A Union of Professionals

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AMERICAN Educator

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Branching Out

THE BENEFITS OF A REIMAGINED CAREER AND TECHNICAL EDUCATION

VOTE

ELECTION 2014

When union members and their families turn out on Election Day, candidates who are with us on important issues usually win. **But when turnout is low among union members and households, the results can be devastating.**

For working families and the issues we care about, the stakes are huge this year, so it's vital to elect candidates who are focused on economic fairness, high-quality healthcare, and strong public education—and to oppose candidates whose agendas favor the powerful and support the dismantling of public education and public services.

As we have seen, every vote counts. It is critical that we all speak to our family members, friends, and neighbors about getting out to vote for candidates who will stand with us to reclaim the promise of America. We cannot afford a repeat of the 2010 elections, when anti-working-family candidates won a majority of races across the country. What happens on Nov. 4 can send a powerful message. You and your family can help us send the right message.

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Engaging Hands and Minds

RANDI WEINGARTEN, President, American Federation of Teachers

FOR SIX YEARS DURING THE 1990s, I taught social studies in Brooklyn, New York, at Clara Barton High School for Health Professionals, a career and technical education (CTE) school.

I remember thinking about how to approach teaching a bioethics course to seniors, including many practical nursing students. We decided that for it to be an effective, enriching, engaging learning experience, we had to make it real and delve deeply into such questions as: Is access to high-quality healthcare a fundamental right? What does that really mean, in real life? If it is a fundamental right, who pays for it?

I often watched our students' faces and body language, wondering if we had figured out the right alchemy for really engaging them. And though it may sound corny to noneducators, we teachers live for those moments when the proverbial light bulbs go on in our students' heads.

At Clara Barton High School, my students acquired practical skills that prepared them for the healthcare workplace—not simply learning how to apply those skills, but also finding joy in discovering new ways of seeing the world around them.

Today, the best CTE programs recognize that 21st-century jobs combine our minds and our hands. And for students living in poverty and at risk for dropping out, CTE can be the key to finishing school equipped with marketable skills and the choice of whether to go to college or to a job earning a living wage, or both.

Across the United States, 3 in every 4 students graduate from high school on time. For those with a CTE concentration, 9 in every 10 graduate on time, and 7 in every 10 go on to enroll in postsecondary education.

"Even though we teach aircraft maintenance, our students enter all careers because they are ready to work," says an AFT member who is a CTE educator in New York City.

Despite the proven success of CTE programs nationwide, many are still struggling with funding or lack of support—and outdated biases that view CTE programs as vocational and meant to relegate students to second-class citizenship.

Throughout our history, the American Federation of Teachers has fought against the idea of a two-tier education system in which one class of students was groomed to be active citizens and molders of the world while a second class of students was taught to use their hands without empowering their minds.

In recent years, many educators and policymakers have come to recognize that a second-class vocational education system works for no one, particularly in our global, increasingly high-tech world. However, as school districts have been called on to rethink and retool secondary education for the careers of a rapidly changing workplace, some have simply eliminated vocational education. This is a tragic mistake.

There are multiple pathways to success in school and in life. Pathways that take an occupational or technical approach can be as rigorous as any "academic" track. In fact, the real world demands such rigor, and the evidence is clear that students respond to it.

Even in this time of tremendous gridlock in Washington, D.C., there is a ray of hope when it comes to CTE and workforce development. Congress recently passed the bipartisan Workforce Innovation and Opportunity Act, which will significantly reform our workforce development and job training system for the first time in many years. And the Obama administration, under the direction of Vice President Joe Biden, recently released the *Ready to Work* report, which outlines what the administration is doing to revamp federally funded training programs.

However, as CTE educators across the country can attest, more needs to be done. "Employers expect our students to know how to use different kinds of hardware and software that we just can't afford to buy," says one AFT member in Florida.

Congress must act now to reauthorize the Carl D. Perkins Career and Technical Education Act with full funding. Last reauthorized in 2006, this crucial piece of legislation should remain a formula grant designed to provide funding to the districts and schools that need it most.

JOHN MULDOON

Randi Weingarten visits teachers and students at A.I. Prince Technical High School in Hartford, Connecticut.

All these initiatives must be aligned so that secondary and postsecondary programs both coordinate and communicate. In addition, teachers, administrators, unions, businesses, and community organizations must be able to collaborate to give students access to high-quality CTE programs as well as internships and mentoring opportunities—and to ensure that CTE educators get the training, flexibility, and support they need.

We need more programs like the National Industry Certification for Educators initiative, recently launched by the United Federation of Teachers in New York City, which gives educators access to software, online resources, and curricula so they can deliver high-quality instruction using cutting-edge technology.

Together, we will ensure that high-quality CTE becomes the vital part of our American educational system that it can and must be.

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Re-envisioning Career and Technical Education

Many trends abound in education, and the virtual disappearance of vocational education is one of them.

As our economy dramatically changed during the last several decades, woodshop, welding, and metalworking all but vanished from high school course offerings. Education experts and policymakers increasingly began to view traditional academic classes—not technical ones—as the ultimate preparation for both a four-year degree and a professional career. And so, unlike Germany and other European countries that continued their strong commitment to ensuring students could choose technical paths to career and postsecondary success—building a technically skilled workforce in the process—the United States largely turned its back on craftsmanship and innovation flowing from the high school shop floor.

An overwhelming consensus emerged instead: the talent and intelligence required to learn and apply technical skills were considered less important. Rather than vocational education being geared up to meet the challenges of the new technology economy, it slowly became a repository for students not regarded as "college material"—an overwhelming majority of whom were low income and minority. The quality of technical and vocational education suffered—that is, until relatively recently.

For a number of years now, vocational education in much of the country has been undergoing a very real transformation, one that extends both to high school students who are career bound and to those who are college bound. Now called career and technical education (CTE), and commonly defined as the education that prepares students for careers in skilled trades, applied sciences, and technology, vocational education has experienced a resurgence of interest. As teachers, administrators, and policymakers begin to see cracks in the college-for-all mentality, they are revisiting CTE as a viable and powerful option for students—both for those who wish to work immediately after high school and for those who plan to pursue a two- or four-year postsecondary program.

The emphasis of CTE is to prepare students for a career at whatever point they decide to pursue one. Employers continue to lament the lack of knowledge and skills among new hires, leading many to question whether high school and college classes effectively prepare students to enter the workplace. Likewise, students themselves often question the value of what they are learning in traditional school settings and long to see more explicit connections between their studies and possible careers. And that is where the best CTE programs come in. They show the relationships between academic subjects like English, history, science, and math to technical fields that provide students with opportunities for not simply jobs but careers.

As a result, the best CTE programs today foster student learning that is both concrete *and* abstract. They also incorporate the "soft skills," such as teamwork, critical thinking, and collaboration, that employers say are sometimes missing from more traditional general education.

It is this kind of learning that we highlight here. The following articles make the case for investing in CTE programs and describe the features of rigorous ones. Several articles in this issue trace the troubled past of this country's class bias against working with one's hands and acknowledge the class and racial biases that once led to steering students into CTE. Once primarily viewed as an inferior program for low-income and minority children assumed incapable of taking on challenging work, CTE—as it is re-emerging today—is undergoing dramatic changes in terms of the curriculum offered, the students who enroll, and the meaningful connections that develop with local businesses and colleges. Today's CTE advocates are committed to ensuring these programs do not track students or "dumb down" the academics required of high schoolers.

This issue also provides examples of successful programs in Europe and closer to home. One such program is the Toledo Technology Academy (TTA) in Ohio. A magnet school focused on engineering and related technologies, TTA was established thanks to a labor-management partnership. The school excels in preparing students for college (many pursue engineering degrees) and career (many pursue engineering careers).

The AFT is proud to represent CTE educators, whose instructional needs our union is trying to understand better. To that end, the AFT's educational issues department recently surveyed members teaching in CTE programs. The results (some of which are highlighted on pages 40–41) reveal the variety of subject matter they teach, many stories of student achievement, and frustrations with inadequate funding.

As discussion in education continues to focus on how best to prepare students for work and life, we hope this issue helps dispel two persistent myths: that a four-year degree is the only path to professional success, and that career and technical education is second-best.

–EDITORS

The Case for High-Quality CTE

By James R. Stone III

After years of languishing as the program for someone else's child, career and technical education (CTE) has been rediscovered by federal, state, and local policymakers. This renewed interest comes at a time when federal policy, beginning with the 1983 report *A Nation at Risk*, has had the effect of turning high school into the new middle school—a point in the education pipeline with no intrinsic value other than preparation for the next level of education, presumably college. This is unfortunate, especially for the sizable percentage of youth who will neither graduate from high school nor successfully matriculate into and complete formal postsecondary education.

A Nation at Risk has been followed by more than 30 years of claims that the American education system is failing its children. Ironically, the generation of children put at risk by "a rising tide of mediocrity" (as boldly trumpeted in the report)[1] moved into the labor market in the 1990s and helped generate the longest sustained economic boom in our history. And the report's concerns about our economic competitiveness arose in the context of fears about Japanese and German companies outperforming American companies, due in large part to the superior quality of their education systems. Today, those concerns typically reflect competition from China as well as other countries where workers are paid little and have little voice. I don't think too many Americans would trade our education system for theirs.

Nonetheless, assumptions about the demise of U.S. economic competitiveness remain connected to education. The U.S. economy, in 2009, did lose its spot as the most competitive in the world, and it has continued to fall in rank ever since. However, the factors identified with this decline have little to do with education. Although education is a contributing factor, more relevant factors include labor-employer relations, flexibility of wage determination, the participation of women in the workforce, infrastructure issues, and worker health.[2]

Despite evidence to the contrary, global competitiveness arguments continue to be used as a means of promoting a strictly academic curriculum in high school—one designed solely to prepare students to pursue a four-year college degree—as the best and only educational option. This college-for-all mentality has had the pernicious effect of diminishing the presence of high school CTE.*

James R. Stone III is the director of the National Research Center for Career and Technical Education at the Southern Regional Education Board. He previously directed the NRCCTE at the University of Louisville, where he was a Distinguished University Professor in the College of Education and Human Development. His research has focused on improving the engagement and achievement of students in CTE programs. He has authored numerous research reports, journal articles, and books about CTE, including his most recent publication, College and Career Ready in the 21st Century: Making High School Matter *(Teachers College Press, 2012).*

*For more about the college-for-all mentality, see "Beyond One-Size-Fits-All College Dreams" in the Fall 2010 issue of *American Educator*, available at www.aft.org/pdfs/americaneducator/fall2010/Rosenbaum.pdf.

ILLUSTRATIONS BY INGO FAST

The Emerging Labor Market: The Raison d'Être for CTE

Career and technical education is the part of American high school that provides the link between the needs of the labor market and the needs of young people to be fully prepared to move into the workforce or continue their career-focused education and training beyond high school. Concerns about how to strengthen our economy, as well as complaints from employers that too many students graduate from college without the knowledge and skills needed to fill jobs, have sparked a renewed interest in CTE.

CTE repeatedly surfaces in discussions of "college and career readiness"—a phrase, much in use these days, that implies "college ready" and "career ready" are one and the same. The evidence contradicts the rhetoric, however. Both testing and labor-market experts argue that being prepared for college is not the same as being prepared for a successful transition into the workforce.[3] Indeed, conflating college readiness and career readiness fails to accommodate the varied nature of the workplace and the different kinds of academic preparation required for successful entry. Put another way, the mathematics skills required for entry into an engineering career pathway are different from those required for a social services career pathway or a business career pathway.

Despite the rhetoric around college and career readiness, there is general consensus that equipping all young people with the knowledge and skills to become productive adults is the implicit goal of public education. CTE, with its emphasis on providing the background knowledge and tangible skills crucial to career preparation, is now recognized as opening multiple pathways to reach that goal. Pathways will differ, of course, for each student, but all pathways should facilitate the ultimate transition into the labor market.

Keeping Tabs on the Labor Market

Over the next 10 years, between one-quarter and slightly more than one-third of expected job openings will require at least a four-year university degree for initial entry. At the opposite end of the spectrum, between 36 percent and 59 percent of job openings will require only a high school credential. The remainder of expected openings will require some level of postsecondary education, such as a community college degree, a diploma, a certificate, or another form of formal or nonformal education or training.[4] This part of the labor market is often referred to as "middle-skill occupations," and many provide robust career possibilities (e.g., registered nurses, apprenticeships, advanced manufacturing jobs, and technicians of various kinds).[5] For the many youth who do not envision a traditional four-year college experience, middle-skill occupations represent viable career pathways.

Areas of job growth also reflect trends in technology.[6] Historically, technology has eliminated the need for some jobs, while also creating new jobs requiring different kinds of skills. This may soon change, however, now that machines are increasingly able to do work that once required human intervention. From self-checkout systems in grocery stores to self-piloting drones to the ATM card, advances in technology are removing the human element from certain types of work.[7]

Despite this uneasiness about the impact of new technology on jobs, there is general agreement on the importance of certain skills in the emerging labor market. My colleague Morgan Lewis and I have defined these skills as the occupational expression of academic learning: academic skills sufficient to enter related, formal postsecondary education (without the need for remediation) and employment training pathways (e.g., apprenticeships); occupational or generalizable employability skills; and technical skills.[8] We believe that each domain of knowledge and skills must be part of a world-class curriculum to prepare youth for careers and continuing education beyond high school.

CTE provides the link between the needs of the labor market and the needs of young people to be prepared to move into the workforce or continue their education beyond high school.

The Academic Skills Employers Seek

The workplace requires varying levels of knowledge of mathematics, science, and literacy beyond those necessary for successful high school completion. For example, oral literacy skills are considered paramount for students pursuing business careers,[9] and potential engineers and workers in advanced manufacturing will most certainly require higher levels of math skills than those pursuing careers in the arts.

Despite the recognized variability, we need to identify a baseline or benchmark that will define what skills all future workforce participants will need to master—and in recent years, there have been efforts toward that end. In the early 1990s, a report by the Secretary's Commission on Achieving Necessary Skills (SCANS) listed academic skills in reading, writing, arithmetic/mathematics, listening, and speaking as basic skills that all workers need.[10] In 1999, the Conference Board (an independent group that provides economic data and research) determined that prose and informational literacy are critical for all workers.[11] In 2002, the Partnership for 21st Century Skills presented a literacy framework for information and communication technologies for all workers.[12]

Similarly, ACT has defined career readiness in terms of a cut score on its widely used college-readiness exam. For example, the organization states that a score of 22 for math is necessary for college and career readiness.[13] Recent research, however, shows that students can achieve an ACT score of 22 by mastering only middle school math, Algebra I, and a few concepts from geometry.[14]

The National Center on Education and the Economy analyzed the math requirements for first-year community college students and found only one program that required Algebra II; most relied heavily on math learned in middle school, especially arithmetic, ratios, proportions, expressions, and simple equations. In this same study, the authors found that the reading skills students needed to succeed in community college were at the 11th- and 12th-grade levels.[15]

While mathematics has received much attention, it is clear from this report that reading is indeed fundamental. The poor reading and communication skills that characterize today's high school graduates may explain the difficulty young people face in gaining traction in the labor market—a problem more pronounced for young men, who lag behind their female counterparts in reading and communication skills.[16]

Industry-recognized credentials are milestones that mark the developmental growth of an individual.

The Occupational Skills Employers Seek

Beyond cognitive skills, employers look for employees with a broad set of traits and skills that fall roughly into two groups. The first concerns employability or work readiness. These skills are necessary for obtaining and holding a job and succeeding in the workplace. From the simple ability to communicate with a potential employer to navigating relationship challenges in the workplace, such skills are often the most highly ranked in employer surveys.

Many colleges, however, do not ensure that students acquire these skills. One survey of employers, for example, found that recent college graduates lack basic workplace proficiencies like adaptability, communication skills, and the ability to work in groups and solve complex problems.[17] The National Association of Manufacturers reports that its members are most in need of employees with strong basic employability skills (such as timeliness and work ethic) and strong technical, team, literacy, and computer skills.[18]

A second group of skills can be classified as character traits.[19] Drawing on research from economics, psychology, neurobiology, and other fields, the argument follows that noncognitive skills, such as persistence, dependability, self-control, curiosity, conscientiousness, grit, and self-confidence, may be more crucial than sheer brainpower to achieving success in the workplace, college, and life.

The combination of these various employability and noncognitive skills may be partially developed in traditional classrooms, especially through project-based learning. But learning in nonclassroom settings, such as work-based learning and out-of-classroom experiences, may better help students develop these skills—and engage those who need to see a more concrete connection between schoolwork and their aspirations but cannot find it in the conventional academic curriculum.

The Technical Skills Employers Seek

Acquiring skills unique to different work environments enhances employability. In certain fields, the most powerful signal of an individual's career readiness is an industry-recognized credential. Beyond educational credentials, industry-recognized credentials indicate to the labor market that an individual possesses a specific set of skills desired by an employer.

A systems approach to robust career pathways would nest industry-recognized credentials in traditional academic degrees, providing for a series of stackable credentials that offer individuals a variety of pathways to future success. Pathways built on stackable credentials are showing up in manufacturing and energy,[20] and states such as Ohio and Pennsylvania have established credential-based pathways that can begin with apprenticeships or industry-based training and lead to applied baccalaureate degrees.[21] These credentials are milestones that mark the developmental growth of an individual, from general work-readiness credentials (e.g., ACT's National Career Readiness Certificate) to credentials for mastering entry-level and more advanced skills.

Understanding CTE's "Fit" in Education Today

To understand how CTE fits into American education today, one needs to look at its history. The CTE programs that currently exist are the culmination of multiple streams of education philosophy, some of which date back to colonial America.

Historically in this country, preparing young people to assume roles as productive adults began with apprenticeships. These programs were often targeted to children of the poor, usually to ensure they would develop what today we call "labor-market skills." It is well known that, as a boy of 12, Benjamin Franklin was a printer's apprentice. Less well known is that other historical figures were also apprentices, such as Alexander Hamilton, who apprenticed as a mercantile clerk, Paul Revere, who apprenticed as a silver smith, and many others. While apprenticeships survive today, they produce relatively few skilled workers. Often, apprenticeships are available only to adults and are limited to specific craft industries, such as construction and manufacturing. However, apprenticeships can be established in almost any area if an employer or union seeks to sponsor them.

A second stream of education philosophy influencing today's CTE was the manual training movement. It was based on the belief that intellectual learning was best supported with hands-on learning, a philosophy of John Dewey himself. The movement led to what was once known as industrial arts classes in American middle and high schools. These classes morphed into technology education classes over time. While vocational in some aspects, the curriculum was less directly connected to specific labor-market needs, in contrast to traditional vocational education.

CTE in today's schools originates from the 1862 Morrill Land-Grant Colleges Act, which inserted the federal government into the provision of technical education for young men to learn the practical agricultural and mechanical arts while also devoting time to "the higher graces" of classical studies, as the author of the act, Congressman Justin Morrill, put it.

It is also useful to know the context of the time to understand the further evolution of vocational education. The 1917 Smith-Hughes Act introduced the idea that the federal government has a role to play in secondary education. The act was passed during a time when scientific principles were being applied to social sciences and when social efficiency was the operational paradigm paralleling the rise of scientific management (à la Frederick Taylor) in the ever-expanding manufacturing economy. In contrast to Dewey, education leaders like David Snedden, Charles Prosser, and John Franklin Bobbitt argued that schools should assign children to specialized curricular tracks on the basis of assessments of their intellectual abilities (tests), which, they thought, would predict an individual's ultimate destiny in life. To determine students' appropriate tracks, one only needed to know their ultimate destinies—that is, the few should be educated for leadership and the others prepared to be "fit for useful employment."[22]

Fewer students are accessing CTE coursework today. One could argue that increased requirements for academic course-taking have squeezed out the curriculum space necessary for CTE.

The social efficiency approach to vocational education was uncontested through numerous amendments to the Smith-Hughes Act until the 1950s. In 1957, however, the Soviet Union launched Sputnik, which in turn led to our first STEM (science, technology, engineering, and mathematics) crisis and triggered a federal response, the National Defense Education Act (NDEA), whose authors argued that our public schools and colleges were doing an inadequate job teaching math and science.

There are other striking parallels to the past, such as the myopic focus on testing, but most germane to this conversation is the pushback that came in the 1960s and the years that followed. In 1962, four years after the passage of the NDEA, the business community expressed concern about the overemphasis on science to the detriment of other aspects of public education, such as preparing youth to become productive workers in the labor market, generating economic growth. An advisory panel reported these concerns to President Kennedy, which led to the 1963 Vocational Education Act, the largest single federal investment in high school in U.S. history. This law expanded both the breadth of vocational education through a substantial increase in funding and its reach to a wider range of students through the expansion of program offerings (e.g., distributive education and occupational home economics).

However, subsequent amendments in 1968 that emphasized a focus on the "hard to reach and the hard to teach,"[23] along with a requirement to create new programs for the disadvantaged—while well-intentioned—had the effect of shifting the focus of vocational education toward youth who traditionally did not do well in school. While not the only factor, one could argue that this contributed to a public perception of vocational education as something less than desirable for mainstream students.

In the 1970s and 1980s, as the country saw its position in the global marketplace slipping, Congress again looked to strengthen vocational education as a way to bolster worker preparation and economic activity. In 1976, amendments focused on gender equality in a half-hearted attempt to attract female students, long underrepresented in such programs. And in 1984, Congress passed the Carl D. Perkins Vocational Education Act, named after a congressman who was a longtime champion of vocational education. The Perkins Act further amended the 1963 Vocational Education Act and emphasized improving the skills of the labor market.

In 1990, Congress passed a more extensive revision of the vocational legislation. Influenced by a growing criticism of American education (e.g., *A Nation at Risk*), the revised Perkins Act introduced new requirements for curriculum integration, articulation between secondary and postsecondary CTE programs (Tech-Prep), and greater business and industry involvement in CTE. This was a dramatic departure from the historic approach to CTE as a narrowly focused employment-preparation program. Instead, the revised law emphasized CTE's connection to academic education and learning beyond high school and recognized it as necessary to prepare the workforce of the future. This act defined CTE as part of an integrated system that included:

- Horizontal integration of academic and occupational education within high schools;
- Vertical integration between secondary and postsecondary education programs; and
- Strong connections, in the form of partnerships, with business and industry.

Despite the potential of CTE to contribute to the nation's economy and to individual development, and despite the important role of CTE in college and career readiness, enrollments in CTE have declined in the past 20 years. While about 85 percent of all high school students take at least one CTE course, less than 20 percent take enough courses to be considered "concentrators" in CTE.[24] Within this decline, some program areas—such as healthcare, communications and design, and culinary arts—have shown increases in enrollment, but overall, fewer high school students are accessing CTE coursework today. One could make the argument that increased requirements for academic course-taking have squeezed out the curriculum space necessary for CTE courses.

Today's Approach to CTE

Many policymakers are striving to ensure that all students (1) graduate from high school, and (2) do so with the skills necessary to be "college and career ready." Hence, a major bipartisan focus of federal funding for career and technical education is for schools to work with parents, students, and postsecondary institutions to create coherent career preparation pathways. These are most often referred to as Programs of Study, or POS. Under the 2006 Perkins reauthorization, all school districts that receive Perkins funding must offer POS that:

1. Incorporate secondary education and postsecondary education elements.
2. Include coherent and rigorous content aligned with challenging academic standards and relevant career and technical content in a coordinated, nonduplicative progression of courses that align secondary education with postsecondary education.
3. Offer opportunities, where appropriate, for secondary education students to gain postsecondary education credits through dual or concurrent enrollment programs or other means.
4. Lead to an industry-recognized credential or certificate at the postsecondary level or an associate's or bachelor's degree.

A successful career pathway system that serves the needs of many, if not all, students requires supportive state policies and a well-articulated system. Such a system must bring together key institutions in effective partnerships grounded in extensive and intensive career development staffed by knowledgeable and effective educators who teach a world-class technical curriculum. If we assume the Common Core State Standards will continue to shape the traditional core academic subjects, what is the role of career and technical education curriculum in preparing youth for careers and continued learning beyond high school?

Public education's response to this conceptualization of college and career readiness has been the development of the career clusters and career pathways framework, led by the National Association of State Directors of Career Technical Education Consortium. This framework identifies the coursework necessary to support each career cluster and pathway.[25] What is missing from the framework—and many other course-based frameworks—is an explicit focus on the noncognitive employability skills and, often, the technical skills necessary for successful transitions to careers and college.

Delivering CTE in Today's High Schools

American secondary education is delivered through traditional comprehensive high schools, regional career-tech centers, and special-focus high schools. Within these delivery systems, approximately 94 percent of traditional high schools offer some CTE, 100 percent of the regional centers do so (as one might expect), and 55 percent of specialty high schools do so.[26]

The majority of adolescents attend regular or traditional high schools in the United States. These schools offer a broad array of programming in academics, the arts, and CTE (for examples of such programs in New York City, see the article on page 30). Then there are regional centers, which increasingly blend academics and technical education in ways that offer students clear pathways to meaningful work and continued education. Successful models are full day and feature academic specialists who may directly teach academic content where appropriate or work with technical educators to embed academics into technical lessons. The successes of schools like Blackstone Valley Regional Vocational Technical High School in Massachusetts provide evidence of the power of this approach.

Shared-time centers achieve similar ends. For example, Cass Career Center is a regional technical center that serves 12 traditional high schools in Harrisonville, Missouri. At Cass, content specialists in mathematics and English teach academic content in the technical classes. To develop this academic content, the content specialists at Cass meet with their counterparts in the 12 high schools and work with these instructors to develop a separate curriculum that Cass content specialists can fit into its technical curriculum. The CTE teachers at Cass then reinforce the academic content in their technical classes. Technical teachers partner in the delivery of the academic instruction by reinforcing academic skills. Although variability existed among the schools' technical programs, the center's one-year evaluations in English and mathematics showed that integrated instruction was having a positive impact in measures of academic learning.[27]

Structuring CTE within High Schools

High-quality CTE should employ three pedagogical strategies: classroom instruction, work-based learning, and career and technical student organizations.[28] It should also make professional development a priority.

Classroom Instruction. In the classroom, CTE teachers should emphasize contextual learning that teaches students how to apply academic content in a real-world context (for instance, how electricians use algebra to solve job-related problems). According to a report published in 2010 by the National Research Center for Career and Technical Education (NRCCTE) Curriculum Integration Workgroup, the integration of curriculum in CTE should support the understanding of academic *and* technical content. As the authors note, "rigor resides in combining CTE and academic skills as applied to real-world problems."[29]

The NRCCTE has conducted a series of experimental studies of curriculum integration where teams of CTE and academic teachers enhanced existing CTE curriculum to emphasize the underlying academics. The initial study, Math-in-CTE, was the largest and most robust. Researchers working with teams of math and CTE teachers created an enhanced CTE math curriculum and introduced a seven-element pedagogic framework taught by the CTE teacher.

The curriculum and framework were implemented over the course of an academic year in auto technology, health, agriculture, information technology, and business and marketing classrooms.[30]

Even though the experimental students received an average of only 20 hours of enhanced math instruction taught by the CTE teachers, these lessons produced a significant effect. The experimental students scored 9 percent higher than the control students on the TerraNova posttest, a standardized test of basic math and English skills, and 8 percent higher on Accuplacer, a placement test for students enrolling in community college. They also scored higher on WorkKeys, ACT's career-readiness test, but the difference was not statistically significant.

The 20 hours of enhanced math represented just 11 percent of a one-hour class taught for the typical 180 days of a school year. And not all of this time was spent on math, because the math was taught in the workplace context in which it naturally occurred.

Similar results were found in the next study, Authentic Literacy in CTE, but analyses of test data from the final study in this series, which focused on science, showed that science integration works differently from math and literacy integration. Overall, the treatment had no significant impact on students' science achievement. When the researchers disaggregated the data by quartiles based on pretest scores, however, they had an interesting finding: the effects of the treatment were inconsistent across levels of pretest science achievement. That is, the treatment had no effect on posttest science achievement for the lowest-ability students, but it had a substantial positive effect for higher-ability students.[31]

Work-Based Learning. Beyond the classroom, high-quality CTE programs must actively involve employers in the training and education of youth, a strategy called work-based learning. The Organization for Economic Cooperation and Development report *Learning for Jobs* and the Harvard University report *Pathways to Prosperity* describe such involvement as a necessary part of preparing youth for successful adulthood.[32]

Such work-based learning has the potential to build the kinds of skills and behaviors that research is increasingly showing are critical to success in many contexts, including the workplace and college. It is quite clear that learning within a community of professional practice provides students unparalleled opportunities to learn the adult behaviors necessary to succeed in today's workplace and develop the five key skills identified in the SCANS report mentioned earlier—the ability to productively use resources, work with others, acquire and use data, understand complex inter-relationships, and work with a variety of technologies[33]—competencies not easily developed in typical high school classrooms.

To see that work-based learning matters, one only has to look at international comparisons. We know our students do not do well in international comparisons of academic performance.* It is less known, however, that intensive CTE, which includes work-based learning, positively affects key measures of school performance, including attendance rates, high school graduation, and college attendance.[34] In addition, numerous studies show that students who participate in high school work-based learning have improved reading scores, enroll in postsecondary education at levels on par with similar students, and have improved postsecondary achievement.[35]

Career and Technical Student Organizations. In addition to a strong work-based learning component, almost all successful CTE programs have an active student organization. Career and Technical Student Organizations (CTSOs) are cocurricular, with some activities taking place during regular classes and others outside of school hours. Because of their integration of rigorous academic and technical content and their focus on career preparation, CTSOs complement many elements of the Programs of Study required under the 2006 reauthorization of the Perkins Act.

High-quality CTE should emphasize classroom instruction, work-based learning, career and technical student organizations, and professional development.

At least nine CTSOs are recognized at the secondary level by the U.S. Department of Education, serving more than 2 million students in a variety of programs, such as agriculture, skilled trades, business, health, and information technology.[36] CTSOs have been a part of CTE since the passage of the Smith-Hughes Act of 1917. Over the course of the last 90 years, CTSOs have developed numerous activities—such as skills contests, community service, and leadership development—to improve their members' leadership skills, career and technical knowledge and skills, personal characteristics, and employability skills. CTSOs exist within CTE high school programs and are facilitated by a teacher-adviser. Through chapter activities such as running for office, officer training, competitions, and service learning, CTSOs provide students with individual and cooperative activities designed to expand leadership and job-related skills in their fields.[37]

Students also learn skills related to specific occupations and develop their technical literacy through exposure to the general concepts of their chosen fields. Some of the positive experiences identified by CTSO members involve teamwork, decision making, competition, leadership, community awareness, career awareness, and personal and social development.[38] A national study by the NRCCTE found that, compared with comparable students not enrolled in CTSOs, CTSO participants reported higher academic

*For more on international comparisons, see "Soaring Systems: High Flyers All Have Equitable Funding, Shared Curriculum, and Quality Teaching" in the Winter 2010–2011 issue of *American Educator*, available at www.aft.org/pdfs/americaneducator/winter1011/DarlingHammond.pdf.

motivation, academic engagement, career self-efficacy, and college aspirations.[39]

Professional Development. Extensive and ongoing professional development is an important component of delivering world-class curricula. The NRCCTE's research on math and literacy integration found that CTE teachers were able to teach embedded academics but faced a steep learning curve in doing so. This is because many CTE teachers have strong technical expertise but do not have the teaching backgrounds to deliver academic course content without the necessary training and support. Not surprisingly, the more exposure CTE teachers had to high-quality professional development, the better their students performed.[40]

Drawing from the several overlapping definitions of college and career readiness, it seems reasonable to define a world-class curriculum for occupational education as one that ensures students can continue learning beyond high school, acquire the noncognitive work-readiness skills employers demand, and develop specific technical skills that lead to real job opportunities—especially for the majority of youth who will not acquire a formal two- or four-year college degree.

Academics offer essential workplace knowledge and skills. A linear equation is simply a tool, like a torque wrench; both are useful in the workplace.

The NRCCTE's work on curriculum integration suggests the following are important principles to facilitating integrated, contextual teaching—embedding academic content into technical courses—and are part of what CTE teachers should strive to do:[41]

1. Develop and sustain a community of practice among teachers. Unlike other approaches, the communities of practice formed in the NRCCTE's professional development models are centered around the occupational context of the programs, transcend schools and school districts, and include technical and academic teachers.
2. Understand that academics offer essential workplace knowledge and skills. A linear equation is simply a tool, like a torque wrench; both are useful in the workplace.
3. Maximize the academics in the occupational curriculum. The NRCCTE has operationalized this as teaching and reteaching the underlying academic knowledge and skills when they arise in the technical curriculum.
4. Recognize that teachers in the occupationally oriented courses are not academic teachers but teachers of academics in context (e.g., a business teacher teaches writing in the context of creating business plans).

High-Quality CTE Models

In addition to the work of the NRCCTE, several other organizations have created and implemented versions of high-quality CTE, and several influential organizations and universities have issued white papers detailing the elements they believe are essential for such a program.

For example, the Southern Regional Education Board's High Schools That Work model is developing a series of course sequences with a focus on advanced technical programs, including aerospace engineering, advanced manufacturing, informatics, food and nutritional science, automated materials joining (which is a high-tech version of welding), and clean energy technology.* These four-course sequences are designed to blend learning in mathematics, science, literacy, and technical areas, with a focus on strengthening the habits of mind and behaviors necessary for success in both careers and further education. In a very real sense, these are Advanced Placement–quality courses for students who are technically inclined. These programs share a common set of features, including application-based learning of essential academics; a technical curriculum mapped to the Common Core State Standards; authentic, project-based curricula; and professional development focused on curriculum integration, project-based learning, and teaching to rigorous standards.

The National Academy Foundation (NAF) has also created a model for high-quality CTE in the form of academies, which operate primarily in urban public school districts but are also in suburban and rural communities.† These academies are organized around one of five career themes—finance, hospitality and tourism, information technology, health sciences, and engineering. In addition to core academic courses, students take industry-specific classes related to these themes and participate in work-based learning activities to put their lessons into action. The NAF's academy framework is based on these core principles:

- Personalized learning environments;
- Academic engagement of all students;
- Empowered educators;
- Accountable leaders;
- Engaged communities and youth; and
- An integrated system of high standards, curriculum, instruction, assessment, and supports.

*For more about High Schools That Work, see www.sreb.org/page/1078/high_schools_that_work.html.

†For more about the National Academy Foundation, see www.naf.org/naf-academies.

To become a NAF academy requires substantial commitment on the part of the school district and teachers to hold themselves and their students to high standards, to participate in ongoing professional development, and to adhere to the NAF curriculum, among other rigorous requirements designed to ensure high quality. These include:

- Cross-disciplinary teaching strategies;
- Strong links to industry standards and practices;
- Course objectives that have been validated by industry experts and academy teachers;
- An emphasis on NAF academy teachers working with academic counterparts;
- A project-based learning approach; and
- Professional development.

As a final example, California's Linked Learning initiative, supported by the James Irvine Foundation, is an effort focused on developing career pathways that incorporate challenging academics, demanding technical content, work-based learning, and support services.[‡] Linked Learning shares many characteristics of other programs, including ties to academic and industry standards, a focus on college and career readiness, teacher collaboration, curriculum alignment, and problem- or project-based learning. This model emphasizes work-based learning that is designed to link rigorous academics with real-world professions, with an emphasis on the transition to college. Student support services, like individual counseling and supplemental instruction in math and reading, are a unique component of the Linked Learning approach.

No one can predict the future, especially long-term labor market needs. To ensure that all youth have the opportunity to be successful adults, public education must do more than ensure high school graduates can pass tests. Clearly, there are many pathways to future success. Some involve traditional college pathways, but many others involve alternate but equally rigorous pathways through apprenticeships, community college programs, the military, unions, and industry-based training.

These pathways must begin with high-quality career and technical education. Beyond the research shared here, many national organizations have offered policy or advocacy papers in support of a renewed focus on CTE. For example, the College Board and the Georgetown Law Center on Poverty, Inequality, and Public Policy issued a paper in 2013, *The Promise of High-Quality Career and Technical Education*,[42] in which they list a number of characteristics necessary to support high-quality CTE and identify a number of promising models and practices.

In addition, the National Association of State Directors of Career Technical Education Consortium has issued several papers addressing the topic, including *The State of Career Technical Education*, a recent study of how well states are aligning with the Common Career Technical Core, a framework it suggests is necessary for high-quality CTE.[43] And the United Federation of Teachers, in conjunction with the Albert Shanker Institute, rolled out a draft position paper, *A Quality Education for All: A Career and Technical Education Policy Agenda,* during a national CTE conference that included experts from industry, education, and unions.[44] The paper calls for a policy agenda to ensure that all students have access to a high-quality career and technical education.

These organizations, and others too numerous to list here, have come to the conclusion that limiting educational options in high school does not serve the majority of American youth well. ☐

[‡]For more about the Linked Learning model, see www.irvine.org/grantmaking/our-programs/youth/linked-learning.

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Not Your Father's Shop Class

Bridging the Academic-Vocational Divide

ILLUSTRATIONS BY STUART McREATH

By Mike Rose

The frame of a very small house sits in the middle of the large electronics workshop. The frame is bare except for wires running across and through the beams, wires and receptacles, some wall switches, various light fixtures, and a power panel, door open. Students test their skills on this simulated residence, sections of the classroom's tiled floor taped off and marked *washer*, *garbage disposal*, *TV*. On this day, Tyler and Mariana are hooking up the lights and running the wires to the power panel. They are just about done, Mariana giving the circuit breakers in the panel one last look.

There is a group of younger students present, new boys and girls just entering the program. I stand among them. We are all back a little ways from the house. Tyler and Mariana say they're ready, so the teacher walks over to the classroom's central power source and flips a switch. It works! The whole house lights up, ceiling lights, wall lights, floods. "Wow," exclaims a boy by me, under his breath. "Man," he says, "that's crazy!"

Young people who find little of interest in the traditional curriculum can be intrigued by the world of work. I would find out that this fellow was such a student; he had already come to believe that school wasn't for him. Though the reasons young people leave school can involve much more than curriculum, this program might catch him. This might help keep him in school and aid him in fashioning an occupation for himself, an opening through the intersection of technology and desire. The huge question is what would await him? A restricted pathway that defines him and the electrician's trade in narrow intellectual, as well as economic, terms? Or a curriculum that assumes curiosity and the ability to learn, and that, while situated in the illuminated house frame, seeks connection to writing, to mathematics, to the economics of the trade, to the historical and cultural meaning of shelter and light across time? Some version of this basic question is currently being asked both within and outside the circles of career and technical education (CTE).

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Though CTE is currently the focus of a good deal of public and policy discussion, debates about vocational education—the earlier incarnation of CTE—have tended to take place at the margins of education policy. But as I was visiting schools and doing research for *The Mind at Work: Valuing the Intelligence of the American Worker*, which was first published in 2004, I came to believe that a comprehensive discussion of CTE, and with it, the very separation of the vocational and the academic curriculum, could become the site of a broadly significant conversation, one that would not only affect CTE but would range far beyond it.

Perceptions of Physical Work

When I was in high school in the 1960s, the curriculum was split into three tracks: an academic or college-preparatory track, a general education track, and a vocational track. Upon entrance, students were placed in one of them based on their previous academic records or a measure of ability, typically an IQ score. The curriculum directed us toward a four-year college or university, possibly a community college, or toward service or low-level managerial careers, or into blue-collar work. The curriculum also contributed powerfully to our school's social order. I was slotted into one of the general/vocational tracks. The college-bound were in student government, edited the newspaper and the annual, and at year's end had a thick list of activities under their class photographs. I swear, looking back on it all, the college-prep crowd walked around campus with an air of promise. Their course of study was the place of smarts and big ideas while the "voc-ed" crowd inhabited the domain of the manual, the concrete, the gritty.

From the beginning of curriculum tracking, some educators and social critics were concerned that this way of educationally stratifying young people was undemocratic. John Dewey called it "social predestination." To make matters worse, by the mid-20th century, sociological studies were documenting the bias at work in the way students got placed in these tracks. For example, working-class and racial and ethnic minority students with records of achievement comparable to their advantaged peers' were more frequently being placed in the general education or vocational course of study.

Finally, vocational education was, on the whole, not providing a good education. This concern is summed up by the authors of a 1993 report from the National Center for Research in Vocational Education: "Vocational teachers emphasized job-specific skills to the almost complete exclusion of theoretical content. One result was that the intellectual development of vocational students tended to be limited at a relatively early age."[1] This is a remarkable statement. We charge the school with cognitive development, yet in the very curriculum that places work at its core, we find a restriction of intellectual growth.

To be sure, there have been many voc-ed teachers who have taught well and have made a difference in young people's lives. My stepfather, a very handy guy, locates the origins of his skill some 60 years ago with a Mr. Foster, his high school woodshop teacher, and an owner of a successful hair salon I know got her start in a high school program.

Some vocational teachers have concerned themselves with the full development of the students in their charge, have provided good counsel, and have structured students' experiences to foster both trade skill and a problem-solving cast of mind. Still, the report from the National Center for Research in Vocational Education captures the fundamental paradox of vocational education as it has been practiced in the United States: the diminishment of the intellectual dimension of its subject matter. This state of affairs provides an extended illustration of the bias against manual and service work that runs deep and wide in our social and institutional life.

For a very long time in the West, there has been a tendency among intellectual elites to distinguish between physical work and technical skill—labor, the mechanical arts, crafts and trades—and deliberative and philosophical activity, which emerges from leisure, or at least from a degree of distance from the world of work and commerce. This distinction is related to another: between pursuits that are ends in themselves and pursuits that are means to other ends, "pure" activity and knowledge versus the instrumental, applied, and practical, which are often thought to possess less merit.

> Young people who find little of interest in the traditional curriculum can be intrigued by the world of work.

These distinctions find early articulation in Classical Greece, where entire social and occupational groups were narrowly and harshly defined. In *The Republic*, Plato mocks the craftsman who would pursue philosophy, for his soul is "warped and maimed" by his work; such men are "incapable of culture."[2] And Aristotle in *Politics* notes that "there is no element of virtue in any of the occupations in which the multitude of artisans and market-people and the wage-earning class take part."[3] To be sure, the craftsperson—from cobbler to shipwright to potter—was essential to Greek civilization, and his skill was praised, but, wrote Plutarch, "It does not necessarily follow that if a work is delightful because of its gracefulness, the man who made it is worthy of our serious regard."[4] Work of body and hand, then, has limiting, even harmful, consequences for civic status and engagement, for the ability to deliberate and interpret, for virtue.

Though there certainly are dissenting voices in Western intellectual history, from Saint Augustine to William Morris, it is striking how pervasive this perspective on human behavior is. Closer to our time, there are many reasons to explain why physical work is so perceived, reasons stemming from social class, the organization of work, and the dynamics of occupational status. But an element of our perception is related to these Classical distinctions, absorbed into new historical contexts. As labor journalist John P. Hoerr observes: "Since the early days of industrialization, a peculiar notion has gained ascendancy in the United States: that wage workers and their representatives lacked the competence to handle complex issues and problems that required abstract knowledge and analytical ability."[5]

The distinctions between pure and applied, theoretical and practical, are deeply familiar to me, resonant from undergraduate courses in philosophy and literature, from graduate study in education and psychology, and from years of professional life in a research university, where a range of institutional decisions and certifications—from course credit to disciplinary definition—are made on the pivot of the pure-applied differential. Our egalitarian ethos notwithstanding, a lot of our schooling reinforces this way of thinking about human activity. This sense of deficiency affects, and distorts, everything from education and job training to the way work is organized—and is intimately tied to the institutionalization and development of curriculum tracking and to the place of vocational education in that tracking system.

Renewed Interest in CTE

A remarkable amount of effort by educators, policymakers, advocacy groups, and parents has resulted over the last few decades in a dismantling of formal tracking. Although patterns of inequality still exist in the courses students take—vocational courses are overpopulated by poor kids—we have in our time witnessed the emergence of a belief that college is possible for everyone. Also, there has been a significant effort to reform vocational education, to beef up its academic content, and to provide better pathways both to postsecondary education and to employment. Some high schools, for example, have developed "career academies," which allow students to be introduced to an occupation (from the arts to healthcare) while taking academic courses that draw on occupational topics and materials.

School politics and reforms are a complex affair, however; while career academies and other experiments were unfolding, other elements of career and technical education—the traditional shop classes particularly—were being cut. CTE has taken a huge hit over the past several decades, its suitability for our current economy and, no small matter, its expense questioned—it costs a lot to maintain state-of-the-art labs and workshops. Where CTE programs did survive, they often were reoriented toward healthcare or technology, or, more recently, given a "green" focus.

But recent events have sparked renewed interest in CTE. Some economists and policymakers are questioning the viability of the push for college for all—the expense and low completion rates—and pointing to the kinds of midlevel technical jobs that might require a postsecondary occupational credential but not a two- or four-year degree.* The Great Recession has given some weight to this argument. Also, CTE now involves more technical and design courses, seen as academically substantial and viable in a 21st-century economy.

One model frequently in the news is a partnership whereby an industry teams up with a local community college to train students for high-demand jobs in that industry—specialized computer-assisted manufacturing, for example. These programs are understandably popular, for they are short-term and provide a pathway to employment, a godsend in communities wracked by the recession. A concern is whether the training is narrow or broad in scope, providing knowledge and skill for people to move into other kinds of work if the specific job they trained for becomes obsolete.

This concern about a more comprehensive education is being widely discussed in CTE circles today: What does it mean to be educated in a rapidly changing work environment? Are we providing adequate knowledge and skill for students to continue learning, to have a future orientation to the world of work? The best CTE (or older voc-ed) programs I've seen help students become more literate and numerate and teach processes and techniques in ways that develop broader habits of mind.

A community college automotive technology program I visited recently, which had students learning about diesel, hybrid, and compressed natural gas vehicles, emphasized problem solving, principles and concepts, and understanding machines as systems. "The textbook gives you the mechanisms," a student explains, "their function and their purpose. But our teacher, he gets us to see that when *x* fails, then *y* fails. Man, that's a whole different story." Another student, studying to be a bus mechanic, characterizes his program's approach toward repair: "You're like a doctor. You use all your senses, and you also ask the driver, what'd you hear? Feel? Smell? And you put that together."

It comes as no surprise, given the place of high technology in the culture at large, that there is real excitement in CTE about the educational possibilities provided by the high-tech nexus of computers, engineering, and design. Some of the occupations related to this nexus are still developing, but the hope is that students will be equipped for work in, let's say, digital media or customized design. Furthermore, more traditional jobs in a number of fields—healthcare is a big one—will need people skilled in computer and information technologies. I recently visited the lab in a design program, and there among various computers and computer-design equipment, robotics kits, laser cutters, and a 3-D printer were students working on projects, talking about design principles, aesthetics, and marketing. This isn't your father's shop class.

There is one more development that is relevant here, separate from but not unrelated to CTE. Over the last 10 years or so, increas-

*For more about college for all, see "Beyond One-Size-Fits-All College Dreams: Alternative Pathways to Desirable Careers" in the Fall 2010 issue of *American Educator*, available at www.aft.org/pdfs/americaneducator/fall2010/Rosenbaum.pdf.

ing numbers of Americans have discovered (or rediscovered) the pleasures of working with our hands—or at least of using products that are handmade, manufactured on a small scale, or locally produced. There is a makers movement and *Make* magazine, and a related do-it-yourself movement. In education, there is growing interest in making and "tinkering" to foster, in one organization's words, "imagination, play, creativity, and learning."[6]

As opposed to some anti-technology expressions of this hands-on spirit in the modern West, our era's movement embraces technology—computers and digital media are as much a part of the makers movement as woodworking and quilting. The same holds for education, which wants to draw on young people's involvement in computer technology and social media. A revitalized CTE is both influencing and incorporating making and tinkering.

Fortunately, there are programs and schools that have this kind of engagement as their central mission. Big Picture Learning, a network of 50-plus schools across the country, is one such effort; High Tech High, a network of 12 elementary, middle, and high schools in Southern California, is another. Both of these organizations, in different ways, have created courses of study that blend occupational and academic learning from the ground up, are heavily driven by student projects rather than a fixed curriculum, and recruit students from all income levels, with a focus on the less advantaged.

I have sat in on a meeting of Big Picture Learning principals, and in addition to being impressed with their creativity and zeal, I was also struck by just how hard their work is, trying to push against so many established ways of doing things and of thinking about ability and learning—not to mention the students who keep them awake at night with worry. But the payoffs are powerful: strong graduation rates and rates of postsecondary study. And there is the intense fulfillment of watching their students develop into competent, thoughtful people. The founder of High Tech High tells me this story: A visitor asks a ninth-grader about her homework, and she says she doesn't have any. Surprised, the visitor then asks what she does at night, and she replies that she works on her projects.

Teachers pray for that kind of involvement.

Rethinking the Academic-Vocational Divide

Earlier, I suggested that a renewed interest in CTE could spark conversation about a broad range of fundamental topics. There is the issue of intelligence itself: its definition, the limits of our standard measures of it, and our lack of appreciation of its many manifestations in the world of work.[†]

There is also the issue of differences in aptitude and interest, in the things we like to do with our minds. Though our schools have put some effort into dealing with this kind of heterogeneity, they end up responding to difference in pretty simplistic ways. We develop limited categories for courses and for placement, which are administratively efficient but cognitively reductive—and we quickly rank order them. Given, for example, the distinctions we make between the academic and the vocational, difference can devolve to deficiency. Sadly, some policy and curricular deliberations about career and technical education have embedded in them assumptions of cognitive limitation—and these assumptions shrink our curricular imagination.

To revitalize that imagination, we need to rethink our notions about mind and work, and we need to reassess long-standing and seemingly self-evident distinctions among levels and kinds of knowledge. Certainly, distinctions can be made; expressions of mind are wide and varied. But as I noted, there is a tendency, in the school as in the culture at large, to view knowledge and skill associated with many kinds of work as rudimentary. As education scholar Theodore Lewis puts it, vocational knowledge is not perceived as valid school knowledge.[7] A related issue is that the traditional, and weighty, separation between pure and applied knowledge, between the theoretical and the practical, tends to neatly segment a more complex reality. The more time I spend amid different intellectual disciplines and amid different spheres of work, the less sure I find these distinctions to be.

There is a tendency to view knowledge and skill associated with many kinds of work as rudimentary.

And then there is the issue, much in public talk these days, of the purpose of work, which gives rise to a cluster of further issues: meaning and identity, tradition and ethics, values, human connection. There are so many moments in the practice of challenging work where values, ethical questions, connections to self and tradition emerge naturally, and with consequence, ripe for thoughtful consideration. Surrounding such issues, influencing them at every level of working life, are the profound effects of social location, economics, and politics.

[†]For more about intelligence, see "Schooling Makes You Smarter: What Teachers Need to Know about IQ" in the Spring 2013 issue of *American Educator*, available at www.aft.org/pdfs/americaneducator/spring2013/Nisbett.pdf.

The early architects of voc-ed wiped these concerns from the curriculum, and vocational education has been pretty anemic on such topics since. This is unfortunate, for young people are at the stage where they're realizing how important work will be in their lives, how it will frame who they are and what they can do in the world. They are desperate to be somebody, to possess agency and competence, to have a grasp on the forces that affect them.

All of the above, it seems to me, plays in and out of the basic question, the Jeffersonian question, about the purpose of schooling in a democracy. Throughout the early history of vocational education, both advocates and opponents relied on democratic rhetoric to make their cases: It is democratic to provide all students with a similar course of study—at that time, the academic curriculum. Or, no, it is democratic to respond to the individual needs of quite different students. As I've considered it, I don't think this is the most fruitful way to frame the debate. The vocational-academic divide leads us to consider the Jeffersonian question in more nuanced ways.

For some critics, schooling should be freed of economic motive and vocational content. Though unrealistic, and, to a degree, elitist—how can we tell poor students not to view school as a gateway to socioeconomic advancement?—there is merit in this position when one considers how crassly practical some have tried to make schooling. (One influential early-20th-century superintendent wanted to evaluate subjects in the curriculum based on each subject's "unit cost" per pupil recitation.[8]) But economic motives have long driven mass education in the United States. In addition to his claims of the intellectual, civic, and moral benefit of the common school, Horace Mann devoted an entire report to the economic benefit, as well.[9] One could certainly argue that the strictly academic curriculum has long served as a vocational course of study for the middle and upper classes. It seems that the key issue here is how narrowly or richly "vocation" is conceived and whether the child is defined solely as an economic being.

I think there are two basic and interrelated questions that will shape the continued evolution of career and technical education. First, how do we rethink in a fundamental way the academic-vocational divide? There has been a lot done in this regard, from career academies to the emphasis in some programs of the intellectual content of work. And there are new approaches that affect CTE. Linked Learning, for example, is a program that advocates that all children get a uniform education in mathematics, English, and the arts and sciences, and only then branch off to a college- or career-oriented course of study. For Linked Learning or any other revision of CTE to be truly effective, however, our culturally embedded beliefs about mind, work, and social class will need to be surfaced and examined—for they will maintain the academic-vocational divide, even if a host of structural changes are made.

The second question moves us from the structural level of curriculum to the level of the individual student. Can we view the young people who pursue an occupational education as serious thinkers and see their engagement in work as an opportunity for them to explore aesthetics and ethics, history and politics, even—as will sometimes be the case—when their basic academic skills are weak? To answer this question positively might well mean creating the conditions for them to change the way they see themselves, for many have bought the definition laid on them by their place in the educational and social order. I think of a principal I once interviewed who described how the students in her school "looked at us in disbelief when we told them they were intellectuals." Such talk can't be superficial happy talk, but talk warranted by legitimate intellectual engagement with ideas and the world of work.

The early architects of vocational education built into its implementation bureaucratic and budgetary safeguards to protect it from the more powerful academic side of things, but in doing so cemented in the deep biases of the culture about physical versus mental activity. Furthermore, there were no bridging mechanisms built in between the vocational and academic realms to enable creative interaction, to foster cross-disciplinary discussion that could expand and enlighten, for example, the use of tools or the development of literacy. I think here of something I saw at a Habitat for Humanity site that crystallized the issue for me. I was watching a skillful high school carpentry teacher working with two of his students.

They have just placed an assembled window into its space in the frame. They are looking it over, eyeballing the edges, checking it with a spirit level. They're following procedure, and everything seems OK. They're ready to fasten the window in place. Their teacher takes a few easy steps toward them and asks them to come here a moment, to walk with him around to the other side of the window, inside the house. "Take a look from here," he says. The boys inspect the edge of the frame—and see the problem. The plywood that forms the frame on this side of the window assembly has been cut unevenly, and at several places there is not enough wood to receive the nails that the boys were about to drive from the other side. They are visibly struck by this, say they wouldn't have thought of this. But, geez, now that they see it....

In many ways, this is a small thing. A further routine step in the procedure of window installation—though the teacher sets it up nicely. But it also could be thought of as a metaphor for the vocational-academic divide. Though a routine move, and though certainly functional—you've got to see if your window assembly will be secure—this strategic shifting of physical location rep-

resented for me the shifting in perspective that is such a key element of intellectual development. It contributes to the solving of problems in many domains, to a more complex understanding of human behavior, to adopting point of view in literature and the arts. A lot could emerge from this moment. The day-to-day at the Habitat job site was full of such episodes, and their cross-disciplinary potential was, for the most part, lost to the English teacher or the psychology teacher, sealed off by the physical and conceptual barriers in the curriculum, even in a posttracking world.

As the people who are doing it will tell you, it is hard work to teach at the intersection of the academic and the vocational divide. It involves the delicate negotiation of turf and subject-area status—the touchy personnel dimension of the academic-vocational split. Then there is the bureaucratic dimension: the finessing of work rules, curriculum frameworks, and district guidelines. And there is the crossing of disciplinary boundaries and culturally sanctioned domains of knowledge, something that the typical undergraduate curriculum and teacher education program does not prepare one to do. English teachers are not taught how to talk to historians or biologists, let alone to nurses and engineers. Thus, even the most willing of teachers is hampered by traditional vocabularies and definitions and status dynamics that make it so hard, for example, to articulate—and then to teach—the cognitive and aesthetic dimensions of manual skill.

> Teachers working at the breach between the academic and the vocational challenge assumptions about hand and brain and make the schoolhouse more democratic.

It *is* hard work. It means developing classroom activities that authentically represent the knowledge and intellectual demands of the workplace and, conversely, bringing academic content to life through occupational tasks and simulations. It means that the house or the garment or the computer could be the core of a rich, integrated curriculum: one that includes social and technical history, science and economics, and hands-on assembly and repair. It means learning about new subject areas and making unfamiliar connections: the historian investigating the health care or travel industry, or the machinist engaging the humanities. It means fostering not only basic mathematical skill, but also an appreciation of mathematics, a mathematical sensibility, through the particulars of the design shop, the restaurant, the hospital lab. It means, as well, seeking out the many literate possibilities running through young people's lives—on the street, in church, in romance—and connecting them to the language of the stage, the poem, the Bill of Rights, but the contract, too, and the list of assembly procedures.

And, of course, such teaching might well mean providing instruction in "basic skills," but in a manner that puts the skill in context, considers its purpose, and pushes toward meaning beyond rote performance.

The teachers who do this work are trying to fashion a quality education for a larger-than-usual number of American youngsters. From what I've seen, they increase the number of students who graduate thoughtful and articulate, able to talk about what they're learning and of themselves as learners, able to act in and on the world. "It's the most powerful thing," says one teacher, "that I've ever done in education." While these educational experiments can involve all children, I am impressed by the special meaning they have for students who are not on the educational fast track, the great mass of young humanity. This kind of teaching represents a significant change in established beliefs about the capacity of such students.

It is important to note that in the early days of debate over vocational education, there were compelling voices articulating this kind of belief in the capacity of the common person and connecting education to an egalitarian vision of human and cultural development. There were John Dewey and Jane Addams, but others as well, academics and state-level committee members. But that view of mass education was erased from final policy. It needs to be reclaimed, for it is so pertinent now.

Without such bedrock beliefs and commitments, we will not continue to develop career and technical education or bridge the academic-vocational divide, for the beliefs about intelligence and knowledge that underlie a curriculum are as important as the content of the curriculum itself. Thus, those teachers who do work diligently at the breach between the academic and the vocational are engaged in a kind of applied political philosophy. They challenge the culture's assumptions about hand and brain, and the rigid system of educational theory and method that emerged from them, making the schoolhouse more truly democratic by honoring the fundamental intelligence of a broad range of human activity. ❑

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Keeping It Real

A Toledo Public School Prepares Students for College and Career

Students and teachers engage in hands-on work in engineering and technology fields at the Toledo Technology Academy. The school is a labor-management partnership between Toledo Public Schools and local business and labor leaders.

PHOTOGRAPHS BY JIM WEST AND TROUTNER & SCHULTZ PHOTOGRAPHY

By Jennifer Dubin

"Why do I have to learn this?" It's a question that crosses the minds of many high school students, but one that Ian Furstenberg doesn't need to ask. Because of his classes in such technical fields as digital electronics and automation, he can see the immediate connection between his schoolwork and his career interests; he dreams of becoming an engineer.

Furstenberg attends the Toledo Technology Academy (TTA), a career-tech school within the public school system in Toledo, Ohio. TTA teaches students in grades 7 through 12 using a science, technology, engineering, and math (STEM) curriculum. In addition to the traditional academic subjects of English, history, science, and math, TTA also provides engineering and technology courses, such as those Furstenberg is taking his junior year.

When he graduates from TTA, Furstenberg will leave with a career portfolio, which will include certifications attesting to his technical expertise as well as letters of recommendation from his teachers and the company that hired him for his school-sponsored internship. If he decides to work right after high school, he can present that portfolio, showcasing his knowledge and skills, to a prospective employer. Or he can submit it to a college admissions office along with the standard application.

It's a decision Furstenberg will make in the near future, and it's just as important as the one he made a few years ago to apply to TTA, a magnet school. While 70 percent of the students, like Furstenberg, come from Toledo Public Schools, 30 percent come from surrounding suburban schools. Students enroll because of the school's reputation for rigorous academic and technical instruction.

Roughly half of TTA students receive free or reduced-price meals, a figure indicating economic challenges at home. But despite coming from low-income families, many students are able to put financial concerns aside and focus on their studies, geared to preparing them for further education or training and future careers. Nearly all students pursue some form of postsecondary education upon high school graduation, and many work while doing so to make ends meet.

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The school's emphasis on engineering technology makes sense in a region of the country known for its manufacturing base and ties to the auto industry. The largest city in Northwest Ohio, Toledo is car country. Major employers include a Daimler-Chrysler plant, a Jeep assembly plant, and GM Powertrain, the biggest transmission plant in the world.

Offshoring of manufacturing jobs to China and Mexico as well as the recent recession hit the Toledo area especially hard. But the local economy has begun to rebound. Projections based on data from the Bureau of Labor Statistics show employment growth from 2010 to 2020 for Toledo and its surrounding counties in the following areas: plastics and rubber products manufacturing (3.7 percent), nonmetallic mineral product manufacturing (8.2 percent), and fabricated metal product manufacturing (7.5 percent).

Economic growth in Toledo will require businesses to hire well-trained employees in skilled trades and engineering. To keep such workers from leaving the area and prevent "brain drain" is largely why TTA was created in the first place.

In 1997, the public school system joined with local business and union leaders to establish TTA as a two-year program. In 2002, it became its own school. A governing board, made up of the school district's superintendent, the president of the Toledo Federation of Teachers, the plant manager of GM Powertrain, and the president of the United Auto Workers local, along with 12 other school, business, and labor leaders, meets monthly to help manage the school, whose principal (officially called "director") is a retired GM employee.

The successful labor-management partnership has enabled this school district, which has seen charter and Catholic schools chip away at its enrollment, to retain top students and demonstrate what career and technical education can do for those, like Furstenberg, who thrive on a curriculum that is not entirely abstract. "Being able to go in there and work with my hands," he says enthusiastically, "it's just this fantastic feeling."

"A Particular Kind of Student"

The school that Furstenberg attends actually began as a small program within a traditional high school. In the 1980s, Jerry Ewig, a shop teacher, since retired, started teaching an industrial automation class to juniors and seniors because he was interested in the subject.

To provide students with the necessary tools and expertise, Ewig knocked on the doors of local businesses. Tom Volk, who owns Ohio Belting & Transmission, agreed to help. His company is a distributor for industrial motion-control products, selling parts such as sensors for robots in automotive factories. Volk would visit with students and share his technical knowledge, and he continues to do so today. Later, he would also join TTA's governing board. "It's just the right thing to do," he says of his involvement in the school. "It's good for the community."

Ewig also convinced others, like Oscar Bunch, then the local UAW president, to participate. Bunch then persuaded the plant manager he worked with at GM Powertrain to join the effort. With their help, school district officials and Dal Lawrence, then the president of the local teachers' union, created a governing board to expand Ewig's program into a small high school.

They named it the Toledo Technology Academy and housed it in the district's old Thomas A. DeVilbiss High School, which closed in 1991. District officials as well as members of the business community retrofitted parts of the huge brick building, which dates to 1932, to accommodate machining equipment for labs. They enrolled close to 50 juniors and eight seniors. Academic teachers would teach traditional subjects, including English, history, science, and math, while technical teachers would teach the fundamentals of automation and materials processing. Though the students and staff were in place, a major problem surfaced early on: the teachers didn't get along.

"We did not see eye to eye," says Dale Price, who has taught math at TTA from the beginning and has spent more than half of his 33-year teaching career there. "We had no common point of reference. We had college degrees in teaching, and they had the technical experience."

TTA's emphasis on engineering technology makes sense in a region of the country known for its manufacturing base and ties to the auto industry.

As they move through each grade, TTA students spend increasing amounts of time in labs working with computers and machines.

He recalls that he and the other academic faculty members couldn't relate to the technical teachers because "they knew how to do things that we didn't understand." The two groups went through the motions of working together, but the rift between them grew. The director of the school couldn't bridge the faculty's cultural differences and resigned. Various administrators who succeeded her did not know what to do either, and the position became a revolving door.

In 2004, the governing board hired a new director to unite the school. Gary Thompson was a 34-year veteran of GM, specializing in human resource development. He had years of experience training employees and had successfully brought many labor-management teams together. Thompson had worked his way up in the auto industry, beginning as a floor sweeper at a Chevrolet

factory. Later in his career, he earned his bachelor's and master's degrees by taking classes at night.

Thompson was a 1969 graduate of Irving E. Macomber High School, a vocational school in Toledo no longer in existence. Thompson attended the school after his eighth-grade teacher told him he should work with his hands because he was not "college material."

Thompson never resented the remark. Macomber High School taught him a lot, he says. While the majority of his classmates learned auto mechanics, machining, and electrical work, he studied business and marketing there. Still, the experience made him sensitive to the long-standing divide between the academic and technical worlds, a divide he initially found at TTA.

Thompson's background in labor-management partnerships proved crucial to his success in encouraging academic and technical teachers to collaborate.

To attend TTA, students must apply to the school, have at least a C average, be willing to work hard, and have an interest in science and technology.

His background in facilitating labor-management partnerships at GM proved crucial to his success in encouraging academic and technical teachers to collaborate. He approached his new job the same way he had handled his work in the auto industry: by listening to others and helping them find common ground. "My whole experience was dealing with adults in the workplace, pulling together effective teams," he says. Once the teachers realized they were on the same team and needed to work together, he knew "they'd be good to go."

The school employs 21 teachers, about half of whom teach traditional academic subjects: English, history, science, and math. The other half teach technical courses in robotics; technical communications such as blueprint reading, technical sketching, and CAD (computer-aided design); electromechanical devices; electronics; fluid power; mechanical power transmission devices; programming; CNC (computer numerical control) machining, welding, and fabrication; and computer-integrated manufacturing. The heart of the curriculum is a pre-engineering curriculum published by Project Lead the Way, a nonprofit organization that develops STEM programs.

Last year, the governing board decided to expand the school; grades 7 and 8 were added this fall. The change enables a greater number of students to be exposed to TTA's curriculum earlier, which will better prepare them for the high school's rigorous classes and labs. Today, 275 students in grades 7 through 12 attend the school. Beginning in seventh grade, students must take six years of courses in both traditional academic subjects and technical areas.

When he first came to TTA, Thompson broke down barriers by making sure that academic and technical teachers talked to each other daily, asked questions about what their colleagues taught, and looked for ways they could connect and support each other's instruction. He also instituted weekly meetings for the entire faculty to discuss students together and plan lessons.

Thompson explains that technical teachers tend to come from industry. For instance, the TTA staff includes an electrician and a mechanical engineer. "They left jobs where they could make a lot more money," Thompson says. But "they discovered somewhere they had a passion for teaching."

All TTA teachers must apply to work at the school and interview with faculty members and the director. Compared with traditional Toledo public schools, TTA's school day runs an hour longer. Teachers are compensated for the extra time; they earn an additional $5,000 annually.

Students also must apply to the school. Prospective students must have at least a C average, be willing to work hard, and have an interest in science and technology. They must spend a day shadowing currently enrolled TTA students by sitting in on classes and meeting with teachers. Students and their parents are also required to sign a contract agreeing to abide by the rules of the school.

As students move through the grades, they spend increasing amounts of time working with computers and machines such as mills, lathes, and 3-D printers in the school's labs. They use the equipment for projects and to demonstrate specific competencies for industry certifications they can earn while still in high school.

At TTA, faculty members emphasize the importance of students working together. Team projects are often assigned. The most challenging one is completed senior year, when students work in teams on an engineering project of their choice. They also write a technical paper discussing the project. This paper is usually at least 20 pages long and also counts for a grade in their English class. For the project and the paper, students earn team and individual grades.

Students often enter projects in national competitions. Award-winning ones are featured throughout the school. For instance, a poster detailing a flight simulator created by a team called "The Fly Guys" is showcased in the school's lab so that current students can learn from and be inspired by it. The team's 70-page report, also on display, discusses how the machine they built simulates pitch and roll, and describes the history of flight simulation and the American military's use of it.

In May of their senior year, students spend the entire month in an internship with a local business. By then, seniors have completed all their coursework and no longer attend classes in the school building. About 40 businesses partner with the school to sponsor these internships, which are unpaid and count for a grade.

Thompson says that about 96 percent of the roughly 40 seniors who graduate each year continue in some form of postsecondary education, whether it's at a two- or a four-year college. About half pursue careers in engineering. Some students, who can't afford to attend college or who wish to work right after high school, Thompson helps place in apprenticeships in such fields as electrical work and welding.

It takes a motivated student to choose to enroll in TTA. The school offers no sports, music, dance, or theater opportunities after school. A student can join a sports team or extracurricular group at his or her home school (the neighborhood school he or she would have attended), but with the challenging coursework and the longer school day, few do. However, TTA students can earn a varsity letter in two unusual ways: by participating on the alternative energy team, which builds such vehicles as electric go-carts, or by joining a team that competes in FIRST (For Inspiration and Recognition of Science and Technology) Robotics, a national contest to design and build a robot to certain specifications.

"I get a particular kind of student here," Thompson says, one who is "interested in what we do and willing to work hard."

Putting Engineering Principles into Practice

One February morning in the materials and processing lab, 19 sophomores concentrate on fabricating miniature air motors. Dressed in the school uniform of polo shirts and khaki pants, the students must make nine parts from scratch. They use the lab's two band saws to cut aluminum, its eight lathes to make the motor's rounder parts, and its eight mills to cut the motor's base down to size. Weeks before they had even touched any equipment, they designed their motors using CAD software in the classroom next door.

"I'm going to start working on my flywheel," Furstenberg tells a visitor. "I just finished my base." With his safety goggles pushed back on his head, Furstenberg holds a finished air motor, an exact replica of what everyone is supposed to make, to explain how it works. "You put air through a valve," he says. "The air travels and turns the piston," and "the flywheel is able to generate energy." The project enables students to learn the basic principles of pneumatics and make a piece of machinery that runs.

Furstenberg and his classmates stand at machines and periodically refer to sheets of paper outlining the standard operating procedure for the parts they are working on that day. Their teacher, Marvin Gladieux, walks around answering questions and making suggestions. He will grade not only the finished air motor but each part they make. Students will also give themselves a grade.

"I want you to move closer to the line," Gladieux tells a student, standing at a lathe to make parts for his flywheel. "See the edge of your cutter."

"Mr. Gladieux, I need your help," Cesar Hechabarria calls out over the machine buzz.

"Be right with you," Gladieux says.

A minute later, he walks over to Hechabarria, who is making the base for his air motor by using a device called an edge finder. A sign on the wall above him reads: "Measure Twice. Cut Once."

Hechabarria is having trouble centering his base to drill a hole in the middle. So Gladieux reminds him how to read the numbers on the edge finder's screen and line up the part.

During the 50-minute lab, no one sits down or plays around. Students respect the equipment, which can spin up to 4,000 rpms. In the beginning of the year, they received training on each machine. When the class ends, they clean up just as carefully as they worked. They sweep the floors, store materials, and wash their hands at a large sink by the door.

Gladieux, a technical faculty member, teaches engineering courses to freshmen and sophomores. He has worked at TTA for 17 years but has officially taught for only four. He helped retrofit the building when the school opened and served as TTA's mechanical specialist, repairing equipment and occasionally working with students, until his position was eliminated due to budget cuts.

That's when he decided to pursue teaching. Gladieux earned his teacher certification at the University of Toledo, and he has also taken several education and technical courses at the local community college. Before teaching, he spent most of his career as a millwright, after a four-year apprenticeship, and once worked for the local power company, Toledo Edison.

> About 40 businesses partner with the school to sponsor internships, which are unpaid and count for a grade.

Marvin Gladieux, right, with a student. Before teaching materials and processing at TTA, he spent most of his career as a millwright.

Gladieux enjoys working with students and "seeing the 'aha' moments," he says. He recognizes the importance of teaching them how to translate engineering theory into practice. Coming from industry, Gladieux has worked with some engineers who don't see the practical implications of their work, who "would design things that were impossible to make," he says. "Or they would tell you to turn left three times instead of just turning right once." With projects like making an air motor, he hopes students can learn to avoid similar mistakes. He also hopes they learn that hard work pays off. "When they see their air motor running, they get the biggest smile," he says.

Furstenberg relishes the opportunity to work with his hands. "It's not like you go to a store and you buy an air motor," he says.

"This is something you make yourself. It's not just a piece of paper with a grade on it."

From an early age, Furstenberg played with Legos and his computer in his spare time. He wasn't interested in sports, and social events at school never appealed to him. So when he reached eighth grade, he knew that for ninth grade he wanted to attend TTA.

Furstenberg hopes to pursue a career in a nanotechnology field for engineering. He has passed Algebra I, geometry, Algebra II, and pre-calculus since coming to the school as a freshman. By February of his sophomore year, he has moved on to AP calculus, which he finds challenging. Even with TTA's rigorous courses, he still makes time to participate on the school's FIRST Robotics team. And he is grateful that Dana Holding Corporation, a locally based company that supplies powertrain parts, sponsors the team. Dana helps offset the cost of robotics competitions and encourages employees to advise the team on its work. "It makes me really happy that they would take their own time off to come and help a bunch of high school students," Furstenberg says.

Learning to Connect and Communicate

That kind of connection between local businesses and the school community is exactly what the governing board envisioned. Industry partners volunteer to share their knowledge and expertise so that teachers can expose students to the latest technologies and tweak the curriculum. And just as important, these partners provide internships for seniors.

Joseph Neyhart, left, gained work experience at GM Powertrain during his internship.

GM Powertrain has had such good experiences with the internship program that last year it asked the school to send six interns at the beginning of the school year. Those students, who were seniors, spent nearly half of every school day at the plant until May, when they spent the month there.

TTA graduate Joseph Neyhart, now a freshman at Kettering University, was one of them. He spent his internship, which he also turned into his senior project, working with two other students on designing what they called a "mobile office" for GM Powertrain team leaders. GM devised the project and requested the students' help. "We actually have [students] working on engineering projects for us, meaningful projects that will help advance the purposes of this plant," says Joe Choate, the plant manager at GM Powertrain, which employs 2,000 people.

Neyhart explains that the mobile office combines a toolbox, a desk, and a workstation, all in one, to improve ergonomic conditions on the shop floor, increase productivity of the plant's team leaders, and save the company money. It also allows team leaders to digitize their paperwork. For security, he and his teammates inserted a thumb scanner so only authorized employees can have access.

Neyhart values his time at GM and in his labs at school. "You get experience versus just lectures," he says. "We learned how things work."

Choate, a member of the TTA governing board, says each year his plant hires four or five TTA alumni, after they have graduated from college with engineering degrees. These engineers help design the plant's machining and assembly processes and the tools to operate them. At GM, Choate says, salaries for these positions start at more than $70,000 a year.

He adds that TTA graduates can work at GM before they attend college or while they pursue their degree. Jobs that don't require college degrees pay roughly $17 an hour and include maintaining and assembling plant equipment. TTA students, Choate says, "are actually quicker at picking things up than the normal new hire would be."

Volk, of Ohio Belting & Transmission, also employs TTA graduates; three alumni currently work for his 10-person company. All three interned for him while they attended TTA, and they now work in his customer service department. These employees help manufacturing companies determine what kinds of engineering products they need. Volk says that knowledge of how things move, how to control an electric motor, and how sensors work are prerequisites for these positions. TTA students have this knowledge because the school exposes them "to all those products and processes," which "gives them a huge leg up when they come into an industrial job like this."

TTA also prepares students to communicate. Volk says that because of their coursework and internships, students know how to write and give presentations. He credits such strong communication skills to the fact that academic and technical teachers work together to integrate their classes and also emphasize the importance of putting technical know-how into words.

For 14 years, Louise Lowenstein helped TTA students communicate their technical knowledge. Although the English teacher retired at the end of last year, her successor is picking up where she left off: teaching American literature, taking students to the local art museum, and editing and grading lab reports as well as senior engineering papers. Last year, for the first time, seniors were also required to create a manual of operating instructions to accompany their project so that, as Lowenstein says, even an English teacher could work it.

Lowenstein taught in the Toledo public school system for 28 years and came to TTA because she wanted to work closely with technical teachers. "I probably should have been one of them, if I had been in a different generation," she says. "I'm fascinated by how things work."

Because Lowenstein loves learning about technology, she especially enjoyed partnering with Deb Carper, a former electrician who teaches automation. Last spring, she and Carper won a

$500 grant to purchase a Tesla coil, a transformer that produces high-frequency power, for a unit on alternating current. In Carper's lab, students did a series of experiments with the coil. In Lowenstein's class, they wrote three- to five-page lab reports about their work. Lowenstein also visited Carper's class to see the coil and the experiments for herself.

Carper reciprocates her colleague's interest. She has observed Lowenstein's classes and has often joined their periodic trips to the Toledo Museum of Art. In February, for instance, Carper tagged along when Lowenstein took the juniors to visit the museum's exhibit on the Tuileries Garden in Paris.

Lowenstein believes that such collaboration benefits all students and their learning. "We're modeling for them what it's really like to work in the workplace with colleagues," she says. Students see that "we care about what the other teacher is doing, so it's not them against us, not my department, your department. It's our school."

Because of their coursework and internships, students know how to write and give presentations.

Aside from extending students' learning in their technical classes, Lowenstein also exposed students to great literature. Her students read *Beowulf*, *Frankenstein*, and Shakespearean plays, among other classics; texts about the Puritans and the American Revolution; and more modern works such as the play *A Raisin in the Sun*, by Lorraine Hansberry, and the nonfiction book *The Devil in the White City*, by Erik Larson. Lowenstein says it's important for all students, including those interested in STEM fields, "to have a core knowledge of what makes American literature what it is, the values that we express that way."

Reading literature also teaches students the power of language. Lowenstein tried to emphasize the importance of harnessing that power as well as the practical need to communicate ideas in the best possible way. "Knowing how to build something will get you a good job," she recalls telling them. "Knowing how to sell it to somebody, and explaining it, will get you a *very* good job."

The careers TTA alumni pursue often involve engineering and technology, but not always. Graduates have enrolled in nursing school and early childhood education programs.

About 32 percent of TTA students are female. Thompson, TTA's director, says the school needs more young women and aggressively tries to recruit them. The female students who do attend are strong technically and very focused academically, he says. "They know what they're doing."

In fact, both the valedictorian and salutatorian for the graduating class of 2014 were female. At least four other young women have also been valedictorians at the school in recent years.

Lauren Holder, 2014's salutatorian, is a freshman in the honors college at the University of Toledo. She plans to pursue a double major in business and accounting, and hopes to open her own business one day.

Holder was homeschooled by her mother from grades 2 through 8. She applied to TTA for its small size and strong reputation, and because it fit with her interest in science and math.

About 32 percent of TTA's 275 students are female, like Lauren Holder, above. The school aggressively tries to recruit young women.

Being female made no difference in her experience at the school, she says. "There are a lot more guys, but I don't really feel like people look at you differently because you're a girl." Male or female, succeeding at TTA takes self-discipline. "It's up to you what you want to be and how far you want to go at this school," she says. "If you're really dedicated, then you're going to go far."

At TTA, few have come as far as Brittany Oldaker. Even after she became pregnant as a freshman, she decided not to drop out. Every day that year, she continued to walk the mile from her home to school, although she was tired and the pregnancy made her physically uncomfortable. She was determined not to give up on her studies or herself. In the weeks before she delivered her daughter, Kayla, now 2, Oldaker earned an A on every exam and maintained a 3.7 grade point average for the year.

Oldaker, a junior when we talked, especially enjoyed her digital electronics class. "I like wiring things," she said. "I like seeing how things turn out."

She was already looking forward to her future beyond TTA. After high school, she wanted to land a job, perhaps with the company where she planned to work as an intern during her senior year. She knew she couldn't afford to attend college full time, but taking classes part time at Owens Community College would allow her to continue her education. Since TTA has an arrangement with local colleges, including Owens, in which TTA labs count as college credit, Oldaker estimated she could save herself nearly $2,000 in tuition. After a couple years of working full time and taking classes at Owens, she aimed to finish her undergraduate degree in engineering at the University of Toledo.

"It's simple," Oldaker said of her plan. "But it still provides me and my child a good future." ☐

The Pursuit of Pathways

Combining Rigorous Academics with Career Training

ILLUSTRATIONS BY PAUL ZWOLAK

By Robert B. Schwartz

In February 2011, I, along with two colleagues, economist Ronald Ferguson and journalist William Symonds, released a report, *Pathways to Prosperity: Meeting the Challenge of Preparing Young Americans for the 21st Century*, which was published by Harvard University's Graduate School of Education.[1] When we first began meeting to discuss the study that led to this report, we were mindful of the fact that 20 years earlier a commission established by the William T. Grant Foundation had issued a powerful report called *The Forgotten Half: Non-College Youth in America*.[2] As the title suggests, this 1988 report argued that public resources and support were disproportionately focused on young people headed for higher education, and that without a much more robust investment in preparing non-college-bound youth for successful transition into the workforce, these young people would be at significant social and economic risk. The jumping-off question for our study was: Is there still a "forgotten half" today, and if so, how do we make more progress in serving that population in the next 20 years than we've made in the last 20?

Robert B. Schwartz is professor emeritus in the Harvard Graduate School of Education at Harvard University and coleads the Pathways to Prosperity Network. He previously served as president of Achieve and was the director of the education grant-making program of the Pew Charitable Trusts. He began his career as a high school English teacher and principal. *This article is adapted with permission from his chapter "Pathways, Not Tracks: An American Perspective," in* Kenneth Baker, 14–18: A New Vision for Secondary Education *(London: Bloomsbury, 2013).*

On the face of it, it seemed unlikely that we would find a persisting "forgotten half" of young people in 2011. For one thing, the term "non-college-bound" has essentially disappeared from our vocabulary. Over the last 20 years, there has been growing public agreement that all young people need to be prepared for further education as well as careers. When high school students are asked today what they are going to do after high school, over 90 percent say they are going on to college or university. More important, over 70 percent of high school graduates do in fact go on to enroll in a higher education institution. But when we ask what proportion of young Americans have earned a college or university degree by their mid-20s, the answer is less encouraging: only 32 percent have graduated from a four-year institution, and another 10 percent from a two-year college.[3] We estimate that roughly another 10 percent have acquired a recognized one-year occupational certificate from a postsecondary education or training institution.[4] This brings us to just over half the population with a meaningful postsecondary credential by their mid-20s.

It may be an exaggeration to characterize the other half of the age cohort as "forgotten," but in an economy in which the gap between those with postsecondary credentials and skills and those without is widening, the one young person in five who drops out of high school is especially vulnerable, but so are those who start some form of higher education but never finish. Our conclusion, looking at our high school and higher education dropout data, was that, if anything, the case for investing in developing a set of rigorous career and technical education pathways alongside the strictly academic pathway is even stronger today than it was 20 years ago.

This conclusion was buttressed by two sources of data. First, job projections from the Georgetown University Center on Education and the Workforce suggest that over the next decade, nearly a third of jobs will be "middle skill"—i.e., requiring some education or training beyond high school but not necessarily a four-year degree.[5] This projection challenges the widespread belief that our labor market is becoming increasingly bifurcated into high-skill and low-skill occupations, and that the only good jobs in our economy will require a four-year college degree.

The second source of data we found compelling comes from two recent studies from the Organization for Economic Cooperation and Development, *Learning for Jobs* and *Jobs for Youth*.[6] These two studies provide strong evidence that countries with the best-developed vocational education systems—especially the countries with the strongest youth apprenticeship programs—manage to equip a much larger fraction of their young people with skills and credentials to make a successful transition from secondary school into the workforce, thereby significantly reducing the proportion of young people at risk of sustained unemployment at the point of entry into the labor market.

The gap between those with postsecondary credentials and skills and those without is widening.

The Problematic Status of Vocational Education

When I talk with colleagues about the virtues of the Swiss or German apprenticeship systems—i.e., how these are mainstream systems, serving a broad range of students, preparing people for white-collar careers in high tech or banking as well as the traditional blue-collar trades—the first response is often, "But don't they track students as early as age 10, something we would never condone?" Leaving aside for the moment the pervasive but subtle forms of tracking that characterize much of American education, the answer, at least for Germany, is unfortunately "Yes, they do track very early." Given the history of vocational education in the United States, especially the perception that in large urban districts it has too often been a "dumping ground" for low-income and minority youth, this is usually a conversation-stopper.

To understand this reaction, one needs to understand something about the history of vocational education in the United States. Vocational education, in part because of the stimulus of a major piece of federal legislation in 1917, developed mostly as a separate system, organized and governed at the state level independent of academic high schools. It was not until the 1960s that there was federal support for vocational education programs offered inside regular comprehensive high schools.

Consequently, while vocational education mostly has taken place inside comprehensive high schools for the last half-century, its programs have been offered on a separate track from programs serving university-bound students. American high schools continued to function largely as sorting and selecting machines, identifying those students deemed to have the talent for higher learning and providing them with a rigorous academic education while expecting everyone else to enter the labor market directly upon graduation. Despite our rhetoric about the democratic purposes of comprehensive high schools, by and large these institutions were organized in ways that perpetuated existing racial and economic stratification, with low-income and minority students disproportionately concentrated in the vocational track.

With the rise of the standards movement, however, the name of the game changed. Driven largely by the dramatic changes taking place in the economy—the decline of manufacturing, the computing revolution, globalization, and outsourcing of lower-skill jobs—schools were now being asked to provide *all* students with a foundational level of academic skills that hitherto were expected only of those who were bound for college. With rising academic expectations came rising accountability for results, which meant increased pressure on schools to devote more time to core academics, especially those subjects being assessed for accountability purposes, and less time for electives, including vocational education. Consequently, the percentage of students taking three or more courses in a single vocational area has steadily declined over the last three decades, dropping from 34 percent in 1982 to 19 percent in 2009.[7] While the rhetoric in today's policy environment is that all students should leave high school college and career ready, the reality is that almost everywhere career readiness is on the back burner.

The New CTE

In the past two decades, new models of vocational education have emerged that demonstrate that it is possible to combine rigorous academics with career training in high-skill, high-demand fields.

In order to differentiate these kinds of programs from vocational education in the more traditional trades, the term "career and technical education" (CTE) has come into use. These models are best seen in a set of national programs that have acquired sufficient scale to become important players in the high school reform world. Our *Pathways to Prosperity* report profiles several such programs.

Perhaps the best-known model combining strong academics with career preparation is the career academy. Career academy programs typically enroll young people in grade 9 and carry them through high school graduation. There are roughly 3,000 career academies in the United States, 500 of which operate under the umbrella of the National Academy Foundation (NAF). NAF academies prepare young people in five career areas—finance, engineering, information technology, health sciences, and hospitality and tourism. A key feature of the NAF design is that all students are promised a six- to 10-week paid internship with one of 2,500 corporate partners.

NAF's engineering academies utilize curriculum developed by Project Lead the Way, a national four-year pre-engineering program now enrolling 300,000 students in 3,500 high schools across the country.* Students move through a sequence of increasingly challenging courses culminating in a capstone course in engineering design and development in which they work in teams to devise a solution to an open-ended engineering problem.

High Schools That Work (HSTW)† is another national network, including more than 1,200 schools in 30 states and the District of Columbia. Operated under the sponsorship of the Southern Regional Education Board, HSTW's mission has been to ensure that vocational education concentrators are receiving rigorous academics, especially in mathematics and science, so that they are fully prepared to succeed in postsecondary education as well as the workplace.

In addition to these and other national networks, many states have revamped their old vocational programs or created new ones that combine instruction in more modern, challenging career areas with rigorous academics. One very positive consequence of the standards movement has been that it has created pressure on school districts to close down the low-level, low-expectations math and science courses that vocational students were often assigned to. In a world in which all students are required to pass assessments in math and English based on challenging academic standards as a condition of high school graduation, there is no longer room for such courses.

An important common denominator that characterizes our strongest national and state CTE programs is that they are designed to leave open the option for successful graduates to continue on to higher education, and this is in fact what most of their graduates do. Over 90 percent of NAF graduates, for example, plan to go on to higher education, most to four-year colleges, and more than half graduate in four years (by contrast, the six-year graduation rate nationally is only 58 percent).[8]

A related common denominator is that these programs typically are designed to serve a broad range of students. These programs are not intended primarily for at-risk students or students with very low academic skills. The involvement of employers in program design and the provision of internships or other forms of work-based learning create a set of behavioral expectations around attendance, punctuality, respectful communication, teamwork, and other "soft skills" that typically carry over into the classroom setting, creating a seriousness of purpose often missing from other high school classrooms serving similar students.

New models of vocational education demonstrate that it is possible to combine rigorous academics with career training.

The challenge for the United States is not simply to scale up quality CTE programs like those described above, but rather to create a pathways system within which these and other effective program models can grow and flourish. This is why the experience of European apprenticeship countries is potentially so relevant for us. In Austria, Denmark, Finland, Germany, the Netherlands, and Switzerland, one can see coherent vocational systems designed to help most young people make a successful transition from secondary school to work. Although the design of these systems differs from country to country, there are some common elements. These systems all serve a broad range of students, between 30 and 70 percent of the age cohort. They all offer pathways leading to qualifications in a broad range of occupations, beyond the blue-collar trades that we associate with apprenticeships. They all combine learning at

*For more about the National Academy Foundation and Project Lead the Way, see www.naf.org/naf-academies and www.pltw.org/about-pltw.

†For more about High Schools That Work, see www.sreb.org/page/1078/high_schools_that_work.html.

the workplace with aligned academic coursework in a classroom setting. They all have substantial employer involvement in curriculum design and standard-setting in order to ensure that the qualifications graduates earn will have currency in the labor market. And all of these systems acknowledge the need to create options for graduates to continue on to further education if they choose.

It is easy for American policymakers to tick off the reasons why such systems can't (or shouldn't) be built in the United States. These systems depend on early tracking. They expect students to make binding career choices at too early an age. They require a degree of centralized planning that we would never tolerate. They are built on trade and craft traditions that we don't share. Their employers have strong incentives to participate, and partner with unions, in part because their labor markets are more regulated than ours. The list goes on.

While all of these concerns have some basis in reality in one or more of these systems, they are by no means universal. For example, Finland and Denmark demonstrate that one can have a high-quality upper-secondary vocational system without early tracking. While Germany and Switzerland ask students to choose from a bewilderingly large list of occupations, Denmark asks students to choose initially from 12 occupational clusters, and only later do students zero in on a more specific occupation. While it is true that the German labor market is highly regulated, the Swiss labor market operates much like ours, and Switzerland's apprenticeship system is, if anything, even more impressive than Germany's. Switzerland also has the lowest youth unemployment in Europe. And I don't believe any of these systems treats the apprenticeship contract as irrevocable; in fact, about 20 percent of German apprentices switch occupations after the first year.

Our strongest CTE programs are designed to leave open the option for successful graduates to continue on to higher education.

An American Pathways System

So what would a U.S. pathways system look like—one that avoids the pitfalls of tracking and draws on the best features of the strongest European systems? Given our history and culture, is it feasible to imagine that the United States could ever build a vocational education system that has at least some of the attributes of the strongest European systems? I believe the answer is yes, but it would require an approach built upon the following principles:

1. All students are provided the same core academic curriculum at least through grade 10 (age 16).
2. There is much-expanded investment in career information, counseling, and workplace exposure beginning in the middle grades and continuing through secondary school.
3. All career pathways are aligned with regional labor market needs, have significant employer engagement, and lead to a postsecondary credential with currency in the labor market.
4. All pathways provide continuing academic skill development—especially analytic reading, writing, communication, and quantitative reasoning—integrated with career and technical education.
5. Enrollment in a pathway is based primarily on student and family choice, not assignment by the school.
6. All pathways are designed to leave open the possibility of further education beyond the attainment of the initial occupational certificate or degree.

These principles can best be seen in operation in Northern European countries like Finland and Denmark. While these countries do not have as well-developed apprenticeship systems as Austria, Germany, and Switzerland, they do have the advantage of satisfying principles 1 and 5, critically important if this approach to secondary education is ever to take root in the United States. Finland is especially impressive in this regard. Finland has no tracking whatsoever through grade 9, at which point students choose between academic and vocational upper-secondary schools. The fact that over 40 percent of young Finns now opt for vocational education in a technology-driven economy suggests that it is possible to design a vocational system that can compete with the university-bound system on a level playing field for status and resources.

There are very substantial challenges that would have to be overcome in order to implement the principles enumerated above, especially the third principle. Many American high schools have benefited over the years from partnership programs with local employers. Such programs run the gamut from modest support for sports or other extracurricular activities to scholarships for graduates to more substantial career-related initiatives involv-

ing such things as mentoring, job shadowing, work-based learning, and summer internships. These latter opportunities are usually attached to career academies or other strong CTE programs with active employer advisory committees. In contrast with Northern European systems, however, U.S. employers do not engage with our high schools with the expectation that they are helping to identify and train entry-level employees for their firms, or even the next generation of workers for their industries. Rather, the overwhelming majority of CTE programs in our schools are designed to be exploratory, to expose young people to the world of work, and to motivate otherwise academically disengaged youth to understand why the acquisition of foundational literacy and quantitative reasoning skills matters in the labor market.

In New York City, where the small-schools strategy has been most fully implemented, there is powerful evidence that this strategy has significantly boosted student achievement and increased high school graduation rates, especially for disadvantaged students.[9] Even in New York, however, many of these small schools or academies have very weak or nonexistent employer engagement and are focused more on high school completion than on career preparation.

In its pure form, this option would require all students to choose a career area or theme around which their high school education would be organized. Twenty years ago, the state of Oregon adopted legislation based on this principle. High schools were to organize themselves into broad career majors—e.g., health, environment, technology, arts, and media—each designed to serve a broad range of students, and each incorporating readings, problems, and examples drawn from its sector into the delivery of the core academic subjects. For a combination of reasons, including funding, implementation challenges, and political resistance from families focused only on university admissions, Oregon's career major program never got fully off the ground. This suggests that attempting to weave career preparation into the secondary education experience of all children, at least in the U.S. setting, may not be viable politically.

Programs that span secondary and postsecondary education are increasingly popular, partly because the costs of higher education continue to rise.

A major cultural difference between U.S. employers and those European employers that participate in apprenticeship programs is that most U.S. employers are deeply skeptical that 16- or 17-year-olds can add value to their firms' bottom lines. This may be a chicken-and-egg phenomenon: schools don't ask employers to provide anything like European-style apprenticeship opportunities because they assume employers will refuse, and employers don't offer them because they doubt that high schools could organize themselves to support such opportunities by providing the rigorous, aligned academic work that could help students perform successfully in the workplace.

Organizing a Pathways System: Three Options

Given these challenges, how might a pathways system be best organized? I see at least three major options. The first, which is already being implemented in some large urban high schools, is to universalize the career academy model. In cities like New York, Chicago, Boston, and Philadelphia—thanks in large measure to support from several national foundations—buildings that formerly housed large, dysfunctional tracked high schools with astronomically high failure rates now house several smaller schools or academies, each with a career or thematic focus. These small schools, typically serving 300 to 500 students, are deliberately designed to integrate academic and career preparation. They often are organized in partnership with one or more community-based organizations and almost always provide their students with internships or other forms of work or service-learning opportunities.

A middle-ground option that would not require schools to take on the political challenge of tampering with the academics-only university pathway is to build out a set of four-year career-focused pathways that would coexist alongside the academics-only pathway. Again, the NAF career academy provides a useful model. If all students other than those on the academics-only path could choose among a limited set of career academies (e.g., health, finance, information technology, engineering, tourism), all of which provided integrated career preparation and academics and genuinely prepared people for higher education as well as employment, this would not only ameliorate the concerns of parents wanting an academics-only program, but it would also reduce the anxieties of those who fear a return to tracking.

This is the strategy being pursued by an ambitious California program called Linked Learning. With funding from the James Irvine Foundation, Linked Learning is developing career academies in such major California industry sectors as building and environ-

mental design, biomedical and health sciences, and arts, media, and entertainment. Each academy is designed in such a way as to meet the academic course-taking requirements for admission to California's four-year universities as well as to provide advanced technical preparation in a career area.*

The third option would be to follow the example of Northern Europe and move toward a system in which there is a sharper distinction between lower- and upper-secondary education. This would defer the choice of a career area until grade 10 (age 16), enabling schools to concentrate on ensuring that all students acquire a solid foundation of academic knowledge and skills, especially in reading, writing, and mathematics. This would not preclude schools from using career interests and themes, and applied learning strategies, to deliver core academics in the lower-secondary grades, but it would allow for two more years of full-time academics.

The core premise of the Pathways Network is that all young people need to be prepared for careers and further learning.

In order for the United States to develop a version of vocational upper-secondary education at all comparable to the strongest European systems, we would have to link the last two years of high school with an additional year or two of postsecondary education or training, typically at a community college. This approach, while creating the significant logistical and funding challenges associated with programs that cross institutional boundaries, has one major advantage: U.S. employers are much more likely to be willing to participate in occupational certificate or degree programs organized by postsecondary institutions than those organized by high schools. In this option, one would begin by establishing an agreement between the postsecondary provider and an employer group, mapping backward from the certificate requirements in a particular field and then building a three- or four-year pathway starting in the 11th grade. Such a pathway would include paid internships and summer employment opportunities while students are in high school, with the appropriate sequence of academic and technical courses leading to a certificate or degree.

Programs that span secondary and postsecondary education are increasingly popular with families in the United States, partly because the costs of higher education continue to rise. Thanks largely to the Gates Foundation, we now have a national network of 270 "early college high schools" (ECHS),† serving approximately 80,000 students, mostly low income and minority. These schools all have formal relationships with a two- or four-year college or university. The idea behind early college is to accelerate the learning of these students by placing them in college-level courses so that by the time they graduate from high school, they have already accumulated at least one year of college credit. More than one-quarter of ECHS students are now graduating with a two-year associate's degree and nearly half with at least one year of college credit.[10] Although most of these schools are not explicitly career-focused, in many instances the college courses students take are in career and technical fields, and there is considerable interest within the ECHS network in creating more formal CTE pathways leading to occupational certification or a technical two-year degree.

Building a Pathways Network

Despite the challenges inherent in the third option, this is the one that I and a set of colleagues at a Boston-based nonprofit, Jobs for the Future, decided to pursue in response to the extraordinary interest generated by the *Pathways to Prosperity* report. In 2012, we invited a small set of states to join us in forming the Pathways to Prosperity Network.‡ The Pathways Network is designed to ensure that many more youth complete high school and attain a postsecondary credential with currency in the labor market. Each state is engaging educators and employers in building, for grades 9–12 on up through community college, a system of career pathways in such high-demand fields as information technology, healthcare, and advanced manufacturing. Such pathways are intended to launch young people into initial careers while leaving open the prospect of further education. In 2014, participating states include Arizona, California, Delaware, Georgia, Illinois, Massachusetts, Missouri, New York, Ohio, and Tennessee. Jobs

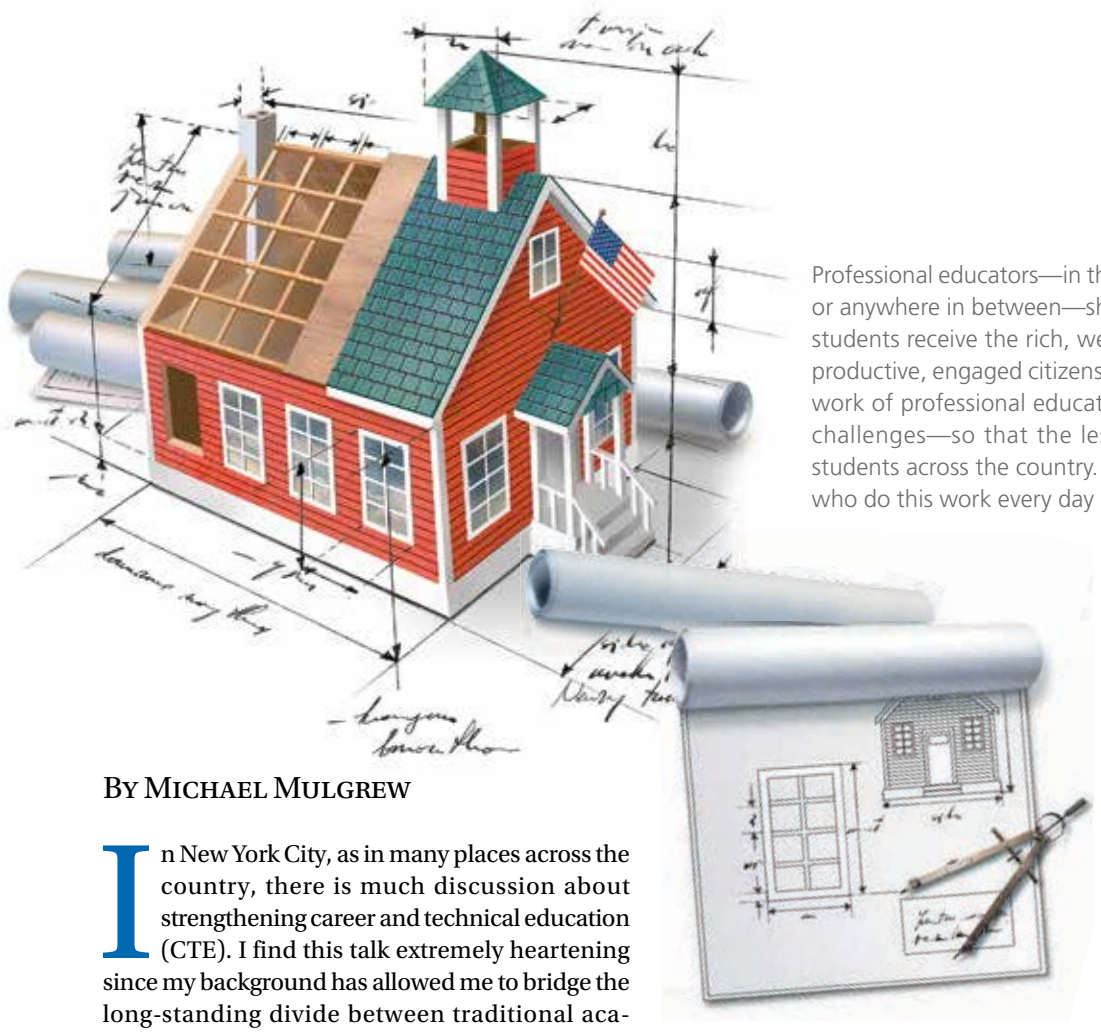
(Continued on page 41)

*For more about the Linked Learning model, see www.irvine.org/grantmaking/our-programs/youth/linked-learning.

†For more about early college high schools, see "The Early College Challenge: Navigating Disadvantaged Students' Transition to College" in the Fall 2011 issue of *American Educator*, available at www.aft.org/pdfs/americaneducator/fall2011/EarlyCollege.pdf.

‡For more about the Pathways to Prosperity Network, see www.jff.org/initiatives/pathways-prosperity-network.

Notes from New York City



Professional educators—in the classroom, library, counseling center, or anywhere in between—share one overarching goal: ensuring all students receive the rich, well-rounded education they need to be productive, engaged citizens. In this regular feature, we explore the work of professional educators—their accomplishments and their challenges—so that the lessons they have learned can benefit students across the country. After all, listening to the professionals who do this work every day is a blueprint for success.

By Michael Mulgrew

In New York City, as in many places across the country, there is much discussion about strengthening career and technical education (CTE). I find this talk extremely heartening since my background has allowed me to bridge the long-standing divide between traditional academic classes and vocational education, a divide that is discussed in this issue of *American Educator*.

Years before I became president of the United Federation of Teachers (UFT), I was an English teacher and a professional carpenter. Because of my passion both for literature and for working with my hands, I have always been committed to ensuring that all students have access to core academic subjects as well as courses that prepare them to earn certifications in technical fields and work in skilled trades.

Accordingly, I have followed with keen interest the current attention CTE is receiving from education experts and policymakers. I take great pride in how New York City's approach to CTE is held up as a model for getting this type of education right. For instance, about a year ago, the UFT and the Albert Shanker Institute, in cooperation with the CTE Technical Assistance Center of New York, organized a conference titled Fulfilling the Promise of a Quality Education for All: 21st Century Career and Technical Education, a two-day event held at UFT headquarters in New York City. A policy statement* calling for high-quality CTE was released at this conference, which many of the top CTE experts from government, academia, and policy organizations attended.

While the bulk of the conference featured presentations and panel discussions, the morning of the second day was devoted to

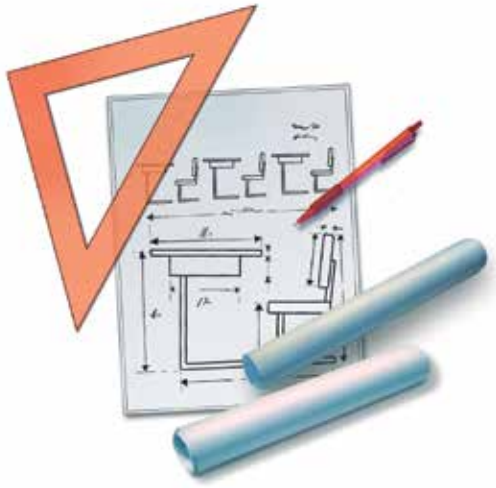
Michael Mulgrew has been the president of the United Federation of Teachers (UFT) since 2009 and has been a vice president of the American Federation of Teachers since 2008. He is also an executive board member of the New York State United Teachers and sits on the boards of the Council for Unity, the City University of New York's Joseph S. Murphy Institute for Worker Education and Labor Studies, and New Visions for Public Schools. A former classroom teacher and UFT chapter leader, Mulgrew was the UFT's vice president for career and technical education high schools and later served as its chief operating officer. This article is adapted from a presentation he gave at the conference Fulfilling the Promise of a Quality Education for All: 21st Century Career and Technical Education, organized by the UFT and the Albert Shanker Institute, in cooperation with the CTE Technical Assistance Center of New York, in October 2013.

*To read the full statement, visit www.shankerinstitute.org/21st-century-career-technical-education.

ILLUSTRATIONS BY NENAD JAKESEVIC

school visits. Conference attendees were able to visit a handful of excellent New York City CTE schools: Pathways in Technology Early College High School (P-Tech), Transit Tech CTE High School, Food and Finance High School, Urban Assembly New York Harbor School, Aviation High School, and Thomas A. Edison Career and Technical Education High School. Each of these schools has a different CTE theme: At P-Tech, students study science, technology, engineering, and mathematics; at Transit Tech, they study industrial electronics; and at Food and Finance, they study culinary arts. Urban Assembly specializes in aquaculture, marine biology, ocean engineering, and vessel operations; Aviation High School focuses on aviation maintenance technology; and Thomas Edison features programs in automotive technology, graphic arts, and robotics. Conference participants attended classes, spoke with students and teachers, and got a firsthand look at engaging and challenging curricula that prepare students for both postsecondary education and the workplace.

These six schools represent only a fraction of the many CTE programs that New York City currently offers. And it is important to remember that these terrific schools were not established overnight. It took us a long time to get to this point. The UFT worked closely with the New York City Department of Education (which at one time actually tried to shut down the city's CTE programs, but more on that later) and local industry partners to help start many of these programs; doing so was a huge struggle. Our story of forging the relationships necessary to create these strong programs holds lessons for other cities looking to engage students in career and technical education.



Our story of forging the relationships necessary to create these strong programs holds lessons for other cities looking to engage students in CTE.

Student Engagement with Meaningful Work

Before I explain the history of the partnership that New York City, the UFT, and local businesses now enjoy, I'd like to set the stage by describing how CTE was once a neglected part of the educational experience in the city. Because of the direction my own career took, I saw that neglect firsthand. In 1992, I took a position as an English teacher at William E. Grady High School, a vocational school in Brooklyn, where I ended up teaching for 12 years. Before becoming a teacher, I had been a professional carpenter for 11 years. I worked for a construction company and was also in business for myself. I became a carpenter because I enjoyed working with my hands and building things. I decided to become an English teacher because I am an avid reader and love working with children.

Given my experience as a carpenter, the city's department of education assigned me to teach at a vocational school. But I had a license to teach English. While I had worked full time as a carpenter as I pursued my bachelor's degree in English at night and on weekends, I came to the teaching profession because I wanted to teach English—not carpentry. Still, the district assigned me to Grady. When I arrived for my first day, I remember having to make that point yet again after the principal tried to assign me to a carpentry class.

After our conversation, the principal finally understood that I really was there to teach English. He assigned me to a class of 28 "at-risk" students—meaning those with behavior problems and poor attendance records—who were taught in this huge classroom in the basement of the school. I quickly found out how tough teaching was.

I wanted to engage these students and teach them to write. But they had trouble staying seated and focusing on their work. So I tried drawing on my background in theater and filmmaking—I had taken many college-level film studies courses and had worked as a production assistant on a film set—to find things that would interest them. Why? Because the key to high-quality CTE, though we often talk about its strengths in terms of economic opportunity, is that it engages students in a meaningful way—it keeps them interested in school and classwork.

With an eye toward doing just that, I started to design a program around writing scripts and filmmaking, which are not traditional CTE topics but at Grady were considered part of the CTE program. Like traditional CTE courses, such as welding and automotive technology, my course had the potential to engage students in a different yet compelling way.

I discovered, hidden away in the basement with my class, a closet that contained two broken video cameras. Even though they were broken, I showed them to my students and suggested that once their scripts were up to par we might be able to produce and record their stories on camera. Seeing the cameras was enough incentive for them to get right to work.

It took months but they improved their writing, and we reached the point where their scripts were ready for filming. Undeterred by the fact that the cameras didn't work, I had a plan to get the school to purchase us new ones. Basketball was a big deal at Grady, so I cut a deal with the principal: if the school would purchase some working equipment, we could use it both to record the basketball games and in my classroom with my students. We got new video cameras soon after that, and my English class really took off. Students no longer had trouble staying seated and focusing on assignments. They looked forward to writing scripts and filming them. Here was a vocational educa-

tion class that did not underestimate students; rather, it challenged them with engaging, meaningful work.

I got into this profession to make a positive difference in kids' lives, and seeing that transformation was incredibly rewarding. I never looked back after that; I knew I was right where I wanted to be.

Industry Allies

I decided to become involved in the union, and in 1999, I became a UFT chapter leader at the school. Soon after, I met Frank Carucci, the UFT's vice president for vocational education, during a training for new chapter leaders. Frank told us, "We are going to change 'vocational education' into 'career and technical education.'"He said that we needed to make CTE relevant to the job market, meaning we needed to prepare students for the workplace and also to make CTE more academically rigorous in order to prepare students for postsecondary education. It was a new concept that made perfect sense, and we all rallied behind it. Frank explained that some vocational education programs hadn't changed their curricula in 30 years and were teaching skills that were no longer relevant. He also asked us to speak at public events throughout the city—such as parents' meetings—to spread the word about our plans to make vocational education more rigorous and explain how CTE courses actually cover material from core academic subjects such as mathematics and science.

During our presentations to parents and various community groups, we explained that this change in emphasis from the traditional vocational education approach to a CTE perspective was rooted in a deep concern that a large segment of the student population was just not engaged in learning. We stressed that the focus in education was too skewed toward testing (as it still is today). The fixation on testing—then, as now—was driving a large percentage of children out of our schools. Parents listened to us and agreed. They supported the push to strengthen CTE.

When Frank retired in 2005, I ran to succeed him and became the UFT's vice president for career and technical education high schools, a position I held for four years. He left at a time when the New York City Department of Education was planning to close many CTE schools. The reason, officials said, was that No Child Left Behind (NCLB) forced them to focus on boosting students' English and math standardized test scores. CTE programs did not focus on standardized tests, they said, and could not help accomplish the NCLB mission.

Their misguided approach led to a big behind-the-scenes fight between the UFT and the department. To win it, we ended up reaching out to local industry and created public-private partnerships to help persuade department officials not only to keep CTE schools open, but to strengthen them.

We were fortunate enough to have a great and influential industry council in New York City. The council is a group of labor and management volunteers from various businesses and trades: the airline industry, the Greater New York Automobile Dealers Association, and the construction trades, among others. These industry volunteers partner with CTE schools to certify the curriculum so that students are gaining the knowledge and skills to prepare them for careers in the fields that the council represents.

Implemented correctly, CTE provides students with options to pursue a job *and* a career—not one at the expense of the other.

The beauty of CTE programs is that students can graduate with industry-recognized certifications that would cost them up to $45,000 if they were to pursue these credentials on their own after high school. We told council members that the department planned to close CTE programs, which prepared many of their companies' employees and, in fact, could prepare them more effectively if the programs were better supported.

To make our case, the UFT presented the council with data showing that CTE programs helped average and below-average students stay in school and find well-paying jobs or pursue further education and training after graduation. Members of the council listened to our position, reviewed the data, and agreed that the department's plan to close these schools made no sense. Thankfully, the council had, and continues to have, real and meaningful relationships with schools.

Soon after, we presented the same data to lawmakers in Albany, and I continued meeting with city officials who realized that shutting down what the industry partners wanted was not the right course of action, from either a business or an education perspective.

After those meetings, the city created a task force—made up of representatives from the New York State Education Department, the New York State Board of Regents, the New York City Education Department, the UFT, real estate developers, and Wall Street firms—to review and strengthen CTE programs and even to establish some new ones to better meet the hiring needs of the industry council. Thanks to the work of the task force, New York City now has more definitive pipelines for graduates of CTE programs to go directly into jobs in various industries, if students decide not to pursue a college degree. Those who employ CTE graduates see there is real "value added" for them to hire these students because they recognize how well-prepared they are—preparation that in turn makes them great employees.

Spreading the Word

I sometimes wonder why our collaborative work around CTE in New York City has not spread as widely to other parts of the country.

Maybe it's because, in too many places, education debates continue to focus solely on test scores instead of how best to prepare children holistically for the world in which they must work and live. The reputation of CTE also suffers as a result of the deplorable practice of "tracking," a policy in which vocational education was too often viewed as a dumping ground for students—usually students of color and working-class kids generally—who were assumed to be incapable of doing challenging work. In some instances, vocational education was characterized by classes that neither provided students with rigorous, intellectually stimulating material, nor equipped them with the skills necessary for future employment.

I can't stress this often enough: high-quality CTE does not involve tracking. Implemented correctly, CTE provides students with options to pursue a job *and* a career—not one at the expense of the other. CTE lays the groundwork for training right after high school that leads to a job or, in some cases, provides the actual training students need to find jobs immediately. CTE also prepares students for postsecondary education that culminates in some kind of advanced degree. The six CTE programs that attendees of the New York City conference visited nearly a year ago (mentioned earlier) do not track children; students would never have been accepted into these programs unless they were top-notch.

Our programs succeed in New York due in large part to four fundamental program components: teacher preparation and development; school supports, including a high-quality curriculum, mentoring, student competitions, and scholarships; work-based learning, such as internships and job shadowing programs; and access to real-world industry applications and credentials.

Today, the debate over CTE is really about "how do we move it forward?" We were lucky enough that two years ago, in his State of the Union address, President Obama talked about career and technical education. "Let's also make sure that a high school diploma puts our kids on a path to a good job," he said. "Right now, countries like Germany focus on graduating their high school students with the equivalent of a technical degree from one of our community colleges. So those German kids, they're ready for a job when they graduate high school."*

In his address, the president also mentioned P-Tech, which Obama himself visited last year. "Now at schools like P-Tech in Brooklyn, a collaboration between New York [City] public schools and City University of New York and IBM, students will graduate with a high school diploma and an associate's degree in computers or engineering," he said. "We need to give every American student opportunities like this."

It has taken a lot of political work to get to this point. But we are nowhere near finished. How do we advocate for CTE inside each school system in the entire country, not just in New York City? That is the question we face.

More people support CTE than ever before because the economic development aspect of it appeals to them. CTE helps prepare students to enter the workplace, which private industry wholeheartedly supports. But the other piece that makes CTE so compelling—even though it's rarely talked about—is the engagement of students and how CTE helps to shape them into better people, equipped with real skills to help them thrive in the world.

When talk in education turns to students competing with the rest of the world, academic knowledge, soft skills, and knowledge of technical subjects are what our children are going to need to know.

Students who graduate from CTE programs leave school with industry certifications in computer engineering, automotive technology, graphic arts, and culinary arts, just to name a few examples. While these certifications show they're prepared with the knowledge and skills to work in a certain field, what such documents also really say is that this student has been actively engaged in his or her learning, has figured out how to work in groups, and has developed all those critical-thinking skills that education experts constantly emphasize.

Just as important, certifications show that students have acquired the "soft skills" (though I dislike the term)—such as perseverance and determination—that enable them to face defeat and pick themselves up so they can turn a loss into a victory. For me, there is nothing "soft" about such skills. They are important social-emotional developments that we often don't value enough in education.

Children who complete CTE courses have had to figure out tough lessons: for instance, how to work with their peers and how to solve problems for which there are no easy answers. They can't just look it up in a book. They must figure out in other ways how to complete something real, like wiring a house, building a transmission, or maintaining an airplane. When talk in education turns to students having to compete with the rest of the world, academic knowledge, soft skills, and knowledge of technical subjects are what our children are going to need to know.

The emergence of high-quality CTE programs has energized teachers across New York City, and I hope word about their good work continues to spread throughout the country. Their message is simple: CTE is a viable and rigorous educational option for children, and one that should be expanded and enhanced. Not only does CTE engage students in new and powerful ways, but it also ensures that students are college and career ready. ☐

*To read the full transcript of the State of the Union address, visit www.whitehouse.gov/the-press-office/2013/02/12/remarks-president-state-union-address.

Look Beyond the Label

Reframing, Reimagining, and Reinvesting in CTE

By John H. Jackson and Jonathan Hasak

Over the last several years, government and philanthropic studies have been drawing attention to declining postsecondary attainment in the United States. Whether it's President Obama's 2020 college completion goal or the Lumina Foundation's Goal 2025, the sad fact is that America's higher education system is failing to set students up to succeed in today's economy. With soaring college costs, many high school graduates are carefully weighing whether to attend college at all. And of those who do attend, only 42 percent graduate with degrees from two- or four-year institutions by their mid-20s.[1] With skills becoming the global currency of 21st-century economies,[2] changing labor markets won't be kind to countries that can't produce a high number of highly skilled workers.

At a micro level, high school students today face a pivotal decision: if they decide to enroll in college, they are likely to do so without the guarantee of a job after graduation at a time when student loan debt has already surpassed a trillion dollars. On top of that, millions of jobs in the past decade have been eliminated while the demand for work skills changes every day. The prospect that future jobs will rely less on traditional bachelor's degrees has muddled the "college-for-all" message and the notion that educational attainment leads to successful careers.

The Challenge: Across the board, American students increasingly enter postsecondary education in need of academic remediation. Every year, nearly 60 percent of incoming college students discover they still need some form of remedial coursework in English or mathematics.[3] With the rising cost of higher education in the United States, it is morally indefensible to charge students to retake courses they should have already received. If we want strong academic institutions that can prepare students for gainful employment, states and the federal government must focus more diligently on integrating career readiness into the mainstream education reform debate.

The Opportunity: We can start by addressing what Education Secretary Arne Duncan has called the "neglected stepchild" of education reform: our career and technical education (CTE) system.[4] Part of the attraction in attending CTE programs is the opportunity to acquire specific skill sets that allow students to more seamlessly transition into the labor market. Although critics

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ILLUSTRATIONS BY JAMES YANG

complain that too many CTE programs are outdated and not aligned to workforce needs, at its best, technical education helps students make the connection between their learning in the classroom and the skills they will need for success in the workplace. Thus, CTE offers a relatively cost-effective way for students to position themselves for successful futures.

Yet, the opportunity for students to take advantage of CTE is not accessible in its current state. First, after decades of poor course offerings and an image of vocational education as the second-rate program for students tracked out of a four-year college, reframing and rebranding is needed. Second, a clear gap has emerged between the academic skills students lack and the skills most CTE instructors have been trained to provide. Third, CTE must have stronger partnerships between the private and public sectors so that students who graduate from four-year colleges or CTE pathways can earn similar salaries regardless of the institution they attended. Finally, to attract students and meet labor market needs, we must reinvest in CTE to provide up-to-date course offerings, curricula, and campuses.

International and Domestic Examples

Although the United States ranks second in baccalaureate education, it ranks 16th among industrialized nations in sub-baccalaureate education.[5] According to the Organization for Economic Cooperation and Development, over the past two decades, the number of associate's degrees has risen by roughly 9 percent in Canada, South Korea, and France, but it has risen by less than 3 percent in the United States.[6] America loses competitive ground by missing opportunities to diversify postsecondary options for its disengaged youth.

American education policymakers have been reluctant to follow successful international examples of vocational programs highlighted in the increasingly influential Program for International Student Assessment results. But in a globalized world that is more interconnected than ever, we should pay closer attention to what these high-performing countries are doing.

One of the more cited models abroad is the apprenticeship program used in Germany, which has students spending half of the school week getting paid by company training and the other half in related academic work. Another model used in many European countries is upper-secondary vocational education. This model, used in Finland and Singapore, for example, provides school-based programs that expose students to a wide variety of opportunities before they must decide which occupation to focus on. What is compelling about both international models is that they were not created as placeholders for non-college-bound youth. Instead, they are popular alternatives for postsecondary education and work preparedness.

Finland and Singapore's model in particular offers useful lessons to the United States. Both countries worked hard to transform the image of vocational education through investments in technical campuses equipped with high-tech facilities, new curricula, and workforce certification systems. In transferring from labor-intensive and export-oriented economies to skill-based economies, the Finnish and Singaporean governments approached reform by offering multiple pathways to students. These pathways became so popular that in Finland, 43 percent of high school students attend vocational school.[7] Similarly, in Singapore, after acquiring a strong academic foundation in their early schooling experience, students are allowed to pursue one of three types of high schools: a traditional academic track that prepares students for postsecondary education; a polytechnic track that focuses on advanced occupational and technical training; and a technical institute that focuses on less-advanced occupational and technical training.[8]

The strong relationship between economic development and vocational systems, in turn, kept all educational investment as apolitical government priorities. This allowed policymakers to monitor changes in their respective economic and education conditions and more effectively update skills taught to students. Compare this approach with that of the United States, where every new administration feels compelled to add its own reform on top of reform.

At its best, technical education helps students make the connection between their learning in the classroom and the skills they will need in the workplace.

We do not mean to imply that the United States should be expected to achieve similar results by emulating a country (Singapore) the size of Minnesota that serves approximately 490,000 students,[9] or a country (Finland) that is much more homogenous in racial and socioeconomic diversity than ours. Unlike in America, where vocational education often faces the burden of racial and socioeconomic disparities, vocational education programs in these countries do enroll a more even distribution of students from diverse racial and economic backgrounds. Even so, these countries do show how vocational education can be transformed into popular alternative pathways where students can acquire high-quality academic and work skills.

However, there are already excellent domestic examples of successful technical education programs. Pathways in Technology Early College High School (P-Tech) in Brooklyn, New York, began in 2011 and offers students an associate's degree within six years as well as a position with IBM upon graduation. Through a unique grades 9–14 model, P-Tech is pioneering a new vision for college and career readiness. After only three semesters, 80 percent of the school's initial student cohort has met or exceeded state standards of proficiency in English and mathematics.[10] These trends were impressive enough that President Obama paid a visit in 2013 to offer his praise, and New York Governor Andrew Cuomo has already ordered 10 more schools to emulate programs like P-Tech's.

Some of what plagues CTE is an image problem still tarnished by the perception of it as an education track for students who should not attend college.

Another successful domestic model is High Tech High, a network of California schools spanning grades K–12 that integrates technical and academic education to prepare students for postsecondary education. Its mission is for students to develop academic, workplace, and citizenship skills through school-to-work strategies such as work-based learning and internships. Having started as a charter school in San Diego, High Tech High now comprises 12 schools and serves approximately 5,200 students. It has also invested in innovative ways to develop new human capital strategies and became the first California public school organization to have been authorized to operate its own teacher-credentialing program that trains educators to incorporate work-based learning in their instruction.

The Road Map Forward

To reframe, reimagine, and reinvest in CTE for the 21st century, it must be incorporated into comprehensive education reform. Borrowing from successful international and domestic examples, policymakers, in collaboration with business and education leaders, should create a more thoughtful system that provides students alternative pathways for academic continuation and workforce preparedness.

1. Reframe the Blueprint for Career and Technical Education

Achieving this blueprint requires using financial capital and political will that has been hard to come by in an environment that has largely abandoned spending on infrastructure reform. However, with Americans citing jobs and unemployment as the most important problems facing the nation,[11] there is already bipartisan support to reform CTE.

Change the Name: CTE programs should be rebranded as "innovation pathways" in a nod to what is most needed for the American economic recovery. Some of what plagues CTE is an image problem still tarnished by the perception of it as an education track for students who should not attend college. It is time to transform the notion of "shop class" into one of several worthwhile options available to students.

Calling career and technical programs "innovation pathways" is not a panacea for all that is wrong with CTE, but the cosmetic name change provides two clear advantages. First, many experts already believe that in the new global knowledge economy, only innovators and entrepreneurs will be immune to outsourcing and automation.[12] Replacing the cumbersome career and technical education name would indicate a shift from abstract occupations toward the innovative skills students need to succeed in the labor market. Second, reframing presents an opportunity to change the narrative for many of these failing programs and motivate students to take advantage of learning opportunities.

Adopt an "Opportunity for All" Mantra: Although the failure to prepare students to participate in a changing economy is not unique to CTE, American vocational programs, historically, have been ridiculed. The pejorative perception is that CTE is where low-income children and children of color, ill-equipped for college preparation, are consigned to a second-rate education.

For much of the 20th century, vocational education programs were a "track to nowhere"; coursework often failed to offer the concrete skills and knowledge needed for real industrial and agricultural jobs, leaving students unprepared for either college or career. Given this history, CTE must acknowledge and surmount the problems of its recent past in which vocational education in America was inextricably linked to racial, ethnic, and class-based discrimination and the denial of opportunity to millions of students.

Evidence indicating that tracking tends to exacerbate inequality is no longer seriously debated,[13] but the stigma attached to CTE—resulting from implications of segregation and years of inconsistent programmatic quality—still remains and must be shed. Many community leaders remain wary of any pathway other than what has been labeled college preparation. However, with a new era of rigorous CTE courses offering multiple pathways toward further education and employment qualifications, this aversion needs to be rethought. High-quality CTE programs offer real academic and financial opportunities to the students who need them most. At the same time, we must actively ensure that career-oriented education will never again be used as a dumping

ground that denies opportunity to poor children of color. And it will take extensive community involvement to guarantee that program quality is established and maintained.

For every excellent CTE program—and some are more effective than traditional academic institutions at preparing students for college, career, and citizenship—many have lacked rigor and simply perpetuate inequality of opportunity. Such variances in programs are rooted in a struggle to monitor changes in economic conditions, as CTE institutions have been slow to update courses, allowing students to make myopic decisions. In turn, the lack of a coherent program of study and the difficulty in transferring course credit often locks these young adults into professions before they have had an opportunity to properly evaluate the labor market or consider continuing their education.

Adopting an "opportunity for all" mantra does not mean students should not aspire to attend four-year colleges. Nor does it mean we believe in lower student expectations. Rather, it would define different pathways students can take toward earning postsecondary degrees and landing meaningful careers. Reformers must do everything in their power to demonstrate that educational attainment does lead to concrete employment opportunities and that completion of CTE leads to paid jobs.

2. Address the Student-Readiness and Teaching-Training Gaps

Despite being held accountable for student academic growth in reading and mathematics under the federal Carl D. Perkins Career and Technical Education Act, CTE teachers have limited time to work on academic concepts, since the majority of instructional time is spent delivering technical skills. To that extent, many certified teachers either have not been properly trained or are simply struggling to teach both technical expertise and academic skills.

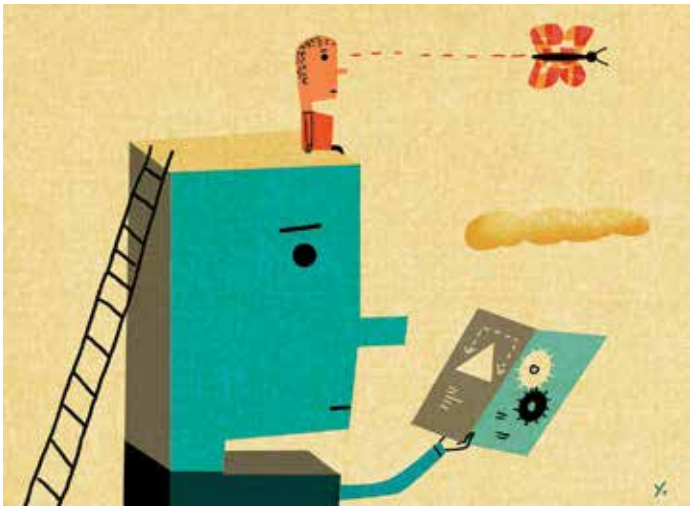
Link High Schools to CTE Programs: Too many students attend CTE programs without basic academic content knowledge. The need for remediation for students, especially those whose skills will not qualify them for current high-quality CTE because of entrance exams, makes the job extremely difficult for teachers. To balance academic and technical experience in classrooms, one solution is to allow students to take remedial courses at nearby high schools for academic credit. With the majority of classroom time spent delivering technical skills that are relevant for specific jobs, more applied learning and time to support academic concepts such as quantitative reasoning and data collection are needed. By having one teacher who can cover technical content and another who can reteach basic academic skills, students would have a more balanced educational experience and an opportunity to become better professionals who are not dependent on one single technical skill set alone.

Attract High-Achieving Students: CTE programs must attract more than just students who prefer to circumvent four-year colleges. Framing these pathways around upward social mobility for all students would be more politically resonant than calls to rectify inequalities in CTE. By attracting high-achieving students, CTE programs would diversify the social capital of their student population and acquire more financial resources; ultimately, it would also lead to the mixed grouping of students, which has proven most effective in raising academic performance.[14] By signaling its dedication to making its students attractive to prospective employers, turning them into good citizens, and providing an excellent education, these programs would offer a compelling message to any student eager for an employer-recognized credential that would lead to a meaningful job.

3. Involve the Business Community

With some 14 million students enrolled in CTE programs in nearly 1,300 public high schools and 1,700 two-year colleges, many of these students are being shortchanged in their career and college preparation. As such, an emerging productivity and skill gap has emerged, with 45 percent of American employers blaming entry-level vacancies on a skills shortage.[15] And while President Obama has asked for $1.1 billion in his proposed 2015 budget to reauthorize the Perkins Act,[16] employers continue spending more than $400 billion a year in formal and informal employee training.[17] Quite simply, most CTE programs have failed to translate the technical expertise of their training systems into jobs for students.

We must actively ensure that career-oriented education will never again be used as a dumping ground that denies opportunity to poor children of color.



The stakeholders most integral to ensuring students' future employment are business leaders. We must engage the business community and help it see the untapped potential of millions of young men and women. While employers across the country are already collaborating with vocational programs, there is still need for more cross-sector collaboration on a larger scale. But employers must do more than just offer half measures and identify a skills shortage as a critical problem; they should actively help resolve the nation's skills problem through a more systemic approach.

In Michigan, for example, new legislation was recently proposed to give students and families more choice in substituting CTE courses for electives. Admirable as it is, the legislation does not attempt to build or integrate a clear route for students to pursue college or career; rather, it hopes that trading Algebra II for a CTE course will somehow improve career readiness. And even when the federal government announced in February 2014 that it would provide $148 million for a manufacturing innovation institute in Detroit, it is difficult not to see the program stuck in the past when it is technical, not manufacturing, jobs that are growing fastest in Michigan.

Reframing, reimagining, and reinvesting in CTE is fundamentally about providing equitable opportunities to all students.

Help the Business Community Become Active Collaborators: Making the relationship between education and employment more transparent is indispensable in reimagining CTE; efforts to do so should integrate work and learning opportunities for students with clear occupational positions and salaries in mind. Educators can accomplish this by illuminating skills taught in classrooms as foundations for skills needed for employment, therein transcending abstract schooling experiences into something more personal—something that can ignite student curiosity, creativity, and imagination.

Convincing business leaders to see themselves not as charitable givers but as active partners in CTE requires helping them see that CTE programs could reduce their costs. As an example, the business community could lobby local and state governments to provide tax incentives for hiring CTE students. In turn, CTE programs would make hiring qualified employees easier since such programs could lead to a pipeline of talent through internships, apprenticeships, and summer jobs.

Connecting employers and career opportunities to CTE students would directly target a skills and productivity gap that, if not addressed, will continue to affect economic productivity for students and employers alike.

Use Public-Private Partnerships as Tools to Engage Businesses: To constantly update equipment and curricula, and to develop teachers who can incorporate new techniques in their training, we need more public-private partnerships (PPPs). With shrinking government budgets and limited financial resources, PPPs enable the private sector to improve learning outcomes for students by providing education services beyond public finance. Case studies conducted in Latin America have shown that some of the benefits from PPPs for schools are greater efficiency, increased student choice, and wider access to education.[18]

An example of the impact of PPPs can be found in Wisconsin, where the manufacturing companies Briggs & Stratton, Mercury Marine, and Kohler partnered with Moraine Park Technical College. Following the temporary closing of Moraine Park because of a $3.1 million budget shortfall, leaders of these three manufacturing industries came together to fund the college and help redesign and restructure the curriculum. Receiving financial support for operational expenses and recommendations on its curriculum from local business leaders, Moraine Park could more effectively, quickly, and accurately improve its programs to prepare students for employment after graduation. The success of this partnership has not gone unnoticed: at Briggs & Stratton, for example, 54 percent of lab employees are graduates of Moraine Park.[19]

4. Reinvest in Innovative Pathways

Vocational programs in the past have never attracted sustained investments. Maintaining and attracting funding for new equipment is especially difficult. Yet the only way for education leaders to prove they are serious about reframing CTE is by investing financial and human capital.

Create High-Tech Facilities: In reimagining a common untracked, comprehensive school experience, students and families—not schools—must be allowed to decide which kind of postsecondary pathway they want to pursue. To support them, we need new campuses with updated high-tech facilities. These facilities can be integrated into community college or university campuses or built anew if funds are available. International examples have shown how updating high-tech facilities can attract prospective students. By demonstrating to students that CTE schools can look like first-class universities, perhaps more students turned off from academic institutions will aspire to attend CTE programs housed in attractive buildings.

Empower Intermediary Groups across Sectors to Monitor Economic Conditions: Creating regional task forces staffed by leaders in education, health, finance, urban and environmental planning bodies, and housing and immigration authorities would allow for more-effective monitoring of economic changes. Strong intermediary organizations should convene these cross-sector actors and help mobilize funding and resources to make coordination between schools and work sites more cohesive. As an independent body, intermediaries, such as UNITE-LA, an affiliate of the Los Angeles Area Chamber of Commerce, or the Boston Private Industry Council, could overcome bureaucratic

hindrances, help scale successful training programs, and serve as a catalyst for systemic reform. These organizations, however, need funding to help facilitate the development of employability and academic skills that can be incorporated into CTE programs.

Reframing, reimagining, and reinvesting in career and technical education is fundamentally about providing equitable opportunities to all students. Efforts to more effectively define the benefits of educational attainment, invest in human and capital resources, and communicate different pathways students can pursue will help ensure CTE programs no longer discriminate and, instead, become sought-out postsecondary alternatives.

Rapid changes in today's economy provide a unique opportunity to rebuild a system that for too long has been designated as second rate. We believe that students and families will be willing to take another look at these programs if we are careful not to assign, implicitly or explicitly, pejorative labels. While alterations in governance structures and innovative approaches to funding are needed, CTE reform cannot wait for political action; immediate changes should be pursued at every level. Through a multipronged approach that aims for short- and long-term reforms, we are convinced that CTE can provide the high-quality degree needed to develop citizenship, career preparation, and lifelong learning for all students. □

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More Than One Way

(Continued from page 11)

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We Asked, You Answered: Learning from Our CTE Teachers

IN SPRING 2014, the American Federation of Teachers' educational issues department conducted an online survey of K–12 career and technical education (CTE) teachers who either are AFT members or have attended AFT conferences or professional development offerings. The survey sought to learn the range of CTE courses currently taught, the kinds of partnerships that schools are establishing, and educators' views of career and technical education in preparing students for college and careers.

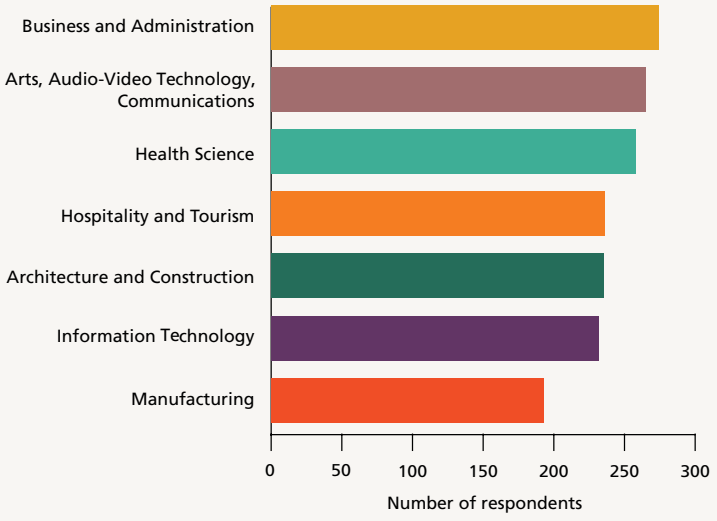
The AFT received 570 survey responses from teachers working in 26 states and the District of Columbia, in 373 different schools. Although the survey was not based on a random sample and is therefore not statistically representative of the nation's CTE educators, it is nonetheless a large and broad survey. Responses came from a diverse group of teachers who teach a wide range of subject areas.

Respondents were asked in which of 16 career clusters their school offered programs. These clusters were based on those developed by the National Association of State Directors of Career Technical Education Consortium as an organizing framework for programs designed to improve pathways to college and career readiness.

The results confirmed what other research has found: CTE offerings are predominantly in technical and design fields. As shown in Figure 1, the two clusters most often reported by survey respondents were business and administration (274), followed by arts, audio-video technology, communications (265). The three clusters mentioned the least were government and public administration (25); transportation, distribution, and logistics (69); and human (consumer) services (96).

Figure 1. Top seven career clusters reported by respondents

n=541

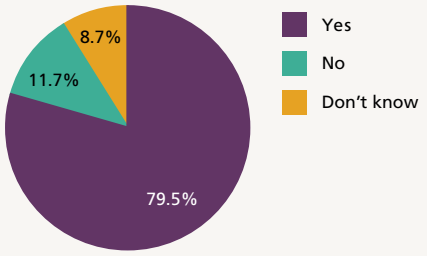


The subjects taught by CTE teachers varied extensively, with some educators teaching multiple subjects. The largest number of respondents (16 percent) taught some kind of business course that included accounting, marketing, finance, entrepreneurship, or management. The second-largest subject area was health science (11 percent), which was primarily nursing but also included sports medicine and dental assisting. Nine percent of respondents reported teaching various computer applications, followed closely by visual and media arts (8.6 percent), a cluster that included digital media, entertainment, and game design. Seven percent taught information technology, computer science, and electronics. And 6.5 percent of teachers taught core subjects such as English, math, and science.

The recent emphasis on career pathways and linking CTE to postsecondary education is reflected in a high percentage of respondents—79.5 percent—who reported connections between secondary and postsecondary courses in their programs. Nearly 12 percent said no such connections exist, and 8.7 percent did not know, but these tended to be middle school CTE teachers. (See Figure 2.)

Figure 2. Are there connections between secondary and postsecondary courses in your program?

n=562

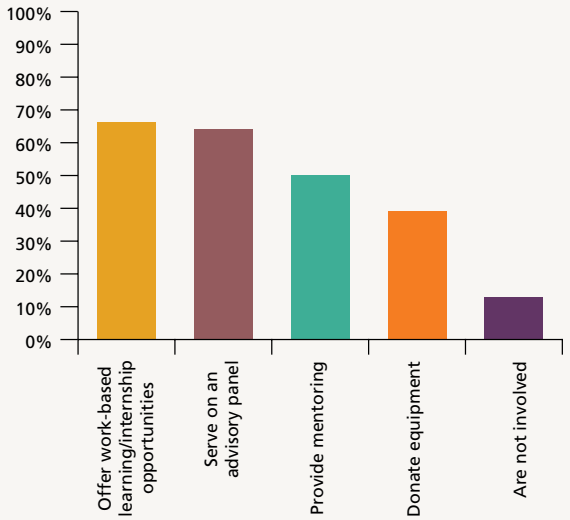


Similarly, as shown in Figure 3, with CTE looking to provide students with skills transferable to the labor market, a majority of respondents said that their programs take local labor market needs into consideration, primarily via student internships (349) and business advisory boards (339). When employers were not involved, respondents tended to report having greater difficulty obtaining updated equipment.

Figure 3. How are employers involved in your program?

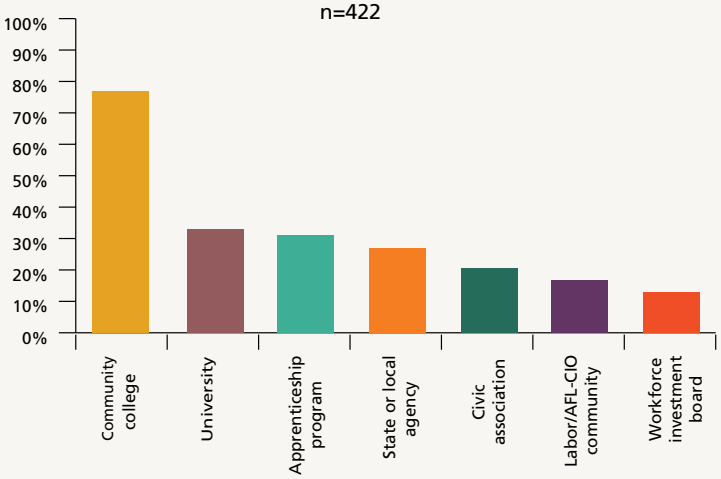
(check all that apply)

n=527



Finally, 422 respondents reported the involvement of community partners in their schools, with 77 percent of them reporting ties to community colleges, 33 percent reporting ties to universities, and 31 percent reporting ties to apprenticeships, as seen in Figure 4.

Figure 4. Does your program have community partners?
(check all that apply)
n=422



The Certification Challenge

MANY CAREER AND TECHNICAL EDUCATION (CTE) courses are taught by industry professionals who have deep content knowledge but do not hold academic subject-matter credentials. This lack of certification for academic instruction can pose a problem for students; in some cases, they cannot receive academic credit for courses taught by teachers who lack full certification. A brief published by the Center on Great Teachers and Leaders, "Credit Quandaries: How Career and Technical Education Teachers Can Teach Courses That Include Academic Credit," looks at how Michigan, Missouri, New York, Washington, and Wisconsin are ensuring that CTE teachers can teach courses that offer academic credit.

These states are resolving this certification issue by recoding course assignments so that course titles and classifications clearly indicate that students learn academic content and earn academic credit in CTE courses. These states are also encouraging CTE teachers to coteach or coplan their CTE courses with fully certified teachers to ensure that such courses are academic-credit bearing. The brief is available at **www.gtlcenter.org/sites/default/files/Credit_Quandaries.pdf**.

The Pursuit of Pathways

(Continued from page 29)

for the Future and the Harvard Graduate School of Education recently released *The Pathways to Prosperity Network: A State Progress Report, 2012–2014*, which documents the progress that states in the network have made in the last two years.

If the core premise underlying the old tracking system was that some young people needed to be prepared for college and others for careers, the core premise of the Pathways Network is that all young people need to be prepared both for careers and for further learning. Further learning need not necessarily take place in a higher education institution, but all young people will need the foundational skills and intellectual dispositions to acquire new knowledge and adapt to changing circumstances over a working lifetime. A narrow, occupationally focused education is unlikely to equip young people with those skills, which is why it is critical to ensure that all students leave school with a solid academic foundation.

I want to close by returning to the lessons the strongest European systems offer for us. For all of their differences, countries like Austria, Denmark, Finland, Germany, the Netherlands, and Switzerland teach us that it is possible to build secondary education systems on the premise that all young people need to be educated for a vocation or calling, that all vocations are worthy of serious preparation, and that the best preparation comes out of a well-organized, well-defined partnership among educators, employers, and employee associations. While some vocations require university preparation, most don't, but all require a mix of classroom-based and workplace-based learning. Unless and until we are prepared to invest in building rigorous, robust pathways across the occupational spectrum that can prepare all young people for a life of satisfying work and further learning, and to give young people the academic support and information needed to make appropriate choices among pathways, we will never overcome the legacy of a two-tiered, heavily tracked education system that predictably replicates social and economic inequality from one generation to the next. ❑

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RESPONDING TO *VERGARA*, *HARRIS* DECISIONS

In July, delegates to the 2014 AFT national convention unanimously passed a special order of business to fight legal attacks on unions and teachers as reflected in such cases as *Vergara v. California* and *Harris v. Quinn*. The AFT's special order characterizes these lawsuits as "contributing to an escalating and engineered imbalance in our democracy." Amended from the convention floor, the order was revised to include strong language in reference to Secretary of Education Arne Duncan, who publicly supported the *Vergara* decision. It derides his promotion of "misguided and ineffective policies on deprofessionalization, privatization, and test obsession" and calls on President Obama to implement a "secretary improvement plan." The special order is available at **http://go.aft.org/AE314news1**.

BREAKING THE FEVER OF TESTING

States covered by No Child Left Behind waivers don't have to use student test scores in teacher evaluations until the 2015–16 school year, Education Secretary Arne Duncan announced in late August. Duncan's statement acknowledged that obsession with testing was "sucking oxygen out of the room" in some schools today. Duncan's move constitutes "a good step" from an administration that has "spawned this testing fixation" through rules covering Race to the Top grants and NCLB waivers, says AFT President Randi Weingarten, but much more needs to be done. "We shouldn't be testing every child, every year," Weingarten says. "We need assessments that meaningfully measure student learning. We need to invest the time and resources wasted on excessive and unhelpful testing back into art and music and other enriching curriculum. And we need a new accountability system that moves from a test-and-punish model." Duncan's statement is available at **http://1.usa.gov/1tpMHa8**.

WORKFORCE INNOVATION AND OPPORTUNITY ACT: PROMOTING CAREER PATHWAYS AND TRAINING

Career and technical education programs received a welcome bit of news this summer when President Obama signed into law the bipartisan Workforce Innovation and Opportunity Act. The law emphasizes career pathways and training programs leading to recognized credentials and could be a blueprint for the reauthorization of the Carl D. Perkins Act, which focuses on career and technical education programs. The Department of Labor is offering technical assistance and resources tied to the new law at **http://1.usa.gov/1rz8E8j**.

STRONG, SAFE, SUPPORTED NEIGHBORHOOD SCHOOLS

A group of Democratic leaders is pushing for access to strong, safe, well-supported neighborhood schools as the right of every child and the key to better schools. Democrats for Public Education (DPE), launched on August 19 as a tax-exempt organization, already has built an impressive roster of leaders. DPE co-chairs include Democratic National Committee Vice Chair Donna Brazile; former Governors Jennifer Granholm of Michigan and Ted Strickland of Ohio; Montana State Superintendent Denise Juneau; and U.S. Representatives Marcia Fudge (D-Ohio), Mark Pocan (D-Wis.), and Mark Takano (D-Calif.). Among DPE's goals: small class sizes and time for teachers and staff to collaborate; an engaging curriculum that includes art, music, and physical education; and access to wraparound services. For details, visit **www.bit.ly/1vGyJRF**.

NEARLY 7 IN 10 PARENTS THINK STANDARDIZED TESTS DON'T HELP TEACHERS

The first results from the 2014 PDK/Gallup Poll of the Public's Attitudes Toward the Public Schools were released on August 20. They confirm what the AFT has long been saying about the problems caused by excessive testing and its potential to impede thoughtful implementation of the Common Core State Standards. The poll reveals that 60 percent of respondents now oppose teachers using the standards, with many indicating they do so because they appear to limit teacher flexibility. Concerns about testing also seem to be driving much of that sentiment: 54 percent of respondents don't believe that standardized testing is helping teachers teach—a view held by 68 percent of public school parents. The poll results are available at **www.bit.ly/1odk4rq**.

SINCE SANDY HOOK, 74 SCHOOL SHOOTINGS

Frustrated with inaction to reduce gun violence, 36 teachers and other school staff who survived the 2012 massacre at Sandy Hook Elementary School in Newtown, Connecticut, continue to press for better firearms background checks. They recently wrote an open letter that their colleagues can use to encourage congressional support of the King-Thompson and Manchin-Toomey bills on Capitol Hill. These measures would expand background checks to commercial firearm sales, including those at gun shows, over the Internet, and through classified ads. "There have been 74 school shootings since December 14, 2012," says Sandy Hook second-grade teacher Abbey Clements. "As survivors and educators who cannot sit idly by, we feel we must contribute to the efforts for change." The letter is available at **www.bit.ly/1rvlC7S**.

ILLUSTRATION BY LEON MUSSCHE

Rethinking Student Discipline

ILLUSTRATION BY JAMES YANG

EDUCATORS KNOW the importance of building a safe and supportive school culture. Yet such a culture does not always exist in communities of learning. Often, in environments that do not foster positive relationships, serious student behavior issues can occur. How to handle those situations in classrooms and on school campuses is critically important to the mission of public schools: educating all students.

Around the nation, school discipline policies and practices disrupt teaching and learning. Statistics show a high differentiation between suspensions of white students and suspensions of students of color and students with disabilities, who receive a disproportionate number of referrals. Recent data from the U.S. Department of Education's Office for Civil Rights reveal the negative impact this disparate treatment has on such youth.

"proactively build healthy relationships and a sense of community to prevent and address conflict and wrongdoing."* Traditional discipline models typically involve a third-party authority figure who determines both the violation and the punishment. However, with restorative practices, those involved in a conflict can take ownership of the resolution process and take responsibility for their behavior; *they* are empowered to solve problems, change, and grow. Rooted in values such as dignity, respect, trust, and care, restorative practices focus on harm done rather than on rule breaking. They enable affected parties to be heard, to bridge differences, and ultimately to alleviate underlying causes of conflict.

In schools, ways to incorporate restorative practices include establishing peer juries and creating peer mediation, conflict resolution, and community service programs.

> "No matter what baggage children bring to the classroom, it's our responsibility as educators to educate them out of their situation."
>
> —**Khalid Mumin**, superintendent of schools in Caroline County, Maryland

To create safe and welcoming schools, we must move away from punitive, zero-tolerance measures. Educators must have access to alternatives to suspensions and be trained to implement practices that create a more effective teaching environment, reduce bullying, decrease suspensions and expulsions, and increase time for learning by minimizing disruptions.

That's where restorative practices come in. The term describes approaches that

In addition to implementing restorative practices at the building level, individual educators can use them to foster healthy relationships and promote positive discipline measures in their own classrooms. For instance, educators can focus on social-emotional learning, encourage students to communicate feelings with affective statements, use classroom circles to resolve conflicts and teach social skills such as listening and respecting others, and engage school counselors and parents.

To learn more about this approach to student discipline, see *Restorative Practices: Fostering Healthy Relationships and Promoting Positive Discipline in Schools* (**www.bit.ly/RestorativeGuide**), a guide for educators that was jointly created by the AFT, the Advancement Project, the National Education Association, and the National Opportunity to Learn Campaign. The AFT has also developed a policy statement on discipline titled "Reclaiming the Promise: A New Path Forward on School Discipline Practices," available at **www.bit.ly/AFTstatement**.

–AFT EDUCATIONAL ISSUES DEPARTMENT

*From *Restorative Practices: A Guide for Educators,* www.otlcampaign.org/restorative-practices.

Restorative Practices Principles

1. Acknowledge that relationships are central to building community.
2. Systemically address misbehavior and harm in a way that strengthens relationships.
3. Focus on the harm done rather than on rule breaking.
4. Give voice to the person harmed.
5. Engage in collaborative problem solving.
6. Empower change and growth.
7. Enhance responsibility.

This list, from the San Francisco Unified School District, reflects its approach to implementing restorative practices. To learn more, visit **www.healthiersf.org/RestorativePractices**.

Additional Resources

- International Institute for Restorative Practices (**www.iirp.edu**)
- SaferSanerSchools: Whole-School Change through Restorative Practices (**www.safersanerschools.org**)
- Teaching Restorative Practices with Classroom Circles (**www.bit.ly/ClassroomCircles**)
- Directory of Federal School Climate and Discipline Resources (**www.bit.ly/DisciplineResources**)
- Teaching Tolerance's School Climate Questionnaire (**www.bit.ly/ClimateQuestions**)

A Resource for CTE Teachers

JAMIE GANT TEACHES computer technology courses at Ronald W. Reagan/Doral Senior High School in Miami-Dade County, Florida. He's taught everything from web, graphic, and digital design to multimedia, animation, and Advanced Placement computer science; this school year, he has introduced an app- and game-design course.

After working with Cox Radio, where he was the computer director at four top radio stations, he decided to become a teacher, with the goal of inspiring the next generation of technology developers. Coming from a family of educators has fueled his drive to teach, and he has seen firsthand the effect educators can have on young lives.

Gant credits the Share My Lesson website as being one of the most important resources he uses to help his students succeed. "It's education's 'dream team,'" he says. "It takes the best teachers and makes their resources available for everyone to learn something new and to adapt in their own classrooms." By attending Share My Lesson marathon events and reviewing resources shared by other teachers, he says he has improved as a STEM (science, technology, engineering, and mathematics) educator.

In his time with Cox Radio, Gant noticed how few programmers were being produced in the United States, and he figured this dearth was most likely due to a lack of exposure to technical content in schools. He became a teacher so he could pass along the knowledge and skills he had acquired in the radio industry. He has found a large digital divide in his classes, with students bringing a wide range of technological experiences to school. But Gant prides himself on helping to close that divide by ensuring his students become certified in computer programs such as Adobe Dreamweaver, which he knows can pave the way for job opportunities and internships.

He uses Share My Lesson to find science and language arts lessons, as well as lessons in other content areas, and then he infuses a technology project with content from those lessons to help his students in their core classes. For example, when his students have trouble visualizing geometric shapes from a book, he will help them code the shape on a computer to calculate the surface area and volume. "With the students being able to program the computer to calculate these values, they learn the formulas and perform better in their math classes," he says.

Gant has been involved with Share My Lesson from the very beginning and believes it's an important professional development tool for any teacher. "This resource for collaboration involves the best teachers using the best technology to make all education better," he says. Indeed, he says Share My Lesson has helped him become a better teacher.

Several of the resources Gant has created, such as tutorials and assignments for programs like Illustrator, Photoshop, InDesign, Dreamweaver, Microsoft Office, GMetrix, and Flash, are available for free on the Share My Lesson site. To download them, visit his profile at **www.bit.ly/JamieGant**.

RESOURCES

COMMON CORE SUCCESS STORIES

A new "Stories of Success" video series, available at **www.achievethecore.org/storiesofsuccess**, features AFT teachers and highlights their positive classroom experiences with the Common Core State Standards. The educators explain their instructional shifts as a result of the standards: asking students to do more reading in science, for example, or teaching children how to cite evidence directly from a text in early elementary school. Videos include teachers in elementary and high schools, as well as those who work with gifted and special needs students.

STUDENT LEADERSHIP

The book *The Student Leadership Challenge: Five Practices for Becoming an Exemplary Leader* is a model for student leadership development. Coauthored by James Kouzes and Barry Posner, and recently published in a second edition, it is filled with stories from around the world and includes critical-thinking activities that invite young people to see themselves in one another and to dare to do extraordinary things in their lives. The book's "Five Practices" model is suitable for a standalone leadership offering or can be used in conjunction with other programs. Additionally, the book helps students conduct an online inventory of their own leadership skills. Details and ordering information are available at **www.studentleadershipchallenge.com**.

CTE MATERIALS ONLINE

The Association for Career and Technical Education (**www.acteonline.org**) and the National Association of State Directors of Career Technical Education Consortium (**www.careertech.org**) offer reliable online sources of information, from best practices to policy briefs, in the field of CTE. The ACTE's educator resources section includes a lesson plan library that is searchable by grade level, career cluster, or ACTE division. On the NASDCTEc's website, you'll find issue briefs, videos, and on-demand webinars, among other resources. Also worth a bookmark is **www.nrccte.org**, the online home of the National Research Center for Career and Technical Education, which features CTE research studies and reports.

RELATIONSHIPS MATTER

The Albert Shanker Institute recently launched a series of blog posts, available at **http://go.aft.org/AE314res1**, exploring the idea that school relationships and networks (i.e., "social capital") matter greatly and can lead to lasting, systemic improvement in school buildings and school systems. Among the facets explored by the series is the challenge that "strategies leveraged to increase teachers' human capital often do so at the expense of eroding social capital in our schools. In other words, these approaches are moving us one step forward and two steps back."

A Union of Professionals

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* New York State United Teachers members have insurance programs and a legal services program through NYSUT Member Benefits Trust. To obtain more information about these plans, members can call 800-626-8101.

[1] Certain restrictions, limitations, and qualifications apply to these grants. Additional information and eligibility criteria can be obtained at UnionPlus.org/Assistance. Credit approval required. Terms & Conditions apply. Union Plus Credit Cards issued by Capital One, N.A.

† Washington State Nurses Association members have access to credit card and mortgage offerings through WSNA Membership Benefits. To obtain more information, members can visit www.wsna.org/membership/benefits/. Ohio Nurses Association members have access to credit card offerings through ONA Membership Benefits. To obtain more information, please visit www.ona.org.

+ Mortgage†

www.unionplus.org/AFTmortgage
800-848-6466

The AFT Union Plus Mortgage program, with financing available through Wells Fargo Home Mortgage, can help AFT members purchase or refinance a home while also receiving special benefits by virtue of your AFT membership. For qualifying members, exclusive benefits and special hardship assistance are available. Many program benefits also are available to the children and parents of members.

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800-284-9756

The Union Plus Real Estate Rewards, powered by SIRVA, allows AFT members to receive $50 for every $10,000 in home value after closing when you use an experienced SIRVA agent to buy or sell a home (not available in all states).

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800-238-1133, ext. 8643
aft.org/benefits

Program information current as of July 2014. For updates and details, visit www.aft.org/benefits, or call 800-238-1133, ext. 8643.

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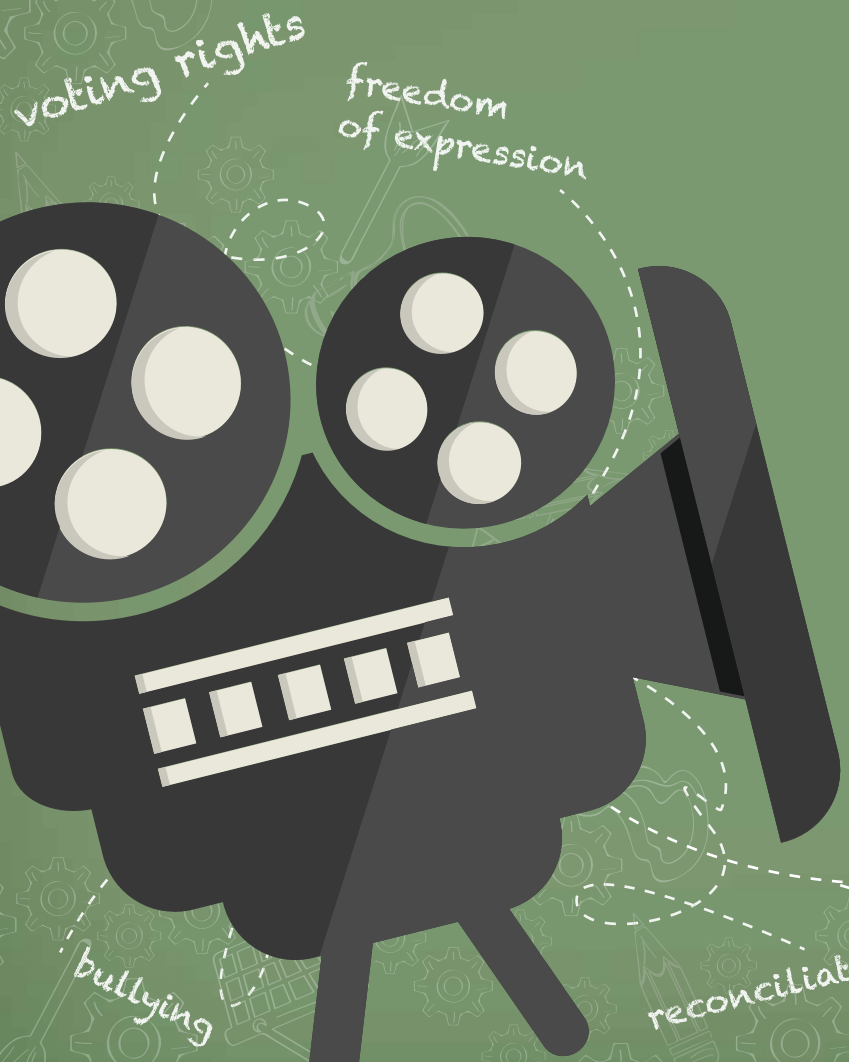

"Speak Truth to Power" is a video contest that encourages middle and high school students to become engaged in social justice.

The contest is an AFT collaboration with the Robert F. Kennedy Center for Justice and Human Rights and its curriculum on human-rights defenders. Winning three- to six-minute videos have been made about such topics as voting rights, child labor, freedom of expression, bullying, reconciliation, labor rights, and domestic violence.

The contest encourages students to demonstrate strong content knowledge and engage in creative storytelling. And it is tech-friendly, with no video experience necessary and a simple uploading process. All videos must be submitted by February 14, 2015.

For more information on the contest, including submission details, prizes, and a look at past winners, visit **www.speaktruthvideo.com**.