efforts.

Winning transformative changes requires transformative coalitions.

In addition to helping to organize the climate strikes and winning fossil fuel divestment, members of the Rutgers AAUP-AFT climate justice committee were also involved in designing the university's climate action plan, which calls for achieving carbon neutrality by 2040. To help achieve this goal, union members have been organizing with environmental justice and community groups in Newark,

Camden, and New Brunswick to educate the public about the benefits of community solar and advocating for the university to open up its rooftops and parking lots to accommodate it. Other members of the climate justice committee have partnered with environmental organizations to oppose dangerous and polluting fossil fuel projects such as the proposed liquid natural gas export terminal in Gibbstown. As climate justice committee member Jovanna Rosen said in an op-ed opposing the project: "Our faculty and graduate worker union at Rutgers believes in 'bargaining for the common good,' [which is] a labor strategy that builds community-union partnerships to achieve a more equitable and sustainable future."⁵⁵

Other unions, especially in the building trades, are vital partners when pursuing green school initiatives. Recently, educators in Washington state worked with the local building trades unions to successfully win support for increased funding for school retrofits.⁵⁶ Nationally, through the Climate Jobs National Resource Center (CJNRC), and in many states, educators and construction trades unions have been working together to win support for green infrastructure projects, including schools. For example, Climate Jobs Illinois, a state affiliate of the CJNRC with 14 member unions, has a community-driven Carbon Free Healthy Schools campaign to invest in Illinois's public schools through energy efficiency upgrades and solar power systems. These healthy schools will save school districts millions in energy costs, decrease emissions that contribute to climate change, offer opportunities for more CTE programs in green energy, and create thousands of union jobs.⁵⁷

At the national level, the AFT and the United Auto Workers are calling on school districts to electrify the nation's school bus fleet.⁵⁸ Cities and counties can use seed money provided by the 2021 Infrastructure Investment and Jobs Act to accelerate the rollout of union-built electric school buses. There are about half a million yellow school buses operating across the United States, generating more than five million tons of GHG emissions every year⁵⁹ and emitting pollutants that increase the likelihood of asthma and other respiratory conditions among students, drivers, and community members—especially in low-income communities that have suffered disproportionately from environmental injustice.⁶⁰ At a press conference about the effort, AFT President Randi Weingarten set forth a vision of children riding on union-built and union-driven electric buses, arriving safely at union-taught schools.

The key to strong partnerships like these is trust, and building trust takes time. It doesn't happen overnight or after just one meeting. Local unions pursuing climate justice that do not already have existing relationships with community partners should begin to open up dialogue as soon as possible. And while forming a coalition in itself can lead to tangible gains, winning truly transformative changes requires transformative coalitions that involve radical power sharing and democracy, as is the case in bargaining-for-the-common-good campaigns.

Bargain for the Common Good

Bargaining for the common good is an innovative way of building community-labor alignments to jointly shape bargaining campaigns that advance the mutual interests of workers and communities alike. At their heart, these campaigns seek to confront structural inequalities—not simply to agree on a union contract. A bargaining-for-the-common-good approach starts with teachers unions, students, and local community groups working together to develop and articulate a set of demands that serve the interests of students, workers, and the communities where they live and work. Importantly, all stakeholders should have an equal voice in proposing and developing common good proposals.

Some possible demands could be emissions reduction targets, energy efficiency investments, solar panel installations, and the creation of resilience hubs at public universities, colleges, and preK-12 schools. Other demands include divestment of public pensions and endowments from fossil fuel companies and reinvestment of those funds into socially responsible investments, as the AFT has resolved to do nationally.⁶¹ Expansion of public transportation options, including the free provision of mass transit to students or employees, and monetary or other incentives for workers who walk, bike, or use public transportation to commute to and from school are also possible demands. Public school teachers can also fight for climate justice to become a core part of the public school curriculum, as the Chicago Teachers Union has been doing, and for green energy CTE programs to be available to all high school students.

Hitting on many of these demands, UTLA, in partnership with students and several community organizations, developed and successfully negotiated a memorandum of understanding (as part of its contract bargaining) titled "Healthy, Green Public Schools."⁶² The memorandum, Arlene Inouye (then UTLA's bargaining co-chair and secretary, now retired) told me, includes climate literacy curricula; a green jobs study; a green school plan, including conversion to union-made electric buses and union-installed renewable energy systems; and clean water, free from lead and other toxins. Reflecting on the process and proposals that came from it, Arlene said, "it's been very important that we continue to grow the coalition and continue to expand our common good demands.... We're finding different angles to keep pushing the envelope."⁶³

Hold Decision Makers Accountable

Without clearly defined targets and an enforcement mechanism, green school plans are simply promises that can be broken when economic or political structures shift. To ensure that educational institutions are following through on their goals, unions can demand the formation of joint labor-management-community

committees on reducing GHG emissions.⁶⁴ Such committees can be tasked with assessing the employer’s emissions profile and developing climate action plans to reduce GHG emissions and promote climate justice, including the creation of resilience hubs and career opportunities for local community members. Instead of relying on politicians who may be too fearful to establish enforceable targets or take bold action, workers and community partners can persuade or, if need be, force their employers to do so.

Along these lines, the Boston Teachers Union has begun discussions with the city’s school board and City Hall regarding Mayor Michelle Wu’s plan for a Green New Deal for Boston Public Schools. “Our main focus,” Betsy Drinan of the BTU told me, “is to get the union a seat at the table and involved in the planning for what the Green New Deal for Boston Public Schools is about, what it looks like, and to make sure that school communities have input into that planning.”⁶⁵ The goal, she said, is to have regular monthly meetings. Local education unions around the country can take similar steps to spearhead the process of greening our nation’s schools now.

Coordinate Efforts Across Localities

The impact of local efforts can be amplified when undertaken in concert with other localities making similar demands. One way to help coordinate local efforts is to become involved with the national AFT climate and environmental justice caucus.* Just as climate justice committees create a space within local unions for members to work on climate justice issues, the national caucus provides a space within the national union for local union climate justice committee members to share information—including best practices, challenges, and wins—and to potentially coordinate their efforts across political jurisdictions, learning from each other’s efforts. The caucus also helps advance the work of the national AFT climate task force by offering creative ideas and solutions and organizing horizontally across locals.

The Labor Network for Sustainability (LNS) has also been convening a cross-union Educators Climate Action Network with AFT and National Education Association members participating. The network emerged after conversations by education union activists at both the Labor Notes Conference and the national AFT conven-

*Get involved with the AFT’s national climate and environmental justice caucus through this form: go.aft.org/b6z.



tion in the summer of 2022. The network of over 100 union educators from across the country convenes monthly and is open to all education union members interested in tackling climate change and promoting climate justice.†

Conclusion

In my experience, most educators, students, and school employees fully understand and are very concerned about the threat of climate catastrophe. As David Hughes, a member of the AFT national climate task force, said, “We as teachers represent truth, and we have to act in accordance with the truth.... We have knowledge, we’re teaching knowledge, and we’re generating knowledge about a catastrophe that’s incredibly important for everyone. We’ve got to use whatever mechanism we can to implement the logical change that follows from that knowledge.”⁶⁶

Together with students and community partners, education unions can fight for and win a just transition that addresses not only the climate crisis, but also the inequality crisis. As anchor institutions in their communities, with large swaths of public land, buildings, parking lots, and roof space, educational institutions are ideal sites for renewable energy generation and resilience hubs. The good jobs that are created in the process, with strong labor standards and local hiring provisions, will contribute to forging a just transition to a more sustainable and equitable future. And the expansion of CTE and the incorporation of climate justice curriculum into schools will equip future workers as well as citizens with the skills and knowledge needed for a green sustainable economy. As with all major societal change, it begins by organizing and building power, then exerting influence on decision makers to advance an agenda that promotes equity.

Many education unions are already beginning this work, starting at the local level and coordinating nationally, but the potential for transformative change has only just begun to be tapped. The Inflation Reduction Act has an unlimited pot of money for investing in green schools, but it is only possible if we initiate the efforts locally and take advantage of the federal incentives. Passage of Bowman and Markey’s Green New Deal for Public Schools legislation would further supercharge these investments. As Ayesha Qazi-Lampert from the CTU climate justice committee told me, “It’s at the national level. It’s originating from below, too. If it’s just one without the other, it may or may not succeed. But if you’ve got both ends of the spectrum pushing in, you got a lot better chance of succeeding.”⁶⁷

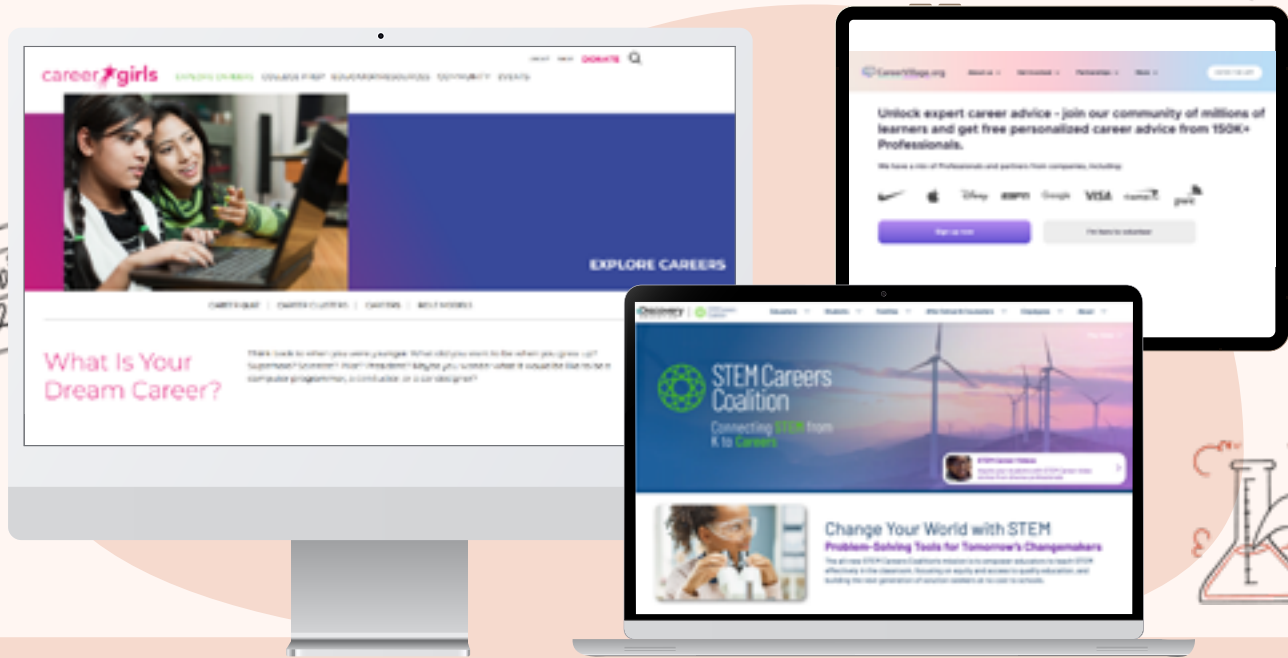
Will your local union be the next to join the effort and help advance a Green New Deal for education from below?

For the endnotes, see aft.org/ae/spring2024/vachon.

†Learn more, including how to get involved, by contacting the LNS at labor4sustainability.org/contact-us.

We can win a just transition that addresses the climate and inequality crises.

Sparking Career Exploration



For more than 60 resources related to career and technical education, check out Share My Lesson's "Career Exploration" collection (go.aft.org/3m7). AFT staff member Megan Ortmeier provides a great overview of the collection (go.aft.org/d4q), from children learning about STEM careers with *Ada Twist, Scientist*, to teens creating career portfolios and preparing for apprenticeships. Here, we focus on three resources for secondary students to learn about the endless possibilities before them.

Career Girls

As an SML partner, Career Girls has shared more than 800 resources! What makes its approach to career exploration unique are short, high-quality videos featuring female professionals across a huge range of careers. From engineering to performing arts, finance, molecular biology, the judiciary—pretty much any field you can think of—Career Girls provides an insider's look. In addition, there are videos discussing related topics like the importance of studying math, overcoming obstacles, and choosing friends who are positive and supportive. Check it out at go.aft.org/g5f.

Career Village

As a teenager—and even as an educator—it can be hard to find answers to career

questions. "What does a typical day as a food scientist look like?" "Should I become a paralegal before going to law school?" "What are difficulties you face as an architectural manager?" These are a few of the real questions asked—and answered!—on Career Village. Over 130,000 professionals volunteer on Career Village to answer students' questions, and the whole archive is searchable. This SML resource (go.aft.org/st5) introduces students to Career Village and gets them started asking questions.

STEM Careers Coalition

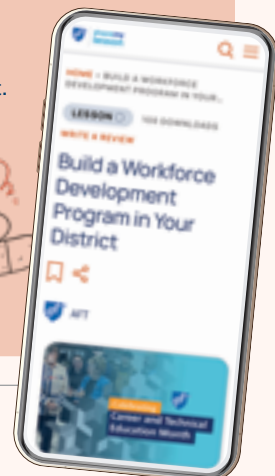
The STEM Careers Coalition brings together a variety of industry partners with Discovery Education to introduce students to STEM careers, with a focus on showing that STEM professionals are problem solvers working in exciting fields from bat conservation to welding. While this SML resource (go.aft.org/pxn) shows students what it's like to be a facilities engineer and a geologist, the STEM Careers Coalition website has dozens more careers to explore.

Do you have resources you'd like to share? SML makes it easy! And if you have ideas or requests, reach out to content@sharemylesson.com.

—THE SHARE MY LESSON TEAM

Become an OSHA-Authorized Trainer

Through the AFT, career and technical educators can become authorized OSHA (Occupational Safety and Health Administration) trainers to offer their students OSHA's 10-hour and 30-hour courses on health, safety, and rights in the workplace. With these courses, students earn their OSHA 10 or 30 cards and are prepared for jobs in construction or general industry (e.g., culinary, cosmetology, auto, technology, health services, etc.). For details, see the SML resource "Build a Workforce Development Program in Your District," which is available at go.aft.org/apz.





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WHY: To build on the progress we've made with Joe Biden and Kamala Harris. Together, we are: Winning historic investments in public education at every level, with a fivefold increase for community schools. Investing in the resources and staff our students need to thrive post-pandemic. Fighting for better pay and more respect for educators and school staff. Expanding school meals. Preventing gun violence. Making school buildings safer and healthier. Tackling the crushing burden of student debt. Protecting academic freedom.

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