Center for an Urban Future

www.nycfuture.org MAY 2008

Schools That Work

Long overlooked and underfunded, New York City's career and technical education high schools might hold the key to improving citywide educational outcomes and ensuring a steady flow of skilled workers for local employers

This report was written by David Jason Fischer, edited by Jonathan Bowles and designed by Damian Voerg. Ben Blackwood and Barbara Beatus provided additional research.

We gratefully acknowledge support for "Schools That Work" provided by the Independence Community Foundation and the JPMorgan Chase Foundation, and for general support for research on workforce development provided by the New York Community Trust.

General support for City Futures is provided by Bernard F. and Alva B. Gimbel Foundation, Booth Ferris Foundation, Deutsche Bank, The F.B. Heron Foundation, Fund for the City of New York, Salesforce Foundation, The Scherman Foundation, Inc., and Unitarian Universalist Veatch Program at Shelter Rock.

The Center for an Urban Future is a New York City-based think tank dedicated to independent, fact-based research about critical issues affecting New York's future, including economic development, workforce development, higher education and the arts. For more information or to sign up for our monthly e-mail bulletin, visit www.nycfuture.org.

Cover: Automotive High School by Aaron Lee Fineman

CONTENTS

SCHOOLS THAT WORK

AFTER SIX TUMULTUOUS YEARS OF SCHOOL REFORM IN NEW YORK CITY, champions and critics argue over progress made on graduation rates and test scores, the value of new systems of accountability and what mayoral control has meant for the city. But while the debate rages on, too many city students still leave high school without diplomas or the skills required for success in the world of work that awaits them.

Career and technical education (CTE) offers a powerful answer to the problems of both high school completion and career preparation. CTE has long been one of the most overlooked, underfunded and misunderstood parts of the city's education system, yet students at the 21 dedicated CTE high schools across the five boroughs graduate at dramatically higher rates and are four times less likely to drop out than academics-only high schoolers. Attendance at the most successful CTE schools runs as much as 10 points above the city average for all high schools. Additionally, research suggests that CTE graduates who attend college—as more than two-thirds do—tend to perform better than other students, while those who go straight into the workplace have greater earning power.

CTE not only boosts educational outcomes for at-risk youth, but holds great value for the city's economy as well. The industries for which CTE programs train students—from optometry and nursing to information technology and automotive maintenance—are virtually certain to offer job openings in large numbers over the next couple decades, thanks to a combination of natural job growth and baby boomer retirements. Most careers for which CTE instruction prepares students are high-demand, well-compensated occupations that for the most part cannot be outsourced, and do not necessarily require a four-year college diploma.

Until now, CTE has not figured into the Bloomberg administration's sweeping education reform agenda. However, in his January 2008 State of the City speech, Mayor Michael Bloomberg praised career and technical education and announced the formation of a task force, chaired by former Mayor David Dinkins, to make recommendations on how to further improve CTE programs. The administration's new focus on CTE is heartening, but as this report shows, realizing the promise of CTE will require a fundamental change in attitude toward career-focused education from top officials at the city's Department of Education as well as a long-term commitment from city and state officials, the State Board of Regents and the business community to ensure that CTE schools have the resources and flexibility they require.

This report, more than a year in the making and informed by more than 50 interviews with CTE administrators, educators and students, business leaders, and local and national education experts, lays out the case for career and technical education in New York City. We look at the 21 dedicated CTE high schools, the interests and needs of a business community eager to support career-oriented education, and the performance, problems and promise of a vein of educational programming whose time might finally be at hand.

The secret of career and technical education is, simply, context and relevance. CTE imparts academic skills through real-world applications. While requiring students to meet the same high academic standards as those at academic high schools in order to graduate, the 21 dedicated CTE high schools across the five boroughs also help students prepare for potential careers as dental lab technicians, nurse assistants, electricians, subway maintenance technicians, IT support workers, aircraft mechanics, chefs and dozens of other occupations. Rather than wondering why it's important to learn geometry, students grasp that the concept on the chalkboard relates to something real.

CTE's hands-on approach to education is largely producing positive outcomes. Attendance at a number of the CTE schools is well above citywide averages (see page 10). Some of the schools are national models, and most are deemed effective by the city. Half of the 18 CTE high schools that received grades under the Department of Education's controversial report cards released last autumn received As or Bs. Others struggle: three CTE high schools got failing grades, falling short on the same measures of graduation rates and standardized testing that bedevil high schools of all descriptions.

Those low marks indicate that obstacles remain for the success of CTE programs—and perhaps the biggest is the enduring sense that only low achievers are ticketed for vocational studies. In an age where "college for all" has become an unlikely rallying cry, all too many parents, who remember what "voc ed" meant a generation ago when they were in school, regard career and technical education with something resembling horror.

Unfortunately, the bias against CTE isn't just limited to students and parents. Political officials and top administrators in the Department of Education (DOE), and the Board of Education before it, and no small number of teachers themselves, shared the disdain. "There's been a huge divide between the academic and vocational worlds for years," says Betsy Brand, director of the American Youth Policy Forum. "Most academic teachers aren't really exposed to the requirements of the economy and workplace. They don't know how the world of work has changed."

Another important reason why CTE has been denied its due is that for decades education administrators at the city level showed no appreciation for the full value of these programs. Indeed, since the Bloomberg administration gained control of city schools in 2002 and further increased the emphasis on standardized testing, CTE enrollment in New York City sharply declined—from 118,892 in the 2002-2003 school year to 103,172 in 2006-2007.[1] Focused solely on college admissions—and concerned little if at all with how the city will or won't meet its projected workforce needs—education policymakers have paid no attention to the successful outcomes of high school graduates who go on to remunerative and stable careers in fields from graphic communications and cosmetology to aviation maintenance and carpentry. Even today, on the statistical assessments that DOE requires each year from every school, there is no methodological rigor applied to "students' post-secondary plans" beyond surveying graduating seniors—and there is absolutely no tracking of students' outcomes after they leave high school.

The secret of career and technical education is context and relevance. Rather than wondering why it's important to learn geometry, students grasp that the concept on the chalkboard relates to something real.

"What if a kid graduates from Automotive High School and gets an apprenticeship at one of the best dealerships in the city?" asks Stanley Schair, an attorney at the midtown firm of Bond, Schoeneck and King and the longtime chairperson of the city's CTE Advisory Council, a collection of educators, businesspeople and advocates that meets quarterly to support CTE programs. "Isn't that a fantastic outcome? That's what he went to school for."

Another major obstacle has been that CTE programs have struggled to make do with inadequate resources. As the Independent Budget Office reported in August 2007, CTE schools have been underfunded compared to the citywide norm over the past few years, a state of affairs that has only partly been remedied under the Fair Student Funding budget formula adopted for the 2007-2008 school year. The IBO found that average per student spending in CTE schools significantly lagged the average in all city high schools.[2]

Additionally, the school system does not budget for equipment costs, a huge problem since most CTE schools require a range of machines and tools to effectively teach a vocational curriculum. This equipment isn't cheap—an oven in a culinary arts program might cost a couple thousand dollars, while state-of-the-art automotive diagnostic systems or a single lab's worth of computer networking equipment might run more than ten times as much—and it must be maintained and kept up-to-date. While many schools benefit from money and equipment donated from industry partners, many businesses say that they have made these donations in spite of DOE rules they find time-consuming, frustrating and laden with bureaucratic hurdles.

Unfortunately, this is just one of many ways in which the education bureaucracy has ill-served CTE over the years. "We haven't had a good support system for the last 30 years," Michael Mulgrew, vice-president for career and technical education with the United Federation of Teachers, said in a 2007 interview with CUF. "These schools were in bad shape when [the current administration] came in. It's not that they've killed them, they just haven't done much of anything to fix it."

Others are more assertive in placing blame. "If you spend too much time working with the Department of Ed, you get nowhere," states Jack Powers, director of the International Informatics Institute and president of the Graphic Arts Education Advisory Commission, which supports CTE schools with curriculum advice, training for teachers and mentoring to students, as well as linkages with printing and technology companies from Xerox to Apple. He believes DOE officials have nourished an active disdain for CTE's focus on careers and work. "Mention the word 'employment' and they close you down. The less I have to do with those people in the bureaucratic jobs, the better off I am."

Perhaps the most destructive administrative act came in the summer of 2007, when the CTE team within the Department of Education was slashed from nearly 30 staff members to 10—just one more than for the city of San Diego, which has a population about one-seventh of New York City's. These administrators were responsible for a number of the most important tasks for CTE programs and dedicated schools, such as helping schools secure partnerships with businesses and industry groups, making progress toward state approval of programs (see page 18), working on the ever-present issue of teacher recruitment and certification (see page 20), and managing work-study funds for students. The department officially contended that the functionality of the CTE division was simply being shifted to the newly created Office of Portfolio Development—but the result has been to add layers of complexity for principals needing assistance on a variety of school-related issues.

In a painful irony, considering the mayor's background, another missed opportunity of CTE programming through the first six years of the Bloomberg administration has been the failure to engage the private sector in a comprehensive or visionary way. "CTE schools have not been as relevant to industries or students as they can be," observes Adam Rubin, director for policy and research with New Visions for Public Schools, an education reform group known to have the ear of Department of Education officials and which is now developing new models for CTE programming in the city. The New Visions proposal, which is currently in development, is designed to ensure both high academic standards and relevance to industry needs, and will help shape three new schools scheduled to open in September 2009.

Fortunately, there has been some progress in DOE's collaborations with industry. A new CTE school set to open in Long Island City this fall—the Academy for Careers in Television and Film—was developed in part from a proposal by the New York Production Alliance, a group that advocates on behalf of the city's television and film industry. Another soon-to-open CTE school, the High School for Innovation in Advertising and Media in Brooklyn, has guaranteed that all juniors will perform internships at New York-based advertising agencies.

If the city does truly reach out as a result of the new mayoral task force on CTE, employers in more established professions are equally likely to respond with alacrity. Louis Coletti, president of the Building Trades Employers' Association, stated at a May 2007 forum on CTE hosted by the United Federation of Teachers, "I don't think anyone from Department of Ed has ever asked me, 'Can you send some contractors into the schools to talk about career opportunities?'" He added, "Most contractors are deathly afraid of government—but they'll do it."

Employers in Coletti's industry of construction, and many others as well, are willing to engage with "government" in the context of the schools, because they can read actuarial tables. They know that large numbers of their workers are likely to retire in the next 10 to 20 years, and view the school system—and CTE schools in particular—as a prime source for replacing baby boomers who will be trading the workplace for the golf course. Educators and administrators resistant to career-focused schooling emphasize—correctly—that preparation for the job market is not the mission of the high schools. But if CTE both helps inculcate academic skills and facilitates students' exploration of and preparation for potential careers, the dynamic is not an "either/or," but rather a "both/and."

Trends at the local and national level alike seem to be converging for dramatic progress on CTE. Reports from the IBO, the city comptroller and the public advocate all have noted the striking results of CTE students and called upon the administration to remedy the systemic disadvantages that have plagued CTE schools. Researchers across the country trumpet the ongoing evolution of models that show effective results in boosting academic performance through CTE-contextualized teaching. Parents and teachers are mounting a backlash against the obsessive testing regime of the federal No Child Left Behind education act.

Meanwhile, several states have recently embraced vocational learning. In California, Governor Arnold Schwarzenegger has been outspoken in support of CTE and increased the state's support for these programs by $52 million. In Maryland, which started to increase its support for career-focused education in the early 1990s, more than half of the state's high school students took CTE programs in 2004 (see page 28). On top of all this, local and national business leaders from Microsoft CEO and philanthropist Bill Gates to Partnership for New York City President Kathryn Wylde have taken an increasingly vocal role in supporting the new emphasis on and investment in education with relevance to employers' workforce needs.

All these factors will be necessary to reach all students who could benefit from CTE instruction—and finally dispel the outdated and discriminatory bias against education that acknowledges the existence of a labor market. But the window of opportunity will not remain open forever. "If not now, when?" Regents Vice Chancellor Merryl Tisch asked during a January 2008 hearing on CTE at Automotive High School. "If we don't act soon, the urgency will disappear."

With greater public attention, interest from business and political leaders, and a growing backlash against excessive standardized testing, the stars seem to be aligning for CTE reform.

MEET CTE

Beyond the "voc ed" stereotype, today's career and technical education schools are preparing students for some of tomorrow's best jobs

CAREER AND TECHNICAL EDUCATION HAS A LONG and honorable history in New York City, dating back to the early 20th century. In a time before college attendance was the expected norm, city high schools trained builders, plumbers, masons, electricians, welders and technicians of every stripe. The vocational schools themselves once had a tradition and an *esprit de corps* characteristic of elite institutions: at one point, students at Automotive High School in Greenpoint ate meals on engraved dining ware.

Around mid-century, however, "voc ed," as it was known, began to acquire a stigma as an academic dumping ground that it retains to this day. Schools officials began to relegate youngsters with academic deficits or special-education needs to career preparation programs, and gradually a largely separate and clearly unequal system-within-a-system began to take shape. "Voc ed became almost synonymous with special ed," says Frank Carucci, a retired UFT vice president for CTE. Gregg Betheil, the newly appointed senior executive for CTE at the Department of Education, argues that the tragedy of voc ed in these years was that it "diminished kids' aspirations by making institutional decisions about what they could do" by enforcing an artificial and outdated distinction between "vocational" and "academic" standards.

During the late 1990s and the first years of this decade, however, the pendulum began to swing back somewhat. A series of education leaders at the city and state level called for higher academic standards within voc ed, now known as career and technical education. Some of the most outdated and least substantive programs were eliminated—ultimately, some of the worst performing schools, such as Harry Van Arsdale HS, were closed—and requirements rose to the point where champions for CTE could fairly claim that their students had to work harder than those pursuing a traditional academic course of high school education.

The traditional perception of vocational schooling includes images of students working with their hands in fields like construction and car repair. Those fields remain a core part of New York City's CTE system, with instructors bolstering the hands-on skills of yesteryear with additional emphasis on computer diagnostic techniques and applied math concepts. But the full range of disciplines offered under CTE today runs from health care, cosmetology and optometry to computer-aided design, desktop publishing and networking systems. This breadth of study options opens exciting doors for students: for example, teens studying vision technology at Brooklyn's Clara Barton High School might measure classmates for astigmatism in a state-of-the-art optometry lab, while automotive maintenance students at Automotive High School a few miles away hone their skills working on late-model Mercedes-Benz cars donated by the company.

This fall, a new CTE school, the Academy for Careers in Television and Film, will open its doors to 108 freshmen in Long Island City, adding a class every year until reaching full size in 2011. Thanks to support from nearby Silvercup Studios, where the HBO series "The Sopranos" and other high-profile productions were filmed, the academy could help dispel the old negative stereotypes about CTE—and generate envy, rather than disdain, from students in more traditional academic settings. CTE reform advocates have equally high hopes for the other new CTE schools: the Academy of Innovative Technology, the High School for Innovation in Advertising and Media, and Frances Perkins Academy—a school named for the first female U.S. Secretary of Labor that aims to draw women into the field of carpentry.

Recent gains at many of the schools have resulted in part from city and state officials' determination to raise not only academic expectations for CTE students, but also standards on the vocational side of the equation. Before the New York State Department of Education will approve CTE programs, schools must demonstrate strong linkages with employers and other stakeholders within the relevant industry, including

CTE IN NYC

After six years of indifference to CTE, the Bloomberg administration hopes to cram for a late A

Almost since he took office in 2002, Mayor Bloomberg has said that voters (and, by implication, history) should judge him on his education record. While critical assessments of that record are far from universal, one constant has been the relative lack of focus on career and technical education—a fact that the mayor himself implicitly recognized through his recent remarks about CTE and the appointment of a mayoral task force to consider policy changes.

Previously, the administration's education reforms affected CTE mostly in indirect ways. As an example, when DOE closed Brooklyn's Prospect Heights High School a few years ago as part of the Bloomberg administration's push to create smaller theme schools, enrollment at Clara Barton High School, a CTE school focusing on health careers, rose to nearly 2,500—well above the 1,800 it was designed to serve. Students who did not qualify for or were not interested in the five new replacement schools went instead to Clara Barton, which in turn saw its attendance rate drop and disciplinary problems sharply rise.[3] More broadly, the emphasis on theme schools served to distract attention—and resources—from CTE.

Similarly, budget reforms pushed by Chancellor Klein did not work to the advantage of CTE schools. In its August 2007 report on career and technical education in New York City, the Independent Budget Office found that per capita student spending tended to be about $750 less in CTE schools than the citywide high school average. IBO characterizes this discrepancy as resulting from a series of changes made to the process of school funding, the first of which was a 2004 adjustment to more closely align per-school spending with budget formulas. That adjustment meant cuts for 17 CTE schools. As the IBO reported: "At least some of the 'excess' spending that was removed from their budgets had originally been added to deal with the higher costs of delivering CTE services."[4] The Fair Student Funding formula implemented for the 2007-2008 school year only partly closed the gap.

The mayor's references to CTE in his January 2008 State of the City speech, however, sent an unmistakable signal that this area of education program finally has captured the attention of policymakers. Bloomberg pledged to change the longstanding perception of CTE as "an educational dead-end," stating, "college isn't for everyone, but education is." The task force, co-chaired by New York Life CEO Sy Sternberg and former Mayor David Dinkins, will prepare recommendations for "rigorous career and technical programs that start in high schools and continue in our community colleges."

The small task force, which includes work groups focusing on industry needs, education issues and new school demonstrations, is scheduled to issue findings and recommendations to the Department of Education, Board of Regents, State Education Department, CUNY, and the Partnership for New York City by June 30. The city plans to open three new CTE schools—referred to in task force materials as "demonstration sites"—informed by the group's findings in September 2009. ❖

curricula that reflect current standards and practices of that industry and connection to a post-secondary sequence of study that leads to a college degree. This is more easily done in some fields than others—at Aviation High School in Queens, for example, generations of students have earned Air Frame and Powerplant licenses certified by the Federal Aviation Administration and recognized across the industry, and the school enjoys close and comprehensive relationships with industry heavyweights from Federal Express and JetBlue to the Port Authority of New York and New Jersey. In fact, Aviation High School has an annex at JFK Airport, where students can learn their trade side-by-side with industry professionals—including more than a few alumni.

Aviation High School is one of three CTE schools to be recognized by *U.S. News and World Report* in November 2007 as one of the country's 100 best high schools, along with Manhattan's High School of Fashion Industries and Thomas Edison High School in Queens. But CTE schools where results have been more mixed offer equally unique and exciting opportunities for their students. The High School of Graphic Communication Arts in the Hell's Kitchen neighborhood of Manhattan, which received a C grade from DOE, offers industry-certified CTE sequences in graphic design and commercial photography. Close partnerships with the Graphic Arts Education Advisory Commission, as well as with high-profile businesses like *Billboard* and *Newsweek* magazines, bring the industry alive for participating students. And at George Westinghouse Career and Technical Education High School, which also received a C grade from DOE, the robotics team won the city championship in 2007.[5]

Paul Tropiano, assistant principal for CTE at Transit Tech High School in the East New York neighborhood of Brooklyn, scoffs at the notion that CTE is for young people who can't cut it in the classroom. "At this school, it's the opposite," he says. "Our students must complete the full load of Regents work, plus a vocational sequence." The vocational sequence is taught in part on full subway cars of different vintages, donated by the Metropolitan Transportation Authority (MTA) over many years of partnership with the school.

These vivid learning opportunities present a perfect fit for CTE students who, in demographic terms, disproportionately bear higher risk of dropping out

before high school graduation. Compared to their peers citywide, students at the city's CTE high schools are:

- Poorer: in 2005, 64.2 percent of students in CTE schools qualified for free lunch, compared to 51.2 percent citywide.[6]
- More likely to be over age: at seven CTE schools in 2005, the percentage of entering students older than the typical 9th or 10th grader approached 40 percent, compared to just under 30 percent citywide.
- Less white: across the entire system, New York's student body in Fiscal Year 2007 was 39 percent Hispanic, 32 percent African-American, 14 percent white, and 14 percent Asian. The CTE schools, according to the Independent Budget Office, serve a student body that is 44 percent Hispanic, 43 percent African-American, 8 percent white, and 5 percent Asian.[7]
- Lower-skilled: a Department of Education assessment of 20 CTE schools found that higher percentages of entering 9th graders at those schools tested at Level 1 or Level 2, the two lowest levels of attainment, on English Language Arts and Math exams (60 percent and 56 percent respectively) than in all city high schools aside from those in specially designated citywide districts (50 percent and 48 percent).

Despite these significant disadvantages, CTE students in New York City graduate at higher rates and are four times less likely to drop out compared to their counterparts in academic programs. The biggest reason why might be that CTE instruction makes education relevant and appealing to students accustomed to boredom and alienation in the classroom. Indeed, a 2006 Bill and Melinda Gates Foundation study that included a survey of dropouts found that 47 percent of those who left school did so because "classes were not interesting."[8]

By its nature, CTE goes a long way to alleviate that problem. The compelling nature of the coursework helps explain why 2007-2008 attendance at Aviation High School through the end of February was 93 percent; 90.4 percent at Food and Finance High in Midtown Manhattan; 92.3 percent at Thomas A. Edison; and a stunning 95.1 percent at the High School for Construction Trades, Engineering and Architecture. (See Chart 1 for a comparison of attendance rates at all CTE high schools for this school year.)

While outcomes of CTE students across the New York City school system compare favorably to those of non-CTE students, significant variation exists across the 21 officially designated CTE high schools. In the controversial "report card" grades released by the city's Department of Education last fall, two schools (Aviation and Fashion Industries) earned A's, six earned B's, seven earned C's, and three (Automotive, Chelsea, and Maxwell) were given F's. (Three schools—Food and Finance, the High School of Computers and Technology, and the High School for Construction Trades, Engineering and Architecture—were not awarded grades.)

CTE schools have obvious value for students whose immediate post-graduation plans don't include college, by furnishing them with skills and competencies that city employers value. But post-secondary education remains the focus for most students in CTE programs—and for teachers and administrators. In materials furnished to the mayor's CTE Task Force, DOE notes that 68.3 percent of graduates who successfully completed CTE programs go on to college. Rachel Wellen, a guidance counselor at the highly regarded High School for Fashion Industries, estimates that close to 90 percent of her school's graduates continue on to post-secondary education. "I'm amazed with these kids at how many of them plan to go [to college]," she says. "They want to work, but it's secondary."

During the decades in which vocational education fell into disrepute, critics asserted that it essentially communicated to students that their academic skills were inadequate, and that their future options were accordingly limited. Gradually, that impression is giving way to an understanding that career and college aren't zero-sum alternatives; they actually seem to reinforce each other. "I would say that over half of our apprentice force at one time or another goes to college on their own hook and their own dime," says Norman Gaines, head of the apprenticeship program at MTA New York City Transit. "They recognize that in their trade, if they want to get into supervision, college time will help them."

Whichever option students ultimately pursue, most are grateful for the opportunities to explore the different possible career paths that their CTE experiences afforded them. Joe Antoine, a 2007 graduate of George Westinghouse High School, took A-Plus computer repair in high school and was a participant in the MTA

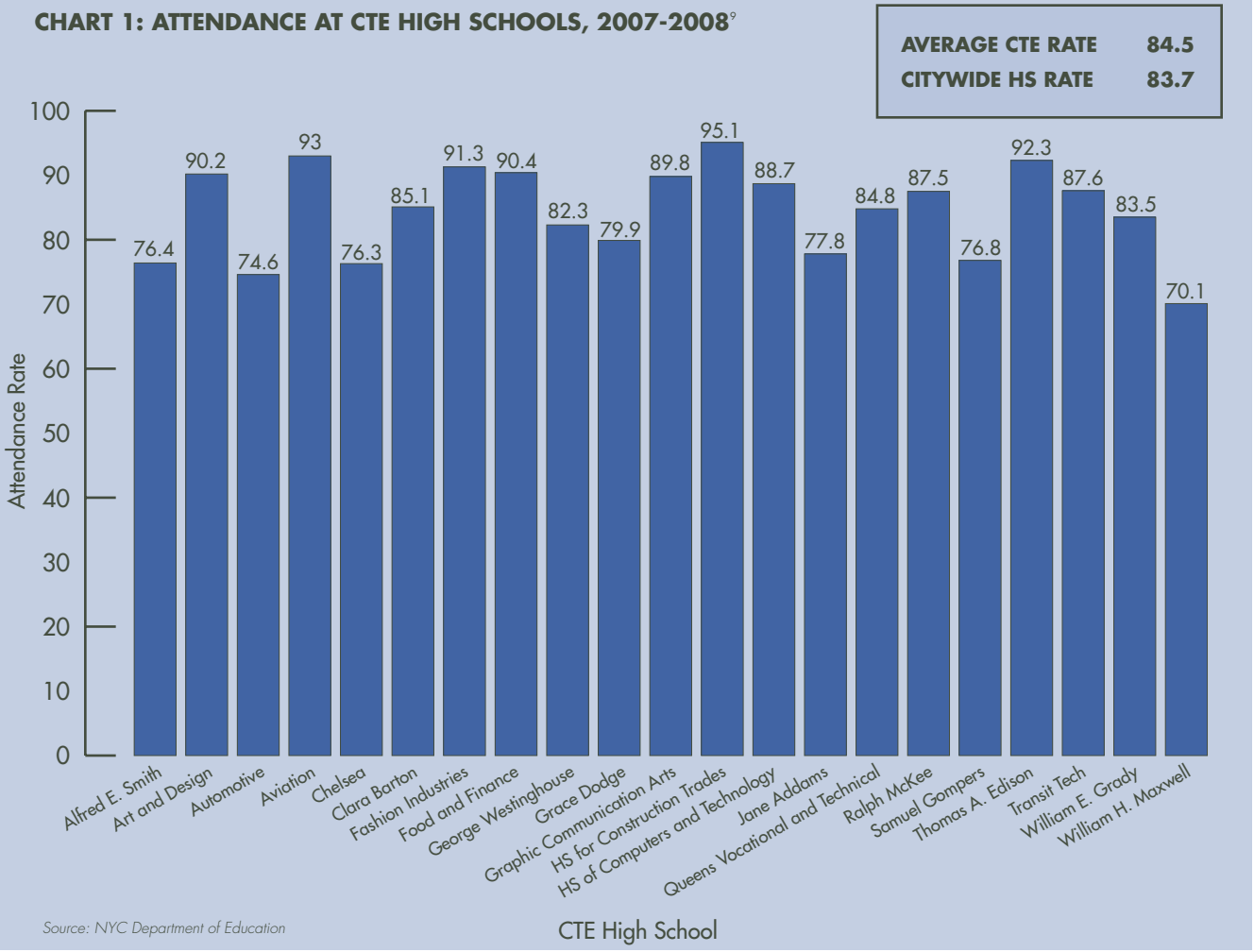
apprenticeship program directed by Norman Gaines. "The exposure and experience, seeing what you have to do and how you act, how you present yourself—all those things come in handy," he says. His high school experiences "showed me where I want to go and made me more comfortable." Antoine is now studying electrical engineering at Trinity College in Connecticut and is thinking of pursuing an MBA.

Even within the struggling CTE schools, students reap the benefits of institutional agreements with colleges and employers. Students taking certain sequences at William H. Maxwell High School can utilize Maxwell's articulation agreements with New York City College of Technology and Touro College to earn advanced placement in their post-secondary studies, or take college courses while still in high school through the school's College Now collaborations with City Tech and Medgar Evers. As of 2007, teens in the Emergency Medical Technician program at Grace Dodge High in the Bronx can take an exam with the New York City Fire Department that guarantees jobs after graduation for those who pass. Successful candidates who perform their duties for five years thereafter are admitted into the FDNY.

When done right, CTE can make a dramatic positive impact in the lives of city high school students. Denise Vittor, principal at Queens Vocational and Technical High School, proudly cites the accomplishments of her 2007 graduates. "Last year, 82 percent of our cosmetologists got their state license; 19 of 21 passed their A-Plus exam for computer repair; 85 percent of our business kids have their full Microsoft Office suite and NACTY business certification for accounting and business practices."

Given both the scope of students' disadvantages (see page 17) and the potential for transformational achievement through CTE programs, half-measures do not suffice. "Those kinds of rates don't come by doing the basics," Vittor says. "They come by going to the extreme."

CHART 1: ATTENDANCE AT CTE HIGH SCHOOLS, 2007-2008[9]



Source: NYC Department of Education

PERMANENT VOCATION

The most popular CTE industries—including health care, construction and information technology—are also the biggest areas of need for New York City's future workforce

WHILE RECENT GAINS IN ACHIEVEMENT AMONG CTE students in New York highlight the educational value of these programs, there is another compelling reason why policymakers and educators should view career and technical education in a new light: these programs have the potential to greatly help city employers in a number of industries meet rising skill needs for their workforce in today's increasingly competitive economy.

"There are real deficits in the U.S. labor market, and a real need for people with technology training that we're not meeting—and it's become a particular problem in New York City," stated Kathryn Wylde, president and CEO of the Partnership for New York City at a January 2008 meeting of the New York State Board of Regents. "There's a unique opportunity for New York City to really emphasize both sides of the equation [academics and career training]. The business community is very eager to get involved in supporting these efforts."

Two years ago, the Center for an Urban Future published a report which underscored the growing workforce needs of city employers. Titled "Chance of a Lifetime," the study concluded that businesses in industries from health care and construction to automotive maintenance and information technology will probably experience workforce shortages in the decade ahead due to a wave of retirements expected among baby boomers.[10] Some job titles within these fields, including construction supervisors, auto body repairers, and various technician titles in health care, arguably suffer from shortages right now. Others are at significant risk of doing so as the disproportionate numbers of older workers in those fields leave the workforce. Among New York City nurses, for instance, about a third are age 50 or older, as are about one quarter of plumbers and nearly 30 percent of printing machine operators.

As Table 1 shows, the city's CTE programs are focused heavily in several of these fields, particularly health care, construction, auto maintenance and information technology—just as one would expect of institutions with names like Aviation High School, Automotive High School, Clara Barton High School and the High School for Construction Trades, Engineering and Architecture.

The existing menu of CTE programs gives New York City a unique opportunity to merge academics and career preparation—and to engage a business community fretting about pending retirements.

These areas of need mirror those of the economy nationwide. A recent study by researchers Harry Holzer and Robert I. Lerman found that "the demand for workers to fill jobs in the middle of the labor market"—positions that require education and training beyond a high school diploma but less than a four-year college degree—"will likely remain quite robust relative to its supply."[11] Their study identifies a number of fields projected to have significant job openings in the future, including radiological technicians, registered nurses, electricians, plumbers, auto and aircraft mechanics and heating and air conditioning installers.[12]

But while nobody disputes the great potential of CTE to help the city fill its future workforce needs, it's

also largely unknown to what extent past CTE school graduates have moved on to jobs and careers in the fields they studied as teenagers.

The city's Department of Education does not track the post-graduate outcomes of its students—leaving the field open to anecdote and speculation. Aviation High School, for instance, is known across the country as a veritable factory for aviation technicians; school boosters have claimed, perhaps dubiously, that one in every ten aviation technicians nationwide passed through its doors. But despite the city's well-publicized need for health care workers, Clara Barton High School has no firm grasp on how many of its graduates are now working in New York's hospitals, doctors' offices and other sites of care.

"We need more longitudinal research to tell what works," says Kathy Hughes, assistant director for work and education reform research at Columbia University's Teachers College. "Are students transitioning to a post-secondary program or a job that pays a living wage? We really don't know a year after they graduate high school if they've gotten the skills they need."

Part of the problem is the general absence of well-marked pathways from CTE schools to either direct jobs in the industry or college programs in the same field. Perhaps stemming from the system's institutional bias toward "college for all," efforts to connect CTE programs with employers in relevant fields have been slow in development and largely come at the behest of industry figures rather than educators. But the school- and sector-level collaborations that have emerged are showing some impressive results.

"When I started working with the city schools, I wondered where they placed students," says Stephen Mercaldo, education and training consultant with the Greater New York Automobile Dealers Association and New York downstate manager for Automotive Youth Educational Systems (AYES). "There was a lack of contact with an industry that's really growing and needs employable people who can go to work at a dealership." He adds, "The only way to get involved with private industry is to build the relationship, and give them students that can be productive after a short period of time."

Mercaldo describes a recent partnership between AYES and three of the city's CTE high schools: Automotive, William Grady, and Alfred E. Smith, all of which have programs that have been certified by the National Automotive Technicians Education Foundation. The initiative places aspiring automotive technicians into summer internships with local auto dealerships following students' junior year. The students then work part time during their senior year. In summer 2007, 28 students from the three schools participated.

"This gives them an opportunity to learn if they're interested in that particular trade," Mercaldo states. "Then the service manager, general manager and mentor watch to see if the kid has the desire and the talent to make a decent living."

CTE schools have forged a handful of exceptional partnerships with major city employers. The Metropolitan Transportation Authority (MTA) is among the most prominent of these, advising schools on curriculum, helping them earn state program approval and offering students a unique work experience that has the potential to lead to permanent employment. "MTA partners with us to offer a one-semester internship for seniors," explains Paul Tropiano, assistant principal for CTE at Transit Tech High School in Brooklyn. "They work from 12:30 to 4:30 every day in various offices of the Transit Authority (TA). These are white-collar jobs that help prepare them for managerial or administrative positions within the TA. That experience also helps students make the decision as to what they want to do in college." MTA officials report that approximately 300 high school and college interns are currently working within the organization.

In addition to taking on a limited number of high school seniors as interns, the MTA also offers an apprenticeship program that is among the most effective career development initiatives in city schools—and an increasingly important source of talent for MTA itself. Project Manager Norman Gaines estimates that there are approximately 200 present and former apprentices among MTA's 46,000 workers. Qualified graduating high school seniors can interview for the program; those accepted spend three years with the agency as full employees in the Transit Workers Union, at the end of which time they can take the civil service exam. Those who pass receive permanent status. "The advantage is that everybody else has to take the civil service exam to get the job," Gaines says of the apprentices. "They just have to take the job to keep it."

The apprentice program provides a number of benefits to the MTA, not least of which is helping the authority prepare for an expected shortage of skilled workers in the years ahead. "Beginning about seven or eight years out, we're going to have probably the largest turnover of experienced tradespeople and supervisors in the history of this property," he explains. "The apprenticeship program works at least to put people here who are properly trained to take over the supervisory roles."

It's not just public sector institutions like the MTA investing time and effort in the city's CTE schools. The Cisco Networking Academy, supported by networking powerhouse Cisco Systems, also has a major presence in four CTE schools in the five boroughs: Thomas Edison High School in Queens, Chelsea in Manhattan, Ralph McKee in Staten Island, and Samuel Gompers in the Bronx. Part of a nationwide program, the Cisco Academy provides theory and practice to students in a range of IT skills, from building, maintaining and troubleshooting computers and laying cable to high-level computer networking and wireless and security technology training. Each of these sequences can lead to industry-recognized certification as well as academic credit.

This programming serves both to enhance students' potential employability and give them insight and experience in this growing field. "At the high school level, many of these courses fit into career clusters or pathways," explains Cisco Area Academy Manager Marie Zwickert. "What that means to the student is that if they're interested in IT careers, they could start by taking the cabling course, getting certified, then IT Essentials and then going on. They get an opportunity to take a series of courses that will better prepare them for the next set."

In the ten years since the Networking Academy began, more than two million students worldwide have gone through the program. Over 4,000 of them have been in New York City, where Zwickert reports that Cisco has made in-kind contributions of $2.5 million to the Department of Education.

The positive experiences of MTA and Cisco, however, are far from universal among employers. Numerous industry representatives complain that the city has shown little interest in developing partnerships with employers, and business leaders who have tried to support CTE efforts continue to encounter maddening bureaucratic barriers.

Jack Powers, director of the International Informatics Institute and chair of the Graphic Arts Education Advisory Commission, has spent years trying to forge stronger linkages between printing employers and the city's school system. His volunteer commission provides curriculum advice, training for teachers and mentoring to students, as well as assistance with equipment and other services. "Going into the schools and working with kids and getting teachers trained are practical things the industry is interested in," says Powers.

The frustration of business leaders with the education bureaucracy can be a powerful turnoff. "If you spend too much time working with the Department of Education, you get nowhere," one says.

While Powers remains strongly committed to CTE as an educational programming track, he says that the frustration business leaders experience is a powerful disincentive to getting involved with city schools. "If you spend too much time working with the Department of Education, you get nowhere," he says. "All the good things that happen are off the charts and probably illegal, and all the bad things are what's supposed to happen."

One reason for his frustration is that business leaders often have to go outside the school system to render the assistance they want to provide. For instance, Powers is involved with Graphic Communications Scholarship Award and Career Advancement Foundation Inc., which has provided scholarships to New York City high school students each year since 2003, including 22 students last year. "The reason why the scholarship foundation got formed was because we

(continued on p. 16)

CTE SCHOOLS AT-A-GLANCE

Bronx (5)

Alfred E. Smith Career and Technical Education H.S.

Enrollment, 2007 - 2008	1,144
Attendance rate, 2007 - 2008 (through February 29, 2008)	76.4%
Gender Breakdown	88% male
English Language Learners (ELL)	12.1%
Race/Ethnicity Breakdown	63.1% Hispanic, 33.9% African-American
CTE Focus Areas	Construction, automotive
2007 DOE Grade	C

Grace Dodge Career and Technical Education H.S.

Enrollment	1,432
Attendance	79.9%
Gender Breakdown	63% female
ELL	18.4%
Race/Ethnicity Breakdown	63.6% Hispanic, 31.8% African-American
CTE Focus Areas	Health care, IT, finance
2007 DOE Grade	C

H.S. of Computers and Technology

Enrollment	437
Attendance	88.7%
Gender Breakdown	80.1% male
ELL	8.9%
Race/Ethnicity Breakdown	53.6% Hispanic, 39.4% African-American
CTE Focus Areas	Computer repair
2007 DOE Grade	n/a

Jane Addams H.S. for Academic Careers

Enrollment	1,713
Attendance	77.8%
Gender Breakdown	67.9% female
ELL	11.3%
Race/Ethnicity Breakdown	63.3% Hispanic, 33.1% African-American
CTE Focus Areas	Business, legal studies, hospitality, health care, cosmetology
2007 DOE Grade	C

Samuel Gompers Career and Technical Education H.S.

Enrollment	1,460
Attendance	76.8%
Gender Breakdown	76% male
ELL	15.5%
Race/Ethnicity Breakdown	68.4% Hispanic, 28.3% African-American
CTE Focus Areas	IT, desktop publishing, pre-engineering
2007 DOE Grade	B

Brooklyn (6)

Automotive H.S.

Enrollment	1,107
Attendance	74.6%
Gender Breakdown	94.6% male
ELL	7.2%
Race/Ethnicity Breakdown	34.2% Hispanic, 58.9% African-American
CTE Focus Areas	Automotive technology, business
2007 DOE Grade	F

Clara Barton H.S.

Enrollment	2,231
Attendance	85.1%
Gender Breakdown	75.7% female
ELL	7.6%
Race/Ethnicity Breakdown	8.7% Hispanic, 84.7% African-American
CTE Focus Areas	Health careers (dental, billing and coding, nursing, vision technology), business
2007 DOE Grade	B

George Westinghouse Career and Technical Education H.S.

Enrollment	890
Attendance	82.3%
Gender Breakdown	62.4% male
ELL	1.9%
Race/Ethnicity Breakdown	19.2% Hispanic, 75.5% African-American
CTE Focus Areas	IT, vision technology, pre-engineering
2007 DOE Grade	C

Transit Tech Career and Technical Education H.S.

Enrollment	1,630
Attendance	87.6%
Gender Breakdown	79.9% male
ELL	1.5%
Race/Ethnicity Breakdown	18.8% Hispanic, 70.3% African-American
CTE Focus Areas	Transit careers, computer applications, electrician training
2007 DOE Grade	B

William E. Grady Career and Technical Education H.S.

Enrollment	1,386
Attendance	83.5%
Gender Breakdown	80.7% male
ELL	6.5%
Race/Ethnicity Breakdown	18.8% Hispanic, 70.3% African-American
CTE Focus Areas	Computer repair, automotive technology, construction, culinary arts, pre-engineering
2007 DOE Grade	C

Source: NYC Department of Education

William H. Maxwell Career and Technical Education H.S.

Enrollment	1,081
Attendance	70.1%
Gender Breakdown	67.1% female
ELL	6.5%
Race/Ethnicity Breakdown	27.8% Hispanic, 67.6% African-American
CTE Focus Areas	Health care, cosmetology, communications
2007 DOE Grade	F

Manhattan (5)

Art and Design H.S.

Enrollment	1,350
Attendance	90.2%
Gender Breakdown	53% male
ELL	3.4%
Race/Ethnicity Breakdown	52.2% Hispanic, 25.7% African-American
CTE Focus Areas	Advertising, architecture, animation, design, business
2007 DOE Grade	B

Chelsea Career and Technical Education H.S.

Enrollment	937
Attendance	76.3%
Gender Breakdown	59% male
ELL	7.6%
Race/Ethnicity Breakdown	57.7% Hispanic, 38.2% African-American
CTE Focus Areas	Computer repair, business, graphic arts
2007 DOE Grade	B

Food and Finance H.S.

Enrollment	400
Attendance	90.4%
Gender Breakdown	58.5% female
ELL	4.8%
Race/Ethnicity Breakdown	44.0% Hispanic, 48.3% African-American
CTE Focus Areas	Culinary arts
2007 DOE Grade	n/a

Graphic Communication Arts H.S.

Enrollment	1,783
Attendance	89.8%
Gender Breakdown	50.5% male
ELL	10.9%
Race/Ethnicity Breakdown	57.7% Hispanic, 38.2% African-American
CTE Focus Areas	Computer technology, business, graphic arts
2007 DOE Grade	C

H.S. of Fashion Industries

Enrollment	1,634
Attendance	91.3%
Gender Breakdown	91.3% female
ELL	4.2%
Race/Ethnicity Breakdown	50.4% Hispanic, 34.6% African-American
CTE Focus Areas	Graphics, fashion, marketing
2007 DOE Grade	A

Queens (4)

Aviation H.S.

Enrollment	1,961
Attendance	93.0%
Gender Breakdown	84.7% male
ELL	3.5%
Race/Ethnicity Breakdown	53.9% Hispanic, 22.3% African-American
CTE Focus Areas	Aviation, engineering, design
2007 DOE Grade	A

H.S. for Construction Trades, Engineering and Architecture

Enrollment	382
Attendance	95.1%
Gender Breakdown	67.3% male
ELL	0.5%
Race/Ethnicity Breakdown	38.2% Hispanic, 27.5% Asian/Pacific Islander, 14.4% White
CTE Focus Areas	Architecture, construction trades, pre-engineering
2007 DOE Grade	n/a

Queens Vocational and Technical H.S.

Enrollment	1,167
Attendance	84.8%
Gender Breakdown	60.1% male
ELL	6.7%
Race/Ethnicity Breakdown	66.3% Hispanic, 13.4% African-American, 11.0% White
CTE Focus Areas	IT, computer repair, business, accounting, cosmetology, construction
2007 DOE Grade	C

Thomas A. Edison CTE H.S.

Enrollment	2,709
Attendance	92.3%
Gender Breakdown	67.2% male
ELL	1.9%
Race/Ethnicity Breakdown	40.3% Asian/Pacific Islander, 28.5% African-American, 25.1% Hispanic
CTE Focus Areas	IT and computer repair, design, automotive, engineering
2007 DOE Grade	B

Staten Island (1)

Ralph R. McKee Career and Technical Education H.S.

Enrollment	752
Attendance	87.5%
Gender Breakdown	67.0% male
ELL	3.7%
Race/Ethnicity Breakdown	41.8% African-American, 29.5% Hispanic, 22.6% White
CTE Focus Areas	Computer repair, IT, graphic arts, automotive technology, construction, pre-engineering, cosmetology
2007 DOE Grade	B

couldn't give scholarships through the advisory commission," says Linda Nahum, the former president of the foundation. "It's one of the reasons why we have this incredibly awkward name. We were charged with career awareness and providing scholarships and marketing and outreach—to let people know that these were positions that required college."

Earlier in her career, Nahum was the director of education and training at the Association of Graphic Communications, New York City's industry association for printers and graphic artists. In that role, she got a sense of just how difficult it would be to connect the classroom and the workplace. "There was such a large gap between the industry and the school," Nahum recounts. "We harnessed people from industry to rewrite and update the curriculum at the High School for Graphic Communication Arts. But the system is not designed to be changed rapidly."

The problem has only gotten worse since then, she says, as the pace of change within the industry has accelerated. "Years ago, if you had a Selectrix [typewriter], it would last for 15 years. Now you get a computer and six months later, one or two of the software packages you use gets upgraded. It's very difficult to keep up. For teachers there's no way to keep up curriculum that quickly, and for schools to update all computer labs costs a fortune. And it's just not built in." The scholarship program and competition were developed and launched with minimal input from education officials.

Beyond these problems, many CTE experts say that DOE is missing out on many other potential connections between the schools and industry. Paul Tropiano of Transit Tech suggests that the Department of Education could start by forging stronger relationships with other city agencies, including the police, fire and sanitation departments. "They have cars and trucks and vans, and they need workers on the repair end," he points out. "But our students aren't getting jobs in the repair departments of those agencies."

TABLE 1: OCCUPATIONAL SPECIALTIES IN NYC CTE SCHOOLS

Industry	Number of Distinct Programs
Information Technology	12
Legal Studies	1
Automotive/Aviation Technology	6
Manufacturing	2
Fashion/Design/Esthetics	7
Agriculture	3
Arts & Communications	17
Business and Administration	6
Building and Construction Technology	13
Education and Training	3
Health Services	13
Hospitality and Tourism	2

Source: http://www.nyccte.com/nycctenew/programcategory.asp

EXTRA CREDIT

Before they can fulfill the great promise of CTE, schools must contend with a host of systemic and administrative issues

FOR ALL THE VALUE OF CAREER AND TECHNICAL education and the prospect of continued improvement as the Bloomberg administration begins to focus on ramping up programs, daunting challenges remain for CTE schools at both the classroom and system level.

Perhaps the most daunting obstacle is the severe academic deficits with which many students at CTE high schools arrive, which requires the schools to spend significant time and effort on remediation—time that can't be spent on vocational instruction. CTE schools also face challenges in recruiting and retaining appropriately credentialed teachers for vocational subjects and winning state approval for CTE sequences. The schools also have struggled to get the support they need from DOE, on everything from equipment purchases to the flexibility needed to forge relationships with industry partners.

ACADEMIC REMEDIATION AND THE PROMISE OF INTEGRATED INSTRUCTION

The accomplishments of New York City's CTE students are all the more striking when one considers the deep and wide educational deficits with which so many of them enter high school. Of the 18 full-size CTE high schools, nine enrolled much higher-than-average percentages of over age students in their 2005-2006 entering class—from 38.6 percent at Maxwell High School to 45.2 percent at Alfred E. Smith High. In that same year, only 5 of 18 CTE schools exceeded the citywide average of high school entrants who met the standard in English Language Arts (32.7 percent). In fact, ten of the schools had less than half that percentage meeting the standard; at Smith, just 10.8 percent of entering students tested at standard level. The situation is only slightly less abysmal on the math exam: 11 of the 18 CTE high school entering classes tested below the citywide average of 40.8 percent, with three schools—Smith, McKee, and Graphic Communication Arts—reporting less than half that rate.

But even these raw numbers sometimes fail to capture just how deep the education deficits run among entering CTE students. "Of our 400 freshmen, 86 percent were reading at least four grades below 9th grade level," says Automotive High School Principal Melissa Silberman of her 2007-2008 entering class. The result is that remediation activities—time spent bringing students with such inadequate academic skills up to speed—eat into time that students likely otherwise would spend on their CTE activities.

"The academic piece has not been easy," says Denise Vittor, principal at Queens Vocational and Technical High School. Vittor estimates that 80 percent of her entering students read well below standard. "Kids have deficits, and we don't have enough time to do it all. There's no room to give extra English. A lot of schools cut 9th grade CTE so they can do more academic remediation; we don't do that here."

The question of remediation cuts to the heart of the tension between increased reliance upon standardized test results to gauge school performance and an emphasis on CTE as a means of capturing students' imaginations and ambitions that otherwise might wither in the traditional classroom environment. Without intensive efforts to raise the skill levels of underachieving high school students, schools will perform badly on tests—and draw critical attention from federal, state and city evaluators. In the higher-stakes environment of school reform in the era of No Child Left Behind, this ultimately might mean losing funds or being closed down.

But the classroom practices through which schools try to boost those skills typically are of the same type that failed to teach those students in the first place. "Academic deficits that students come in

with all too often lead educators to conclude, 'we'd better keep repeating academic intervention,'" says Stanley Rabinowitz, program director for assessment and standards development services at WestEd, a national nonprofit research, development and service group. "The lack of good applied learning models hampers efforts for applied remediation."

Schools like Automotive and Queens Vocational are trying to develop models to both close students' academic shortfalls and remain true to their career exploratory and preparatory mission. "We try to incorporate a lot of process writing, informational writing and projects that are fun but also informative," Vittor explains.

She cites a cross-disciplinary project called "Power in Your Face," which combined students' English classes with electrical installation, cosmetology, and computer technology instruction. "The electrical installation kids talked about how to power up all the devices the cosmetologists use, what power they required and how the answer to that question might change in the future. The cosmetology kids talked about how you beautify the face using those machines. And the computer technicians talked about computer imaging—how to change the face through computer imaging."

Rabinowitz explains that integrated instruction of this kind can both help the academic mission and directly support what a student needs to know in his or her career preparation. But he adds that there's only so much that schools like Automotive can do to dramatically raise the reading levels of students who enter high school reading at a 5th grade level, alluding to the freshmen that Silberman described.

"The schools are good, but they're not miracle workers," he says. "The real question is, can [Silberman] educate auto technicians who are good enough to be hired or go on to a two-year college program, without raising their reading ability eight years in four years' time? That's her challenge."

To this point, few schools anywhere have found answers to the question of how to effectively integrate traditional academic instruction with career teaching. But the promise of this approach is increasingly clear, as an experiment known as "Math-in-CTE" demonstrated. Mindful of data showing the widespread lack of college-level mathematics attainment among high school students, particularly CTE students, researchers from the National Research Center for Career and Technical Education at the University of Minnesota hypothesized that student math attainment would improve if an effort were made to more explicitly offer math instruction within the CTE context.

They supervised a trial in which CTE teachers in the sectors of agriculture, auto technology, business/marketing, health, and information technology worked with math teachers to identify embedded mathematics concepts within a CTE curriculum and develop instructional activities that would more effectively teach those concepts. During the 2004-2005 school year, this experimental group of 57 educators taught the newly developed curriculum, while a control group of 74 teachers used the traditional CTE curriculum. In all, nearly 3,000 students in 12 states participated in the experiment. After a year, the results showed that students in the experimental group performed significantly better on two of three standardized exams used to measure math mastery, and slightly better on the third. The researchers' conclusion: "Essential to the model was the ongoing teamwork between CTE instructors and their math partners in an authentic community of practice."[13]

Integrated instruction can both help the academic mission and directly support career preparation. But there's only so much schools can do for a high school freshman who reads at a 5th-grade level.

PROGRAM APPROVAL

Several of the recently published studies about career and technical education in New York City highlighted the low percentage of state-approved programs as one of the system's major challenges. The October 2007 report from City Comptroller William C.

Thompson, Jr. found that less than 15 percent of CTE programs in city high schools were state-approved. This is frustrating to both city and state officials, who blame each other for the delay. Gregg Betheil, the city's newly appointed senior executive for CTE, reports that 15 proposals are pending with the State Education Department (SED), on top of 67 that have been approved. Issues holding up final approval include questions around teacher licensing and industry certification.

Many classroom instructors say that the long delays in the approval process have a real impact. Eugene Li, a teacher of computer applications at Lehman High School in the Bronx, believes that the delay in getting the program approved hurts the credibility of CTE with students, parents, and school administrators, depressing enrollment in the programs and making it even more difficult to get needed support. He has waited three years for his school's CTE sequence in entrepreneurship to win

WHAT GOES UP…

In his January 2008 State of the City address, Mayor Bloomberg said of career and technical education, "college might not be for everyone, but education is." Nick LaGuardia agrees, and is happy to tell you about an alternative. "There's another four-year degree," LaGuardia states. "It's called an apprenticeship program."

The longtime director of the vertical transportation vocational education program for the International Brotherhood of Electrical Workers' Local 3, LaGuardia has helped steer hundreds of young New Yorkers into the field of elevator repair. His program includes a four-year apprenticeship that begins after high school completion, for which CTE students can win advanced placement by taking certain course sequences while in school. By almost any standard, it's a fantastic opportunity. There are about 100 openings in elevator repair per year in the five boroughs, which pay a median wage of more than $70,000, according to New York State Department of Labor data.[14]

But LaGuardia's apprenticeship program, from which graduates typically advance to six-figure salaries with excellent benefits and early retirement, nearly had to shut down as a result of decisions made by the city's Department of Education. In August 2002, DOE officials told LaGuardia that the program, located for 15 years at Park West High School on 50th Street between 10th and 11th Avenues, would have to move. The Department was planning to close Park West, a 2,500-student comprehensive high school, and create a number of smaller high schools within the building.

LaGuardia's division and the 40 employers he partnered with had made a substantial investment of money and time into Park West. He estimates that in-kind donations to the program were worth more than a half million dollars over the years. When the department rejected a proposal to remain at the site, the program needed a new home for its classes, which are held in the evenings. But this was easier said than done.

The first site they tried was another CTE school, the High School of Fashion Industries on 24th Street. Given the school's overwhelmingly female student body, and the nearly all-male enrollment of the Vertical Transportation program, this proved not to be a good fit. The next place LaGuardia tried was the O. Henry School on 17th Street. But this too proved a poor match for the program: the school served 6th through 8th graders, and the desks and classrooms were simply too small for participants in their late teens and early 20s.

LaGuardia finally found a solution to his problem in 2006, when he happened to meet Queens Vocational High School principal Denise Vittor at a conference they both attended. As they talked, LaGuardia learned that Queens Voc Tech had an electrical installation program—teaching substantially the same material covered in the first two years of the Vertical Transportation Program—so they had the physical facilities needed for the program. For the school's part, Queens Voc Tech graduates who pass the entrance exam get the equivalent of advanced placement into the Vertical Transportation program. "The kids get credit for the first year of apprenticeship before they even walk through the door," Vittor explains. "They come in as second-year apprentices."

In September 2006, LaGuardia moved the entire program to Queens, and both partners are very pleased with the results–no thanks to the Department of Education. "If I hadn't gone to that event, and Denise hadn't been there, we might never have met up." ❖

state approval. "What seems to be missing from our binder is something called a 'career counselor,'" Li explains. "We have a guidance counselor who counsels on careers, but she doesn't have a specific set of credits that's needed."

While all parties within the education community—the individual schools, the city Department of Education and state administrators—regard program approval as important and assert their interest in better facilitating the process, the quantifiable implications of program approval aren't completely clear. Graduates of state-approved programs receive a technical endorsement on their diplomas, and only state-approved programs can offer industry certification. But the city does not track CTE graduates' post-high school outcomes; accordingly, no data exists to measure whether employers are less inclined to hire graduates of programs that have not been certified.

State Education Department officials maintain that programs which have gone through the process offer a better educational experience, citing the requirements of work-based learning opportunities and nationally recognized industry standards as value-adds that are assured within approved programs but might not be present within non-approved programs. It is unclear, however, if the training accessible to students who are in approved programs helps them advance to positions of greater responsibility—or even whether those who successfully complete approved programs fare better in college than their counterparts who complete programs that have not won approval.

The application for state approval requires a number of specific components, including a technical assessment that is nationally recognized and based on widely accepted industry standards. In some fields—automotive maintenance and information technology, for instance—this presents no obstacle; the industry is replete with certifications that confer universally recognized value. In others, such as technical theater, no such assessment is widely known, and the school must scramble to find one or accept that its program will not be approved. Also required are agreements with post-secondary institutions to recognize the students' accomplishment for college credit. Additionally, the application must be focused enough to be responsive to local workforce needs—programs that fail to address labor market demand will not win approval—but broad enough to serve participating students at a wide range of interest levels, from those who will go right to work in the industry after high school to four-year college students who might not use the skills they've learned in a job for years, if ever. Finally, an external review committee must review the application and sign off. In all, the time between when a school first conceives its program and when SED receives the application can typically take two years.

Once it's received at SED, a subject matter specialist begins to review the application—another step of indeterminate duration. CTE team members within the department maintain that the quality of the application determines how long the application is in their hands, and characterize the back-and-forth between an applying school and the agency as "a give-and-take technical assistance kind of relationship." Even so, some applications received as far back as 2003 are still in progress.

TEACHER RECRUITMENT AND CERTIFICATION

Finding and retaining certified teachers is a challenge for the entire New York City school system, but particularly for CTE programs. The certification process seems almost intentionally designed to frustrate individuals coming from industry who want to stay in their subject fields but give something back by taking a place at the front of a classroom. Compensation is an issue as well. Private sector positions in CTE fields pay more than teachers make, but schools generally cannot offer higher salaries based on outside considerations.

Michael Mulgrew, vice-president for CTE at the United Federation of Teachers (UFT), reports that he has just one available "excess" teacher—someone who can be assigned to a class if the current instructor falls ill, retires, or otherwise is absent over an extended period—for every CTE program in New York City. If any more than one teacher is unavailable for a stretch of time, that class will end. Typically, the UFT has an excess of between five and twelve teachers citywide. "There's just nothing now," he says. Given internal analyses by the Department of Education which found that multiple schools could face short-

ages within the next year, the need is becoming urgent if CTE programs are to be sustained.

Part of the problem is that the State Education Department's teacher certification process can seem more like a parody of Kafka than a well-considered mechanism to put qualified instructors at the front of city classrooms. Lehman High's Eugene Li describes the travails of one colleague trying to get certified as a CTE teacher in a technology sequence. "He took classes like web design and computer graphics, computer animation at school," Li explains. "But at the college he went to, those classes had an "A" in front of them, as if they were art credits. When he sent his transcript to the state, they didn't think his 'art courses' counted toward his technology license. So in order for him to get his New York State license in technology or whatever the area is, he has to take more technology courses. He'd have to take the exact same course, but at a place where it has a 'T,' not an 'A' in front of it." Li adds that when his colleague was in college, those courses weren't offered through the technology department.

Betheil notes that the DOE is "trying to leverage progress…in projecting needs and identifying and attracting teaching talent." He's encouraged by the Board of Regents' expressed willingness to give the issue greater thought. In fact, Merryl Tisch, vice chancellor of the New York State Board of Regents and co-chair of the mayor's new task force on CTE, named teacher certification first when listing the board's concerns about CTE at a January 2008 Regents meeting.

But the problem remains complex, and an answer might not be forthcoming anytime soon. One mechanism the department has used for boosting the supply of CTE teachers is Success Via Apprenticeship (SVA), a paid internship program co-administered by DOE and UFT. Since it began in 1984, SVA has trained about 170 teachers—98 percent of whom are graduates of CTE high schools in the city—into the city school system. Participants in the five-year program spend three years working in the industry for which they hope to teach, followed by two years of instruction to become classroom teachers, and take college courses throughout—all while earning 90 percent of a first-year teacher's salary plus certain benefits, including tuition. DOE is currently reviewing SVA's organizational structure; Betheil characterizes the program as successful but "not inexpensive, and therefore of limited value in the short-term effort to find a scaleable solution."

SUPPORT FROM THE DEPARTMENT OF EDUCATION

Mayor Bloomberg's recent remarks about the positive role of career and technical education, and his promise of greater commitment to vocational education, have created a new sense of optimism among many educators, administrators and advocates within the CTE community. Given the city's long history of undervaluing and underfunding these schools, however, many CTE experts remain skeptical that the recent signs of progress will prove more powerful than the inertia that often strangles education reform efforts.

CTE has its own website, separate and largely unlinked from the overall Department of Education site—a circumstance that one CTE official jokes is "the metaphor for CTE being out in the woods."

CTE barely merited a footnote in the wave of reforms initiated during the first six years of the Bloomberg administration. One sign of this disconnect is that CTE has its own website (www.nyccte.com), separate and largely unlinked from the Department of Education site (http://schools.nyc.gov). At the March 2008 meeting of the CTE Advisory Council, one CTE official quipped, "This has become the metaphor for CTE being out in the woods."

The 2007 decision to cut the department's CTE division from 27 staffers to 10 was seen as another fundamental slight to the system. CTE was placed within the newly created Office of Portfolio Development, creating new—and not always clear—lines of accountability. "The justification is that the Portfolio Office is

supposed to deal with new schools and different options for young people," says Stanley Schair, chairperson of the city's CTE Advisory Council and ex-officio member of the mayor's CTE task force. "But the question is, how is this coordinated? That's why principals are baffled."

Queens Vocational and Technical High Principal Denise Vittor finds that the changes have made an already challenging job even more difficult. "The changes mean we now have to go to four different places for support," she says, citing matters such as accreditation, budget and personnel needs. "Formerly you could go to one superintendent." Vittor notes that at one recent meeting to address her school's needs, the presence of 12 different officials was required. "All those people had to be there or else I'd have gotten nothing. In the old days I would have called one person." The confusion in governance matches that in procurement, as CTE schools in particular are hamstrung by outdated and illogical restrictions on what vendors they can purchase supplies from and how much they can spend with each.

On top of all this, many CTE instructors and administrators say that the city's education officials have long failed to give their schools adequate resources to purchase the basic tools and equipment they need. (See "Procurement Pickle," below)

THE PROCUREMENT PICKLE

Manhattan's Food and Finance High School has a lot going for it: motivated students, a faculty with deep and wide-ranging experience in both education and the culinary arts, and seven "labs"—we'd call them kitchens—in which students can hone their cooking skills to compete in a surprisingly hot job market for chefs and other culinary arts workers. But like every career and technical education high school, Food and Finance has its problems as well. There are low-achieving students, insufficient resources to maintain those seven labs, and an outdated and irrational Department of Education policy that forces educators and administrators at the school to scramble like mad just to make sure students have the tools they need to learn.

In this case, those tools include dairy products, vegetables, and fresh meat. DOE requires that every school spend no more than $250 dollars in purchases from one vendor each month. As a result, says Food and Finance principal Roger Turgeon, "We don't have the ability to purchase what we need without jumping through hoops."

The policy has been in place at least 15 years—during which time its limitations have evolved from frustrating to infuriating. "Years ago you were able to buy a case of butter that would cost $12 to $15 dollars," Turgeon explains. "Now it costs $80." Three cases of butter "finishes" one vendor, but the school has other ongoing needs for cream, cheeses, sour cream and milk—meaning that Food and Finance must contract with multiple vendors of dairy products every month.

Each vendor must be DOE-approved—a process that some simply don't want to bother with. A second aggravation for vendors, Turgeon notes, is that the school's relatively small orders are hardly worth the effort. "A lot of people don't want to waste time delivering $250 worth of items per month when the restaurant down the street orders $1,000 worth of items every week."

Every CTE school faces a variant of this same problem: $250 isn't sufficient to buy a month's worth of lumber at schools where students learn carpentry, for instance. At Ralph McKee High School in Staten Island, Assistant Principal James Barbieri is looking to renovate cosmetology labs and has gone through the bidding the process. "The machines need thousands of dollars worth of repairs," Barbieri explains, "but we bump up against the $250 reimbursement limit. [And] I can't use the vendor down the block if they're not registered."

But Food and Finance teacher Michael Lynch observes that his institution is doubly disadvantaged in this respect. "The department feeds 1,400 schools—700,000 students, every day," Lynch states. "Why can't we work with [the] School Food [Division]?" Lynch points out that allowing Food and Finance to order just $1,000 a month from vendors contracted by DOE's School Food Division would dramatically ease the problem. But while he's been asking the question for years, the department has never directly addressed it. "The only answer I've gotten over the years is that they're two separate entities. They do pay differently, yes. But even though they have two different budgets, different chains of command, why can't we hook up with them?" ❖

THREE SIDES OF CTE

A closer look at three unique CTE high schools shows the full range of obstacles and opportunities that characterize the field

AUTOMOTIVE HIGH SCHOOL

Perhaps no career and technical education high school embodies both the great promise of CTE and the huge barriers in the way of student success than Automotive High School in Greenpoint, which this September will celebrate its 70th anniversary at its current site.

At its best, education at Automotive is literally groundbreaking—as when, two years ago, students designed a working car that runs on cooking oil. Graduates leave Automotive with an industry-recognized certification from the National Automotive Technicians Education Foundation (NATEF), which virtually assures them entry into an industry where starting auto technicians can earn $30,000 a year, and frequently more than double that number within ten years on the job. Yet student achievement—and the prospect of seizing that job market opportunity—is severely constrained by the stunning deficits with which most students arrive: the overwhelming majority of freshmen at Automotive read at or below the fifth-grade level, and come from sufficiently poor families that they qualify for free or reduced-price breakfast and lunch at the school. Also, nearly a quarter of Automotive students have been identified as special needs learners.

Pushing back against those challenges is a staff that includes shop teachers who graduated the school themselves more than 20 years ago, working alongside newly hired academic teachers who hail from the hip and increasingly affluent Williamsburg neighborhood just blocks away. And since 2004, they have reported to a most unlikely champion for CTE reform: Principal Melissa Silberman. A white woman in a school where students are 95 percent male and 98 percent non-white, and who didn't even have a driver's license before she started working at the school in 2002, Silberman's high profile and tireless advocacy for the school has drawn both fervent admiration and deep enmity from teachers, peers and administrators. "Melissa has changed the philosophy and attitude of how we see things," says Juan Castro, an assistant principal at Automotive who himself graduated from the school in 1984.

A sign of that turnaround is Automotive's graduation rate, which neared 60 percent last year after sitting at 39 when Silberman arrived. But the challenge of balancing academic attainment with CTE instruction begins freshman year, when students arrive with the sort of reading deficits noted above. The school is unscreened, which means that admission is based on eighth-grade students' rankings of the high schools they would like to attend—rather than an application process whereby school officials could select the most desirable applicants. Automotive attracts many students who simply have an interest in cars; according to data provided by the Department of Education, more than 800 students ranked the school first or second on their preference list. The school must try to honor and cultivate that interest while offering sufficiently robust academics to ensure that the student is on track to graduate.

"We want students who love CTE," Silberman told the New York State Board of Regents at a January hearing held at Automotive. "But we're forced to do two or three periods [per day] of literacy, numeracy… something's got to give." Automotive had previously cut CTE courses for freshmen in evident recognition of this tension. But Silberman restored it upon taking her position. "If a kid chose this school because he's interested in cars, he should get a chance to see what it's about," she says. Freshmen take a three-section exploratory course sequence that includes business, body, and auto technology, and choose one of the three options as a concentration during sophomore year.

The emphasis on automotive subject matter seems to have a positive impact on students' academ-

ic success. "Very few kids just disappear in their third year if they're doing well in CTE classes," says longtime guidance counselor Paul Heymont. "It's usually those doing badly in academics and marginal in CTE."

A former humanities teacher, Silberman has placed much greater emphasis on academics while maintaining the school's commitment to preparing New York's next generation of automotive technicians. Automotive has developed a schoolwide literacy curriculum that includes double periods for literacy in 9th and 10th grade, and a three-period block of English, history and literacy for juniors. Staff members wrote their own curriculum for literacy, seeking to infuse the material with the car-related content to which students respond. For instance, academic and shop teachers have team-taught the materials, including projects in which students make PowerPoint presentations about what cars they would choose for a cross-country road trip and classroom lessons based on reading repair manuals to explain to customers what might be wrong with their cars. "If we couldn't make them readers," Silberman says, "we couldn't make them technicians."

Silberman points to both rising test scores, including English Regents grades well above the city average, and a change in culture around reading at the school as indicators of progress. Despite their best efforts, however, the Department of Education gave Automotive a failing grade last year—an assessment with which staff at the school take strong issue. The department is now in the process of revising its grading system, incorporating changes that high-level officials maintain will better capture the added value CTE schools provide.

But while academic gains have been slow, few, if any, CTE schools in the city can boast industry partnerships as robust and helpful as those that Automotive has cultivated. Visitors to the school are greeted just inside the main entrance by a mounted Toyota Previa engine, signifying a strong collaboration with the auto giant. Automotive students have gotten summer internships at Toyota dealerships across the city, serving as ambassadors for the school. "Some [students] will run into a dealership owner who just becomes taken with the school, and it snowballs," says Castro. "A district sales manager, a regional sales manager with the company will get involved."

Like Toyota, Mercedes-Benz supports a lab in the school, described by Automotive teacher Thomas Cassino as "a marriage between innovation, education and evolution." In late 2004, when the company came to Automotive to announce the partnership, Mercedes-Benz officials cited the nationwide shortage of approximately 100,000 automotive technicians and the increasing importance of technology mastery for new entrants into the field. The school also has partnerships with the Greater New York Automobile Dealers Association, Daimler-Chrysler and Hunter Wheel Alignment.

Cassino is also the coordinator for Automotive Youth Educational Systems, which helps facilitate internships for dozens of Automotive students every year. He visits area dealerships to inquire whether they are interested in taking on juniors or seniors from the school to shadow technicians at the dealership, at no initial expense to the business—the school pays for up to 7.5 hours per week from a funding source through the federal Vocational and Technical Education Act. Typically, Cassino says, the student soon starts making a measurable contribution to the dealership. "They're an extra set of hands, an extra set of eyes. They make money for the dealer and get an idea of what the operation is about." One Automotive graduate from the class of 2007, Curtis Giscombe, started at a local BMW dealer through this program and continued over the summer. After a few months, he had his own repair bay and is now going to college at SUNY-Morrisville for a two-year degree with financial support from the dealer—where he returns to work over college vacations.

Even as Automotive faces ongoing challenges as an institution, students who take advantage of what the school has to offer find themselves well positioned

Few, if any, CTE schools in the city can match Automotive's impressive array of corporate partnerships with industry leaders, including Toyota, Mercedes-Benz, and Daimler-Chrysler.

for success. Of 72 graduates in 2007, school personnel report that 90 percent were offered admission to two- or four-year colleges, though some likely chose to postpone school for employment. Even those who don't proceed straight to college find themselves with options as well. "Since we're industry-certified nationally, our students are stamped ready to go right to work," Silberman explains. "We haven't had a kid come back to us and say, 'we're unemployed.' It's more like 'I want to keep going to college but the money I'm being offered to work really is a lot,' which isn't a bad problem to have. Most of those who go right to work at a dealership then go back for an associate's degree."

GEORGE WESTINGHOUSE CAREER AND TECHNICAL EDUCATION HIGH SCHOOL

In the 75-year history of George Westinghouse High School, few periods were darker than the late 1990s. Almost a third of the kids weren't coming to class. Less than half were graduating. Academics were predictably sub-par, overcrowding and discipline were serious problems, and vocational instruction—the school's *raison d'etre*—was severely hampered by inadequate industry connections and outdated equipment.

Ten years later, the school is on a much different trajectory. Attendance and graduation rates have surpassed citywide averages, an impressive array of corporate partners support the school with curriculum and equipment support, and administrators and students alike praise a much-improved learning environment that supports both classroom excellence and workplace readiness.

"What I liked best about the school is the staff," says Joe Antoine, a 2007 Westinghouse graduate now studying electrical engineering at Trinity College in Connecticut. "They really care." Antoine cites the small-school feel of Westinghouse as a reason he chose to attend college at Trinity. In both places, he says, "You can be a big fish in a small pond."

Most observers and staff give primary credit for the turnaround at Westinghouse to John Widlund, the school's principal since 2003. Previously a teacher at Ralph McKee High School, another CTE school, and a teacher and assistant principal at Westinghouse through the rough years, Widlund is modest about his own role in the school's revival. "It's a gem of a school that had already gone through redesign," Widlund says. "The staff was accustomed to change." As a former CTE classroom teacher himself, he adds, he might have had some credibility that someone from a strictly academic background would have lacked. "The shop teachers welcomed me," says Widlund. "They felt validated in terms of what they offered."

Whatever the reason, the results are unambiguous. In 2003, attendance at Westinghouse was 75 percent and the school's graduation rate, as measured by the New York State Education Department, was 43 percent. Four years later, attendance was at 84 percent and graduation had risen to 65 percent. And while the number of students qualifying for Regents diplomas remains relatively low—ranging from 18 percent in Chemistry to 41 percent in U.S. History for the 2005-2006 school year—academic improvement has been dramatic nonetheless. In June 2003, Westinghouse scored a collective 87 (out of 200) on the federal No Child Left Behind math exam, but by 2007 the tally was close to 150.

One contributing factor, according to Widlund, was a grant from the Bill and Melinda Gates Foundation that allowed Westinghouse to work with the Talent Development High Schools program at Johns Hopkins University in Baltimore. The program works with "large high schools facing serious problems" across the country to change the climate and improve curricula and instructional approaches, and provides additional technical assistance.

The Hopkins group helped reorganize Westinghouse into three "small learning communities," one of which is the Ninth Grade Success Academy. The Academy exposes freshmen to the various CTE track offerings at the high school, particularly the five technology sequences: A+ Computer Repair, Electrical Technology, Oracle Internet Academy, Cisco Networking Academy and Multimedia Internet Technology. Other CTE programs include a state-approved Vision Technology sequence; pre-engineering through Project Lead the Way, a national organization that promotes career exploration and development in the engineering field; and the highly praised Virtual Enterprise program, an educational experience in which students, advised by industry executives and supervised by teachers, simulate every facet of working within a for-profit business.

School officials believe that "putting CTE at the center of the day" is the key to closing the signifi-

cant educational attainment deficits with which new Westinghouse students often arrive. According to city statistics, only 16 percent of the 2005-2006 entering class (the most recent for which data are available) tested at the standard level for English language arts; in mathematics, the rate was 26 percent. By contrast, averages at high schools citywide are 33 and 41 percent respectively. Widlund reports that credit accumulation amongst 9th graders has spiked since the launch of the Success Academy.

Westinghouse is also bolstered by strong industry partnerships—a must for any successful CTE school. An Optical Technical Advisory Committee, the only one in the five boroughs, meets regularly to guide the school's highly regarded Vision Tech program. Oracle and Cisco both have partnered with Westinghouse to offer their customized curricula in the school. And banking giant HSBC "adopted" the school earlier this decade, bringing in hundreds of Westinghouse students to their Brooklyn and Manhattan headquarters to offer "business etiquette" on everything from demeanor at business meals to how to make conversation with new contacts. "We teach them life skills and get them ready to come into the workforce," explains HSBC Vice President Glenore Anderson, who chairs HSBC's Westinghouse advisory committee.

But HSBC's involvement with Westinghouse doesn't end with interview tips and advice on good manners. The company provided internships to 19 Westinghouse students last summer, employing them as tellers in their Brooklyn branches for a two-month period. Two of the students, now seniors, have continued to work part-time for HSBC through the school year, and students who graduate and go on to college are encouraged to return for summer jobs. "They know the experience and want to come back," says Anderson. Westinghouse interns at HSBC must meet certain criteria, including participation in the Virtual Enterprise program and the iMentor program, in which HSBC employees offer academic and life skills assistance to students in person, by phone and over the Internet throughout the school year. The bank has even built relationships with Westinghouse parents, offering programs like a First-Time Homebuyers' Club and assistance with tax preparation.

These days, the pride of George Westinghouse is its championship robotics team, the G-House Pirates. In 2007, the team won a citywide robotics competition, finished second in the regional competition and traveled to Atlanta in a bid for the national title. Earlier this year, the team was profiled in *Popular Mechanics*.

The experience is both rewarding and invaluable for team members, who not only develop impressive skills in building robots—the project for this year's competition is to construct a robot that can navigate around a track and move metal balls under or over a bridge—but discover other skills such as collaborating and fundraising. One participant sold $4,000 worth of candy last year to help fund the team's trip to Atlanta.[15] Other students have built and maintained the team's impressive website (http://gwestrobotics.com). A second, all-girls team, the Lady Pirates, now operates as well and is also competing this year; its robot features claws spray-painted hot pink and yellow.

FOOD AND FINANCE HIGH SCHOOL

If Automotive and George Westinghouse, with their seventy-plus year histories, sit at one end of the CTE spectrum, Manhattan's Food and Finance High School sits at the other. One of six small schools located in the former Park West High School on 50th Street, Food and Finance is preparing to graduate its first class this spring. With a total enrollment under 400 students and a staff with many veteran culinary arts professionals and educators, the school can fairly claim to offer the best of both worlds in the era of school reforms enacted by Mayor Bloomberg and Chancellor Klein: small size and vocational rigor and relevance.

Park West, a 2,500-student comprehensive high school, had included 18 commercial kitchens and bake shops, according to teacher Michael Lynch. The culinary program, serving about 500 students, was the largest in the school. But in the late 1990s, city and school officials began moving to close the school down.

Food and Finance Principal Roger Turgeon, a former chef, college instructor and assistant principal at Park West, saw the trend toward small school creation early in this decade and decided to make his case with a proposal for a new career and technical school focusing on culinary arts careers. "None of us had done anything like that before," Turgeon recalls, "but it was a good time to do it at the start of all the new school development." Working with academics, career consultants and a strong nonprofit partner, Community Food Resource Center (now called FoodChange), they

saw their plan accepted and the school opened its doors in 2004.

Thus far, nobody is arguing with the results. Food and Finance boasts an average attendance rate above 90 percent, and Turgeon predicts a similar percentage of the school's seniors will graduate in June. In early February, school staff met with senior class members to discuss their post-graduate plans and Turgeon says that roughly a third are planning to go into culinary arts instruction at college, a few are going straight to work and most are going into standard college programs. Students whose plans include post-secondary study can draw upon the relationship Food and Finance has built with ProStart, an initiative of the National Restaurant Association Educational Foundation that has articulation agreements with more than 30 college across the country, including the Culinary Institute of America based in Hyde Park, New York, and nationally recognized culinary arts standouts like Johnson & Wales in Rhode Island. The program also offers a certificate of achievement that all Food and Finance students are encouraged to earn.

The school has cultivated a strong partnership with the Cornell University Cooperative Extension, which is providing program and development assistance. Perhaps the most exciting manifestation of the partnership is a hydroponics and aquaponics laboratory where students are growing mercury-free fish and fresh vegetables to be sold at the school's store, and learning skills to be displayed in farmers' market demonstrations. At the curriculum level, Cornell is working with Food and Finance to develop new tools for teaching math and science within the CTE context—complementing work already going on in the school's English department, where texts include the recent non-fiction best-seller *Fast Food Nation* among many industry-related materials.

Though Food and Finance graduates will enter a favorable culinary arts job market with the credentials and connections to find employment, the focus remains on college. "I tell the kids, 'you're going to have to go to school,'" says Turgeon. "Will you be able to go out into industry when you graduate? Absolutely, I guarantee it. But you're going to be more employable with college."

As is the case at virtually every CTE school, the condition of "labs"—in this case, kitchens—is a major concern at Food and Finance. The school includes seven of the 18 kitchens Park West once boasted, and maintenance in many of them has been a problem since long before Park West shut its doors. "When an oven broke down in one of our shops," Turgeon recalls, "they'd get the part from another oven in another shop to fix it. This went on for years. We can't do that anymore—we've got to get things replaced."

Unfortunately, this is easier said than done. "About 12 years ago I wrote a $25,000 grant [proposal] to upgrade a kitchen at Park West," Lynch says. "I had to do everything from planning the renovation, getting all the specs on the equipment needed, getting the three bids, having everything installed." To this day, the Department of Education has not provided the technical assistance—or the resources—that Food and Finance requires to keep its facilities state-of-the art. "The plan should initially come from on-site school personnel," Lynch adds, "but the DOE has to provide the specialists, the professionals to advise us and help us get what is needed in order to accomplish that plan."

Despite its success, the school also struggles with another systemic problem common across CTE high schools: admissions. The school is unscreened, meaning that admission for each class of 120 starts with eighth grade students' rankings of the high schools they would like to attend, and then is put in the hands of Department of Education staff members. Reading levels are typically low—of the 2005-2006 entering class, the percent meeting "standard" in English language arts testing was just 23.7 percent, nearly ten points below the citywide average—but school officials feel they can address that if students have sufficient enthusiasm for the material.

"The biggest challenge is interest," says Turgeon. For last year's entering class, he reports, "More than 560 [incoming freshmen] picked us number one on their list of 12 schools. Another 382 picked us number two." Despite this high level of interest, though, the freshman class includes students who ranked Food and Finance well toward the bottom of their lists, and the principal admits that many of these students have no interest in cooking. "If you're only going to give us 120 kids and 560 picked us number one, give me the students who picked us one and two. I get calls from parents every September who say, 'my child wants to be a chef; why didn't he get into your school?' I have no control over that."

CTE ELSEWHERE

Through innovation and investment, Maryland and California have taken places at the head of the class

AS NEW YORK CITY BELATEDLY SEEKS TO REMAKE career and technical education for the 21st century, policymakers can look to colleagues near and far that have recognized the promise of CTE to improve both education and workforce outcomes and have greatly expanded commitments to career-oriented high school education. In Maryland, high-level educators and the business community have come together to create a CTE system that emphasizes academic rigor and labor market priorities. And in California, Governor Arnold Schwarzenegger—often cited as Mayor Bloomberg's post-partisan twin (Danny DeVito presumably would play Bloomberg)—has emerged as CTE's highest-profile champion nationwide, backed by a strong coalition of private-sector voices with a focused advocacy agenda.

MARYLAND

Perhaps the surest indicator of Maryland's tremendous progress in boosting the rigor of CTE programming is that in 1993, as the state was just beginning its reforms, only 14 percent of Maryland students completing CTE sequences met standards for admission to the University of Maryland. By 2006 the number had risen to 51 percent.[16]

Known locally as Career and Technology Education, CTE's re-emergence in Maryland began in 1989, when the state's Commission on Vocational Technical Education issued a report calling for a new model that would prepare high school students in the state for both employment and post-secondary education, incorporating sequential programs of topical study informed by industry standards. During the 1990s, the State Board of Education incorporated state-approved CTE programs as an elective path to high school graduation, and embraced the commission's earlier recommendation by writing into its strategic plan that every student must graduate high school prepared for both college and careers. CTE enrollment in Maryland high schools rose through that decade and into this one, and by 2004 more than half the state's high school students took CTE courses.

Maryland Assistant State Superintendent Katharine Oliver is unambiguous about the ongoing academic mission of her state's CTE programs. "We expect every CTE student to be college-ready," she told CUF in an interview last year. Additionally, the Maryland School Performance Report indicated that students in selected CTE sequences, such as Health and Biosciences and Arts, Media and Communication, were more likely than their strictly academic peers to take the most rigorous courses.[17]

But strong support from the state's education community is only half the story. "The Governor's Workforce Investment Board has been very supportive," Oliver notes. "They have very much embraced, improved and promoted program offerings in the state." She cites aerospace and tourism as two particular areas in which the board has made a contribution. More broadly, Maryland's business community has loudly and consistently supported expansion and improvement of CTE offerings. The state's Business Roundtable for Education identified high school-level CTE as its top workforce policy issue early in the decade, and hundreds of businesses in the state partnered with Oliver's CTE division within the state education department to create a Career Cluster Framework organized into ten economic sectors: Arts, Media and Communication; Business, Management and Finance; Consumer Service, Hospitality and Tourism; Construction and Development; Environmental, Agriculture and Natural Resources; Health and Biosciences; Human Resource Services; Information Technology; Manufacturing, Engineering, and Technology; and Transportation Technologies. "We're bringing in a whole new world of CTE while maintaining old programs," Oliver says.

CALIFORNIA

It's likely that Arnold Schwarzenegger will always be better known as "The Terminator" than an educator, but his ardent support for career and technical education has provided a huge boost to reformers' efforts in the Golden State. The actor-turned-governor credits the vocational instruction he received growing up in Austria as key to his great success in life, and has called for California to invest more in career-oriented education. Last year, at the governor's urging, California's legislature added an additional $52 million to support CTE programs in the 2007-2008 school year.

Education advocates are thrilled to have a high-profile champion like Schwarzenegger, pointing out that a superstar can do as much to dispel the lingering stigma of "voc ed" as any number of academic backers or even conventional politicians. "Governor Schwarzenegger brought it to the bully pulpit," says Jason Kiker, an education research analyst with the Association for Career and Technical Education. "He explained he was a CTE student in Austria, and how courses helped him do what he did in his life. Right now there are a lot of people who still see CTE as the place where non-college-bound students go. The attention of someone like Schwarzenegger forces those people to update that perception somewhat."

Governor Schwarzenegger convened a CTE conference in March 2007, where he spoke in language that Mayor Bloomberg would echo in his January 2008 State of the City address: "A four-year college education is not the only pathway to success." But he also sounded a note the mayor has not yet hit: "By expanding career tech education, we are giving them options to succeed in good paying jobs in cutting edge industries after graduation."

One possible reason for this is the presence of GetREAL (Relevance in Education and Learning), a coalition of business and labor organizations, advocates, and educators who seek greater emphasis on and support for CTE in California's K-12 schools. GetREAL argues that a "twenty year period of changing… priorities, various reform movements and cultural pressures" has left California's CTE system in "a steep and steady decline." In response, the group calls for California to require that all K-12 students take CTE coursework, to implement CTE in-school accountability measures and to align K-12 standards "with the skill and education needs of available careers in the actual economy."[18]

GetREAL's push on CTE is explicitly tied to California's medium- to long-term labor market needs, a focus that concerns some observers. "High schools need to focus on academic skills, and the purpose of the workplace applications is to reinforce and then extend academics," says Stanley Rabinowitz, program director for assessment and standards development services at WestEd, a California-based nonprofit research, development and service organization. Rabinowitz fears that overemphasis on workplace outcomes might compromise the core educational mission of high schools. "Just focusing on what the workplace asks for is too short-sighted, because that's going to change."

SOURCES AND RESOURCES

"Career and Technical Education in New York State, Final Evaluation Report 2005-06," MAGI Educational Services. http://www.emsc.nysed.gov/cte/docs/FinalMAGIreport.pdf

"The Future is Now," Office of the New York City Comptroller, October 2007. http://www.comptroller.nyc.gov/press/pdfs/CTE-report%2010-22-07.pdf

Kenneth Gray, "Is High School Career and Technical Education Obsolete?" October 2004. http://www.pdkintl.org/kappan/k_v86/k0410gra.htm

Association for Career and Technical Education: http://www.acteonline.org/index.cfm. See particularly "CTE's Role in Dropout Prevention and Recovery," at http://www.acteonline.org/resource_center/upload/Dropouts.pdf

American Youth Policy Forum, Career and Technical Education website: http://www.aypf.org/programs/preparation/technicaled.htm

"Help Wanted: Department of Education Misses Opportunities To Connect Students With Health Care Careers," Public Advocate for the City of New York, November 2006. http://pubadvocate.nyc.gov/policy/documents/CTEandHealthCareReportNovember2006.pdf

"Blue School, Pink School: Gender Imbalance in New York City CTE High Schools," Public Advocate for the City of New York, January 2008. http://pubadvocate.nyc.gov/policy/documents/CTEgirlsreport.pdf

RECOMMENDATIONS

The task force on career and technical education that was recently created by Mayor Bloomberg gives New York City the perfect opportunity to make long-overdue improvements to CTE programs. Chaired by former Mayor David Dinkins and including many of the city's most respected public and private sector leaders, this group should have sufficient credibility to call for the changes needed—most prominently, greater respect and more resources—and to make the case that CTE can play a far bigger and more constructive role in New York's educational agenda and workforce development strategy than has been the case to date.

As this report has described, career and technical education already prepares young New Yorkers for careers in areas of certain demand and possible shortage within the city economy, from health care to information technology. The challenges going forward are to further refine the educational model to realize even greater gains in the classroom and to create stronger connections to employers and a larger pipeline to the labor market. As the task force continues its deliberations and prepares recommendations for Mayor Bloomberg and other city leaders, we urge them to support the following actions:

Embrace career and technical education as a fully equal path for city high school students. The first and most fundamental step New York City can take to support CTE requires no new personnel, procedures or equipment, and will not cost a penny. Yet after more than a year of research into this area of education policy, we believe it will be the most difficult and challenging action of all. Simply put, New York must systematically and wholeheartedly embrace the notion that there are many paths students can take to success in their lives after high school—not all of which lead directly to the ivy-lined college campuses most education reformers remember with such fondness, and some of which never do. Students who pursue career and technical education in high school, and make an informed choice to avail themselves of work opportunities related to what they have learned after graduating, should enjoy the full support of peers, teachers and every aspect of the system. To be sure, education is the first and foremost mission of our city's high schools, and college should remain the primary goal for all students who aspire to it and are prepared to succeed there. But for those who are unsure of their future life goals, career preparation is an admirable and wholly legitimate direction that will better suit some students than going on to college as a default path, struggling once there, and leaving without attaining a degree or enjoying success—but, all too often, with burdensome financial debts.

Fund CTE programs at the level of financial support needed for excellence. CTE programs require equipment and supplies well beyond the traditional textbooks and materials of the academic classroom (though these are needed as well). Schools focused on teaching automotive or aviation maintenance, graphic design, information technology and other CTE programs often have unique equipment needs that are both more expensive and time sensitive—because of the faster pace of change within industry—than is traditionally the case for academics. But school officials have rarely provided the money to make sure that these needs are met, or that programs in culinary arts, cosmetology or construction have the necessary supplies of ingredients, shampoo or lumber to keep classes running without interruption.

Provide stronger institutional support for CTE programs. The onus here is on the business community as well as the school system. Research has shown that the more CTE programs engage with the field for which they offer training—from site visits and guest speakers to full-fledged industry partnerships and mandatory internships—the more effective those programs are. From a business perspective, it's also true that the higher the level of industry engagement with programs, the greater relevance CTE will have to employers' workforce needs. To furnish the needed level of support, the city likely will need to reverse the drastic staff cuts to the CTE team within the Department of Education, made in 2007.

Expedite the program approval and teacher certification processes. The city should work with State Education Department staff to speed up the often interminable cycle of needs, responses, and negotiations. The program approval process certainly seems to hold value for schools that pursue it—but it's simply not acceptable for applications to languish in review for years at a time, as is often the case. A related step would be to find ways to increase the CTE teacher workforce, whether through expanding the Success Via Apprenticeship program, easing some of the more arbitrary state-level requirements for teacher certification, or stepping up recruitment efforts.

Take steps to facilitate integrated curricula and team-teaching. As detailed in this report, the academic deficits of CTE students represent perhaps the largest classroom challenge for these programs. The Math-in-CTE experiment and anecdotal data from city schools suggest that CTE students with such deficits can quickly make up that ground and more effectively learn both concepts and applications when materials are taught

in context, but even the most committed CTE schools have struggled to operationalize these ideas. Whether it's helping these schools learn best practices through a mechanism of the Department of Education such as a new Learning Support Organization, or partnering with the United Federation of Teachers to ease staff concerns about issues that come up with team-teaching, stakeholders within the system can take action to ease this process.

Honor students' preferences in the high school admissions process. Given that CTE students often do bring academic deficits to the high school classroom, their enthusiasm should get top consideration. If Food and Finance High School has more than 500 rising freshmen who ranked the school first on their preferences, and another 500 who ranked it second, for a class of 140, there is no reason that any student not very enthused about the school's course of study should enter ninth grade there. As a related point, middle-school guidance counselors should be fully informed that CTE is a valid and honored choice for eighth graders—and might be specifically well suited for students in groups that bear statistically higher risk of dropping out before completing high school.

Track the post-high school outcomes, for both work and education, of CTE students. While there is strong anecdotal evidence that this form of educational programming has lasting positive effects on participating students' post-secondary careers—in terms of employment, earning power, and educational attainment—New York's educators and policymakers have not yet begun to quantify those effects. City Hall generally values what it measures—and this administration in particular has made data collection and analysis a watchword of reform. Analyzing how CTE study impacts students' later endeavors is a key, indeed indispensable, action in gauging its value.

Reach beyond the educational sphere to find allies and supporters. Finally, the onus is not on education officials alone. As CTE has such great potential to serve the job needs of city employers and build pipelines of skilled workers into sectoral labor markets, the workforce community should fully embrace this system as a partner. That means permanent liaisons to CTE amongst local chambers of commerce and industry associations, representation on the city Workforce Investment Board and Youth Council, and two-way linkages between schools and workplaces across the five boroughs.

ENDNOTES

1. New York State Board of Regents, "Status Report on Regents Policy on Career and Technical Education," October 18, 2007.
2. New York City Independent Budget Office, "Are City Vocational High Schools Being Left Behind?" August 2007. http://www.ibo.nyc.ny.us/iboreports/CTE.pdf
3. "N.Y. Schools Chief Aims to Revive a 'Failing' System," Michael Dobbs, *Washington Post*, May 10, 2005.
4. New York City Independent Budget Office.
5. Lenore Skenazy, "In Robot Battle, Students Are Engineered To Win," *New York Sun*, March 19, 2007. http://www.nysun.com/article/50699?page_no=1
6. New York City Independent Budget Office.
7. Ibid.
8. John Bridgeland, John DiIulio Jr. and Karen Burke Morison, "The Silent Epidemic: Perspectives of High School Dropouts." Bill & Melinda Gates Foundation, March 2006, p. 3.
9. All attendance figures are through February 29, 2008.
10. David Jason Fischer, "Chance of a Lifetime," Center for an Urban Future, May 2006. http://www.nycfuture.org/images_pdfs/pdfs/Chance_Of_A_Lifetime.pdf
11. Harry J. Holzer and Robert I. Lerman, "America's Forgotten Middle-Skill Jobs," November 2007, p. 3. http://www.skills2compete.org/atf/cf/%7B8E9806BF-4669-4217-AF74-26F62108EA68%7D/ForgottenJobsReport%20Final.pdf
12. Ibid, p. 21
13. National Research Center for Career and Technical Education, University of Minnesota, "Building Academic Skills in Context: Testing the Value of Enhanced Math Learning in CTE," July 2006. http://www.nccte.org/publications/infosynthesis/r&dreport/MathLearningFinalStudy.pdf
14. Occupational Employment Statistics Survey, http://www.labor.state.ny.us/workforceindustrydata/apps.asp?reg=nyc&app=descriptor. Accessed March 3, 2008.
15. Jennifer Bogo, "Students Dig in to FIRST Robotics Race With Next-Gen Builds, *Popular Mechanics*, March 5, 2008. http://www.popularmechanics. com/science/robotics/4253200.html
16. National Governors Association Issue Brief, "Retooling Career Technical Education," June 11, 2007.
17. Katharine Oliver, "Reform in Maryland: Achievement Matters Most," in "Remaking Career and Technical Education for the 21st Century: What Role for High School Programs?" Richard Kazis, Jobs for the Future and the Aspen Institute, April 2005, p. 38. http://www.aspeninstitute.org/atf/cf/%7BDEB6F227-659B-4EC8-8F84-8DF23CA704F5%7D/ed_kazis-RemakingCTE.pdf
18. Get R.E.A.L., "Aligning California's Public Education System with the 21st Century Economy," March 6, 2007.

City Futures, Inc.
120 Wall Street, Floor 20 New York, NY 10005

Center *for an* Urban Future

This report and all other publications issued by the Center for an Urban Future can be viewed at www.nycfuture.org. Please subscribe to our monthly e-mail bulletin by contacting us at cuf@nycfuture.org or (212) 479-3341.

Non-Profit
U.S. Postage
PAID
New York, NY
PERMIT #3372