



Double the Numbers: A Jobs for the Future Initiative

Remaking Career and Technical Education for the 21st Century: *What Role for High School Programs?*

by Richard Kazis

With commentary by Gene Bottoms, Betsy Brand, Katherine L. Hughes, Elliott A. Medrich, Katharine M. Oliver, Governor Mark Warner, and Ross Wiener

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About Double the Numbers

Remaking Career and Technical Education for the 21st Century is one of a series of *Double the Numbers* publications from Jobs for the Future. *Double the Numbers*, a JFF initiative, is designed to deepen support for state and federal policies that can dramatically increase the number of low-income young people who enter and complete postsecondary education. The initiative identifies, assesses, and promotes new and promising approaches to increasing efficiencies and reducing inequities in secondary and postsecondary education attainment. *Double the Numbers* publications address controversial policy debates around improving high school completion and the transitions to and success in postsecondary degree or credentialing programs. They propose creative ways to break through existing barriers to improved educational and economic outcomes, particularly for students from groups traditionally underrepresented in higher education. *Double the Numbers* is supported by the Bill & Melinda Gates Foundation and the Ford Foundation.



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What Role for High School Programs?

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Remaking Career and Technical Education for the 21st Century:

What Role for High School Programs?

Preface: High School Career and Technical Education at the Crossroads

High schools have become a central focus of education reform. President Bush has announced a high schools initiative. The nation's governors and business leaders held a summit in February 2005 on high school improvement and what it will take. Bill Gates kicked off the summit with a withering critique of the contemporary high school experience.

In this context, career and technical education has emerged from the shadows to which it is often relegated. The President asked in his 2006 budget that federal support for career and technical education be eliminated and rolled into the high school initiative. Others, including Congress, have argued that a more explicit commitment to improving secondary career and technical education is needed if the goal of a quality high school experience for all students is to be achieved, particularly since one in four high school students is enrolled in a career and technical school or program. It is increasingly apparent that states and localities can no longer treat career education as a thing apart.

The Aspen Education and Society Program recognized this in designing its summer 2004 workshop on high school reform. Aspen planners asked Jobs for the Future's Richard Kazis to prepare a background paper on what has been learned in recent years about student outcomes associated with career-focused education and the implications of this research for policy and practice. That research summary is the starting point for this volume.

After the Aspen workshop, JFF and Aspen decided to take the discussion of career education a step further. We engaged some of the most sage and experienced observers of high school education in general, and career and technical education in particular, to provide their advice for career and technical education in the 21st century. In short but provocative essays, these authors ask: What should high school technical education look like in a knowledge-based economy? What will it take to get there? And how can states and the federal government drive necessary changes?

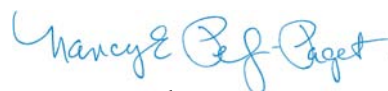
The consensus among the contributors is that high school career and technical education has reached a critical juncture. As one contributor puts it: high school career and technical education has reached a “change or die” moment when it must confront its capability and commitment to upgrade both academic rigor and technical relevance.

To be a high quality option for preparing young people for 21st century careers, high school technical education must make better links to academic instructors within high schools, to postsecondary institutions that offer valued degrees and credentials, and to employers and the labor market that are demanding more, and more complex, skills. There are signs of progress among individual schools and in some states. It is clear, though, that staying the course is not acceptable. Major changes are needed in learning expectations, curriculum and instruction, and external partnerships. Among the contributors to this volume, there is both optimism about the possibility of significant upgrading and concern that needed changes simply won't come fast enough.

Jobs for the Future and the Aspen Education and Society Program are committed to increasing the level of public dialogue on the future of high school career and technical education—and how it fits into broader debates over high school improvement. We hope this volume and the voices showcased here can advance this agenda and accelerate action locally, in states, and at the national level. The success of high school reform across the country depends in no small part upon how the quality challenges facing career and technical education are addressed.



Marlene Seltzer
President and CEO
Jobs for the Future



Nancy Pelz-Paget
Director
Aspen Institute Education
and Society Program

Remaking Career and Technical Education for the 21st Century:

What Role for High School Programs?

Executive Summary

As part of the broader policy debate on how to reform K-12 education, particularly high schools, basic questions about career and technical education are on the table. Does secondary career and technical education have a place in American education? If so, how big a role should it play in educating American adolescents? For which students should CTE be designed? With what educational and economic goals? And under what terms should CTE be supported and modernized?

These questions are critical to state, federal, and local strategies to raise the achievement levels of high school students and reduce the “leaks in the pipeline” into and through postsecondary education and careers. There is no way to significantly improve high school outcomes without tackling the quality of secondary career and technical education. CTE is too important a segment of the high school enterprise, and its traditional role as a track or the “non-college bound” means that a large proportion of the students who need the most support to achieve at high levels are enrolled in CTE programs or schools.

Remaking Career and Technical Education for the 21st Century begins with a summary of what we know—and don’t know—about the value of high school career-focused education, which includes career and technical education as traditionally conceived and also more recent innovations, including school-to-work, work-based learning, career academies, High Schools That Work, and other models of schools, programs, and instructional practices that put careers and occupation-oriented knowledge at the center of school life.

A few broad conclusions emerge from this review of research on career-focused secondary programs and schools:

- The career and technical education enterprise, while shrinking, remains a significant component of the U.S. high school experience.
- CTE appears to help less-motivated and more at-risk students stay in high school and graduate, yet graduation from a CTE

program does not necessarily mean that a student is academically prepared for college-level work or for today’s workplace.

- The overall rigor of vocational education at the high school level has improved noticeably; however, there is a long way to go and many obstacles to overcome to sufficiently improve the academic experience for most CTE students.
- Employers would prefer to hire students with college credentials over those with only a high school diploma—and students with a postsecondary credential are more likely to secure a well-paying job than those without one. At the same time, for those who do not continue to college, jobs found with the help of career-focused programs in high school have a significant short-to mid-run labor market payoff, particularly for low-income students and those who are the most at-risk.

Progress has been made in the past decade toward the spread of more modern and rigorous CTE programs. In states that have aggressively pursued CTE reform, obsolete programs are being replaced with forward-looking ones, enrollments are up, and test scores and completion rates are beginning to climb. Yet, as the research clearly indicates, the overall record of CTE, small career-themed schools, work experience, and work-based learning in high school has been disappointing.

Moreover, existing studies shed little light on whether recent progress can be sustained, broadened, and accelerated so that CTE is a viable, high-quality pathway to 21st century college and career success for an ever-growing number of students. And research alone cannot answer the difficult policy question: Do investments in CTE programs, which typically have a higher per pupil cost compared to traditional high school curricula, add enough value to justify them over other investments that might raise high school standards and performance?

Seven short essays that follow this research review look forward to where CTE will go rather than back to what past research has found. The authors address the challenges and possibilities for

secondary school CTE in today's knowledge economy, charting a course for a reformed and vital secondary CTE sector. In the process, they highlight concrete examples of how states and schools can change for the better and how states and the federal government can drive improvement in CTE programming. They also identify practical challenges facing CTE programs trying to ratchet up quality, in the areas of curriculum, scheduling, the integration of technical and academic studies, the upgrading of technical teachers' skills, and more.

There is a consistent message in these essays: CTE at the high school level must either change or die. Change may mean shrinkage in absolute size. It will certainly mean shifts in the kind and range of programs offered students and in the expectations placed on students, faculty, and administrators. The future may be different in urban and suburban regions, where the economic bases and the educational resources available for CTE improvement can be quite different. The future is also likely to vary with the differential ability of state and regional CTE systems to meet rising expectations for quality and performance.

Taken together, the authors outline a reform agenda for CTE consistent with that of high school reform nationally: rigor, rele-

vance, and relationships—with academic rigor as the primary goal and accountability, choices, and teacher quality as key levers for improvement. By and large, the authors believe that CTE will either take its place as a high-quality high school pathway or cede its role in the American high school experience—that policymakers and practitioners will make the transition to a more academically rigorous and labor market-sensitive secondary career and technical education, or they will continue to shift resources into other high school programs and curricula.

That said, the ways—and the extent—to which work, career exploration, internships and service learning, technical preparation, and occupational themes will be incorporated into high school educational programs are far from set. Further research on the impacts of these approaches will have some influence on their evolution. However, as in the past decade, the greatest influence will come from the politics of education reform in states and nationally, as well as the kinds of pressure and support that stakeholders for CTE and other reform movements bring to bear on public opinion and on the educational establishment. This volume is written as a contribution to this increasingly important debate.

Remaking Career and Technical Education for the 21st Century:

What Role for High School Programs?

Introduction

By *Richard Kazis, Jobs for the Future*

There is no way to significantly improve high school outcomes in this country without tackling secondary career and technical education.

The future of career and technical education at the high school level is being debated seriously across the country, in communities and at the state and federal levels. This debate has been building for at least a decade. In many ways, the school-to-work movement of the 1980s and 1990s was an earlier iteration, with proponents of a revitalized career and technical education system and of work-based learning in high school taking the offensive. The terrain has shifted dramatically as No Child Left Behind and standards-driven reform have raised academic achievement to a primacy that allows little room for some of the priorities that drove school-to-work advocates. In his 2006 budget proposal, President Bush proposed to zero out all dedicated federal funding for CTE through the Perkins Act in order to add resources to a new high school reform initiative. While Congress has rejected this approach, the battle lines are sharply drawn.

As part of the broader policy debate on how to reform K-12 education, particularly high schools, basic questions about CTE are on the table. Does secondary career and technical education have a place in American education? If so, how big a role should it play in educating American adolescents? For which students should CTE be designed? With what educational and economic goals? And under what terms should CTE be supported and modernized?

These questions are critical to state, federal, and local strategies to raise high school students' achievement and reduce the "leaks in the pipeline"

into and through postsecondary education and careers. There is no realistic way to significantly improve high school outcomes without tackling secondary career and technical education. CTE is too significant a segment of the high school enterprise, and its traditional role as a track or the "non-college bound" means that a large proportion of the students who need the most support to achieve at high levels are enrolled in CTE programs or schools. The future of high school reform cannot be addressed without including vocational high schools and programs within comprehensive schools.

The first essay in this volume summarizes what we know—and what we don't know—about the value of high school career-focused education: career and technical education as traditionally organized, but also more recent innovations including school-to-work, work-based learning, career academies, High Schools That Work, and other schools, programs, and instructional models that put careers and occupation-oriented knowledge at the center of school life. This research summary was prepared for the Aspen Institute Education and Society Program's July 2004 session on high school reform. It was written to provide a starting point for the participants' deliberations: What can we say from research (and practice) about the role of CTE and career-focused high school education on students' academic and career aspirations and trajectories? What have been the strengths and weaknesses of these efforts? What has been learned from the burst of activity and experimentation in the 1980s and

1990s around school-to-career and other approaches to what some have labeled “learning through occupations”?

At the Aspen Institute workshop, the need to address CTE as part and parcel of high school reform emerged as a clear theme. As a result, Jobs for the Future and the Aspen Institute decided to build upon the paper by asking a number of experts in the fields of high school reform and career and technical education—researchers, state policymakers and leaders, advocates for increasing rigor and achievement in U.S. high schools—to provide their views on the current state of CTE. Perhaps even more important, we asked for their opinions on the appropriate role for CTE in the coming years—and for their advice to policymakers and practitioners on strategies for driving improvement and reform.

As a collection, these essays challenge CTE to remake itself for the 21st century economy and society. They also point to several non-negotiable elements of any effort to reform CTE. Academic rigor, stronger links to economic development and labor market needs, smoother transitions to post-secondary education by students whose high school career will prepare them for *either* college or career—these themes emerge forcefully from the voices collected here. The authors are not sanguine. They acknowledge the relatively poor record of CTE and work-based learning as a strategy for raising academic performance, and a number of them raise doubts about the ability of secondary CTE efforts to make a successful transition to a more rigorous and more technically relevant curriculum at the high school level. As Elliott Medrich of MPR Associates puts it, CTE may have reached the point where it must either “change or die.”

At the same time, it appears premature to give up on CTE reform and improvement. In the past decade, according to the U.S. Department of Education and others at the national and state levels who have studied these trends, career and technical education systems and programs have responded to demands that they ratchet up their

quality and their expectations for students. In some states, obsolete programs are being replaced with forward-looking ones, enrollments are up, and test scores and completion rates are beginning to climb. Will change come fast enough and will it go deep enough? Will national gains be attainable and sustainable in large cities and other communities whose CTE programs have been stagnating or in decline for many years? The jury is still out. We hope, though, that the perspectives and advice in the essays that follow contribute to what must become a vigorous and determined debate on the future of secondary career and technical education in this country.

The research summary that was prepared for the Aspen Institute workshop provides background for this policy debate. A few broad conclusions emerge from existing studies on career-focused high school programs and schools:

- The career and technical education enterprise, while shrinking, remains a significant component of the U.S. high school experience.
- CTE appears to help less-motivated and more at-risk students stay in high school and graduate, yet graduation from a CTE program does not necessarily mean that a student is academically prepared for college-level work.
- In the past decade, the overall rigor of vocational education at the high school level has improved noticeably; however, there is a long way to go and many obstacles to overcome to sufficiently improve the academic experience for most CTE students.
- Employers would prefer to hire students with college credentials over those with only high school—and students are more likely to secure a well-paying job with a postsecondary credential than without. At the same time, for those who do not continue to college, jobs found with the help of career-focused programs in high school have a significant labor market payoff, particularly for low-income students and those who are the most at-risk.

Progress has been made in the past decade toward more modern and rigorous CTE programs, but the overall record of CTE, small career-themed schools, work experience and work-based learning in high school is disappointing.

Recent research concludes that progress has been made in the past decade toward more modern and rigorous CTE programs, but that the overall record of CTE, small career-themed schools, work experience, and work-based learning in high school is disappointing. At the same time, though, existing studies cannot answer whether progress can be broadened and accelerated so that CTE becomes a viable, high-quality pathway to 21st century college and career success for an ever-growing number of high school students. And research alone cannot answer the policy question: Do investments in CTE programs, which have a higher per pupil cost compared to traditional high school curricula, add sufficient value to justify giving them priority over other investments that might raise standards and performance in U.S. high schools? This question of opportunity costs is particularly important in the context of urban school reform, where resources are extremely tight.

As high school reform climbs to center stage on the national agenda, these questions about the power and effectiveness of secondary CTE cannot be ignored. To arrive at sound answers will require a careful sifting and balancing of research, practice, and political considerations. The short essays that follow the research review explore this terrain. The experts who have contributed their perspectives on the role of CTE in 21st century high school education—and on their visions of what a vibrant system of career and technical education might look like—are aware of the need to consider research, emerging practice, and politics. In these essays, they chart a direction for a reformed and vital CTE sector of high school education. They highlight concrete examples of how states and schools can change for the better, and they identify practical challenges that must be addressed—curriculum, scheduling, the integration of technical and academic studies, the upgrading of technical teachers' skills, and more.

If there is a consistent story in the essays that follow, it is this: CTE at the high school level has no choice but to modernize and to change. This may

mean shrinkage in absolute size. It will certainly mean shifts in the kind and range of programs offered students and in the expectations placed on students, faculty, and administrators. The authors highlight some of the more important challenges and opportunities facing CTE systems in the areas of academic achievement, occupational priorities and relevance, and connections to the labor market and to postsecondary institutions. They also use past and current practice to point to strategies that states and the federal government can use to drive improvement in high school CTE programming—strategies that are consistent with and better integrated with mainstream high school reform efforts.

There is one aspect of CTE reform that is underdeveloped in these essays, perhaps because of their focus on state and federal policy: that is the particular challenge of reforming CTE in urban districts. It is in the nation's cities that the most dysfunctional high schools are concentrated and where some of the most outmoded and poorly functioning vocational programs can be found. Yet at the same time, cities offer rich opportunities for occupational theme-based academies and schools, for work-based learning and employer engagement. How should career and technical education in our cities be organized? How prominent a role should high school technical education play in the comprehensive high schools, magnet programs, and charter schools of our large cities? These questions, which are crucial to the future of urban high school reform, require much more debate and research.

Academic Rigor

The most important reform that CTE programs must commit to and pursue aggressively—with help from state and federal governments—is to steadily ratchet up academic standards so that CTE is an alternative pathway to postsecondary success, not a lesser track. Academic rigor must come first. Without it, CTE cannot succeed—and should not be allowed to divert resources and students from more preferable options.

At the same time, there is a deep sense among these experts that CTE at its best combines what Betsy Brand of the American Youth Policy Forum calls the “rigor, relevance, and relationships” that are so central to current efforts to improve high school performance. As Brand explains, “The best CTE programs and school designs point the way for high school reform more generally: greater academic rigor, a clear focus on theme, pathways connecting secondary and postsecondary institutions, and increased time with adults.” In her view, CTE reform must be an essential component of any successful strategy to reform American high schools.

Elliott Medrich emphasizes that much of career and technical education in our increasingly complex knowledge economy rightly belongs in postsecondary institutions—after high school. Many occupations that do not require a baccalaureate degree require postsecondary math and analytical skills that build upon a strong high school foundation.

Yet Medrich maintains that there is an important place for secondary CTE, provided it changes in some specific though difficult ways. He, too, emphasizes academics, focusing on the need for CTE programs to take advantage of their real world links to develop high-quality, engaging curricula and instructional practices. Recognizing that many CTE students enter high school with low academic skills, he stresses the need not just for academic rigor but also for supports that can help academically weak students succeed and advance.

Technical Program Relevance

Medrich notes a second area for improvement in high school CTE: the technical component. High school career programs must respond more quickly and effectively to where the economy is headed, to the occupations that offer opportunity in local labor markets, to the jobs of tomorrow’s economy rather than yesterday’s. This will require weeding out obsolete and dated programs and encouraging programs in growing technical fields that can lead to good careers and that interest high school students.

For Gene Bottoms of the Southern Regional Education Board, quality CTE curricula must provide students with technical literacy that helps them communicate and work in their chosen field but should also include mathematics reasoning and technical skill development that is broad. In his view, CTE must teach not only to a set of high academic standards but also to a high level of technical literacy that gives students an edge in the labor market *and* qualifies them for further schooling.

In his comments, Ross Wiener of the Education Trust suggests ways that Congress and the federal government can use Perkins Act funding to encourage quality in both the academic and technical components of high school CTE. He recommends that Congress use Perkins Act reauthorization as an opportunity to define more clearly the kinds of high-wage and high-skill occupations that federal dollars should be targeted to support. He also points to a serious challenge facing CTE programs: the need to support and spur more effective instruction not just among academic teachers but also among teachers responsible for career and technical classes.

Connections Beyond the School Walls

A third priority for CTE reform builds on trends with deep roots in the most successful CTE schools and programs: connections to employers and postsecondary institutions so that students have access



Governor Warner stresses the need for incentives that can shape a “shared, unwavering commitment to rigorous standards and improved teaching.”

to opportunities for career and for postsecondary learning. In New York State, as Katherine Hughes of the Institute for Education and the Economy at Teachers College reports, all new CTE programs must have a postsecondary partner and a clear articulation agreement that encourages continuation of technical studies after high school. In Maryland, a statewide reassessment of secondary CTE programs has led to the identification of a specific number of career pathways that the state will promote. As Katharine Oliver of the Maryland Department of Education notes, the state uses its funding to create incentives for pathway programs to partner with industry associations or particular firms for their valuable resources, labor market reality testing, and job networks.

States Take the Lead

In recent years, a number of states have recognized that high school reform cannot be accomplished without attention to secondary career and technical education. The progress of three states—Virginia, Maryland, and New York—in bringing CTE into the 21st century provide a basis for optimism. (A 2005 JFF report for the Pennsylvania Department of Education featured specific recommendations for reforming the state’s CTE system. The department is moving ahead on implementing some of the most significant recommendations, and the Governor’s budget includes an innovation fund designed to help CTE schools that want to modernize and upgrade their academic and technical programs compete for state resources that can spur reform.)

Governor Mark Warner, currently chair of the National Governors Association, describes how Virginia has been upgrading its CTE programs to reach more students, both in- and out-of school, and to prepare more of them for success. The innovations he has introduced include an incentive for CTE students to pursue industry certification while in high school and immediately after, as well as a career readiness certificate for CTE students that indicates to employers students’ competencies in reading, writing, math, and communi-

cations. At the same time, Governor Warner stresses the need not just for incentives that can shape students’ educational choices but also a “shared, unwavering commitment to rigorous standards and improved teaching.”

Katharine Oliver summarizes Maryland’s ambitious efforts to improve CTE quality and outcomes. Attention to academic rigor has created a virtuous circle: enrollments have risen and the number of CTE students who pursue a college prep curriculum has jumped from to 41 percent from 14 percent in 1993. Employer participation has expanded as business leaders perceive an overall responsiveness and attention to quality. Importantly, the state has placed significant emphasis on collecting and analyzing student performance data. The state now requires local CTE plans to analyze and suggest ways to improve student achievement based on measures of academic, technical, completion, and post-high school success that are disaggregated for income, race and ethnicity, and disability.

New York State has also made CTE reform a priority. As Katherine Hughes notes, the state has instituted a program re-approval process as a way to drive improvement and change. The process is built around visits by school district officials and outside experts who assess evidence of curricular quality, including integrated academics, faculty certification in their fields, the use of and results from industry-recognized technical assessments, and the extent of access to work-based learning. The state’s efforts have stimulated demand from local programs to earn the state’s “seal of approval,” and they have also spurred the development of new programs in occupational areas such as engineering/technology and human/public service. CTE program enrollments have started to climb, attendance is improving, and there is evidence of better results on academic Regents exams and of an increase in the percentage of students who receive a CTE endorsement on their diplomas.

CTE Reform Is High School Reform

The quality of CTE across our nation is uneven—and there are too many schools and programs that do a disservice to the many students who leave prepared for neither high-skill jobs nor college success. The challenges to reform are many, perhaps even more daunting than those facing a typical comprehensive high school: a student body that is frequently less academically prepared upon entry; high percentages of special population students; a faculty that began teaching when academic and technical requirements were much lower; in many schools, control over the career and technical courses but not the academic courses that students take in their home schools; and more.

While progress has indeed been made in many states, communities, and schools in the past decade, it is not clear how fully and quickly CTE schools and programs can raise standards, modernize curricula, build outside partnerships, support teacher professional development, and do what needs to be done to make CTE a viable, consistently high-quality high school pathway. The skepticism expressed in many quarters is not without foundation.

For this reason, CTE reform must be both encouraged and monitored carefully—just as with any other high school reform. As Ross Wiener notes, “Meaningful accountability is not possible without meaningful data.” States and the federal government should support and demand more accurate data collection on student outcomes in high school and after graduation—academic achievement, technical credentialing, postsecondary college and employment experiences and success. State education departments should be able to distinguish programs that meet student and employer needs—and that help students achieve to the standards expected of all high school students—from those that do not. They should take a close and careful look at career and technical education programs in urban districts: Are they working? Are students moving on to college or jobs in their field? Are these programs worth the higher cost that accompanies most technical programs and schools? In the

end, states should be ready to eliminate the weakest programs, support the best, and encourage innovation and excellence. Anything less would be a disservice to CTE students, to employers who want to tap their skills, and to an economy and society that depends increasingly on the productive engagement of individuals with postsecondary credentials and skills.

In Maryland, CTE schools are expected to regularly identify the weakest 20 percent of their programs and to articulate a plan for their improvement or a decision about their future. Continuous improvement is becoming part of the state’s basic stance toward CTE. Standing pat will not do; slow, modest reform is also likely to fall short.

If our nation’s current focus on high school improvement is to succeed, CTE must be part of the equation. There are simply too many vocational schools serving too many students to ignore or treat separately. In the end, CTE may emerge a smaller but more successful enterprise, or it may evolve to be one of two or three mainstream high school pathways toward the same goal of academic proficiency (as the Southern Regional Education Board’s High Schools That Work initiative advocates). Or, if change proves too difficult and progress imperceptible, CTE as a system might spiral down into a vicious cycle of poor performance, limited public and political support, weak investment, and further erosion of student outcomes.

The essays that follow argue that making a serious run at reform can have real benefits for students and society. As a group, the authors outline a direction for CTE that parallels and reinforces that of high school reform nationally: rigor, relevance, and relationships—with academic rigor as the primary goal and accountability, choices, and teacher quality as key levers for improvement.

This is a critical moment in the century-long evolution of secondary career and technical education. CTE will either take its place as a high-quality high school pathway or justifiably cede its role as a major curricular pathway in the American high school experience.

What We Know About Secondary Schools and Programs That Link School and Work

By Richard Kazis, *Jobs for the Future*

Around the country, states and communities are paying renewed attention to high schools, as education reform efforts expand their focus from elementary to secondary education. Practitioners and policymakers are returning to a once-central question that has received little public attention for much of the past decade: what role should secondary career and technical education play in a system based on high academic standards and high performance for all students?

For over 20 years, the steady drumbeat in school reform has been the call for increased academic rigor, culminating most recently in *No Child Left Behind*, the federal education reform enacted in 2002. At the secondary level, one of the happy consequences of this period has been the elimination of the general track in many states and schools. As recently as the 1970s, this “track to nowhere,” which prepared students for neither college nor career, was the high school curriculum for more than 40 percent of American students.

A more complex fate, however, has befallen high school programs designed to prepare young people for careers and for success in our increasingly demanding economy.

In the 1980s and into the 1990s, running parallel to the focus on academic upgrading was a reform movement that championed better integration of school and work, the reform of vocational education for the new century, and high school curricula that replaced the traditional “education *for* work” with an academically richer “education *through* work.” These efforts gained significant momentum with the reauthorization of the Perkins Act in 1990 and the school-to-work movement and the School To Work Opportunities Act of 1994.

Educators and others looked to better connections between school and work to address a variety of social, economic, and educational problems: the anomie of disconnected high school youth; the shallow, decontextualized learning experience in most high schools; the widespread lack of motivation among high school students to work hard and learn; the absence of meaningful adult relationships in many students’ lives; the inability of most schools to teach the kinds of social and “soft skills” that are so critical to success in modern workplaces.

In recent years, though, these concerns have been crowded out in most public and policy discussions of high school education, overwhelmed by the intense focus on academic standards and accountability systems and on what sociologist James Rosenbaum calls the goal of “college for all.” In this environment, career-focused high school education seems like yesterday’s news, a vestige of the past.

Indeed, career and technical education—the new name for vocational education—has taken a beating in recent years. Its share of the overall high school curriculum dropped to 16.2 percent in 2000 from 21.8 percent 20 years earlier, as academic course-taking has expanded (Silverberg et al. 2004). Fewer high school students take a full concentration in vocational studies than in prior decades. Some occupational concentrations have all but disappeared.

The rumors of the death of occupation-oriented education in high school are greatly exaggerated, though. CTE remains a huge enterprise. While the proportion of students taking coherent sequences of vocational courses in U.S. high schools has declined, participation rates have been stable in the past decade: about 45 percent of high school students earned three or more occupational

course credits throughout the 1990s, according to the National Assessment of Vocational Education (Silverberg et al. 2004). On average, high school students still earn more credits in vocational education than in either math or science. Co-op education still reaches about 7 percent of high school students, particularly twelfth graders.

Moreover, for many high school reformers, there remains a nagging fear that something significant may be lost if the drive for academic rigor results in a wholesale abandonment of career-focused education. Many new school and program designs at the high school level, particularly those serving youth who are struggling to stay engaged and work hard, are built around “education through work.” As many colleges become more explicitly vocational in orientation, it seems unwise for high school education to head in the other direction, toward a focus on academics divorced from planning for where those skills might lead. In this view, a traditionally taught college-prep academic program may be insufficiently engaging and energizing to students for whom lectures, abstracted learning, and “college as motivator” simply don’t work.

Because of the uneasy feeling that dominant strategies to raise academic outcomes may make it more difficult for a significant group of students to stay in school, work hard, and succeed, some reform strategists are returning to the question of career and technical education. They ask: Can a rejuvenated high school career and technical education curriculum provide an alternative route to success in and after high school?

To assess the value of high school CTE programs, and what is gained and lost if they shrink or disappear, three distinct questions must be addressed:

- Does career and technical education help some students stay in high school longer?
- Can career and technical education, “education through employment,” or work-based learning increase the motivation to learn and the quality of academic and technical learning for a segment of the high school population?

- Can career-oriented learning help provide more students with information, a leg up to better employment prospects, and a realistic sense of future career options and the requirements to succeed in those options?

This paper answers these questions to the extent possible given available research on the leading variants of career-oriented education in the last decade: career and technical education under amendments to the Perkins Vocational Education Act, including the creation of Tech Prep; career academies; school-to-work of the 1990s; and the Southern Regional Education Board’s High Schools That Work initiative and other career-focused comprehensive school reform models operating at significant scale.

This overview of what we know about “what works” in career-focused education is intended to inform a more speculative inquiry: What does this research contribute to debates about the design of high schools and high school programs that can prepare *all* students for success in college and/or career? What is the role for career-focused programming in high school—and in the high school transformation agenda—in today’s world of higher academic expectations and increased workplace demand for skill and the ability to learn? Where does career-focused education “fit” in the movement to improve the performance of U.S. high schools?

What the Research Literature Does (and Doesn’t) Tell Us

There is little that can be said with certainty about the value of career-focused education in its various forms in the United States today, just as there is much debate about effective high school improvement strategies. The research base is thin, a reality that has led David Stern, former director of the National Center for Research on Vocational Education, to advocate for healthy skepticism in interpreting the research, following Oliver Wendell Holmes’ credo that “Certitude is not a test of certainty.” I try to keep this warning in mind in what follows.

For many high school reformers, there remains a nagging fear that something significant may be lost if the drive for academic rigor results in a wholesale abandonment of career-focused education.

Can career and technical education reduce dropout rates?

A rich strand of research tests the relationship between participation in career and technical education and the high school dropout rate. A recent ERIC brief concludes that “CTE actually does play a role in reducing dropouts, especially among students who are at high risk of dropping out” (Wonacott 2002). Studies of High Schools That Work sites, Tech Prep, Perkins Cooperative Demonstration sites, and career academies tend to show reduced dropout rates compared to control or comparison groups of students not in CTE programs. In several of these studies, vocational concentrators have lower dropout rates than either general or academic track controls.

John Bishop and Ferran Mane (2004) recently analyzed the relationship between the share of older high school students in career and occupational programs and the graduation rates in 19 industrialized nations. They found a statistically significant and strong positive effect: an increase in the share of secondary students enrolled in vo-tech programs is related to an increase in high school graduation rates and in the percentage of 15- to 19-year-olds enrolled in school. Bishop and Mane read the results as consistent with the hypothesis that offering students a robust career-tech option increases upper-secondary enrollment and completion rates (without lowering test scores at age 15 or college attendance rates after age 20).

Steven Plank (2001) found evidence to bolster this relationship using data from the National Educational Longitudinal Study, which followed 11,000 students who were in high school between 1989 and 1992. Plank concluded that the risk of dropping out was four times higher when students took *no* CTE courses than when students completed three Carnegie units of CTE courses for

every four units in academic subjects. In this study, when prior achievement, grades, and student characteristics were taken into account, the combination of four academic and three CTE courses appeared to have the greatest positive impact on persistence to graduation. Moreover, Plank concludes that the impact is greatest for students who enter high school most at-risk of dropping out, i.e., those with GPAs and test scores well below the median.

However, while keeping students in school is critical, keeping them in programs that do not prepare them adequately for postsecondary education is not sufficient. The studies of CTE and dropping out shed no light on the power of CTE as currently organized to motivate or impart effective learning, both academic and technical. For this, we must turn to other research.

Can career-oriented education promote academic success?

Among proponents of career-oriented education, the search for strong academic gains (particularly standardized test score gains) from career-focused high schools and programs is akin to the pursuit of the Holy Grail. Unfortunately, the research base that addresses these questions carefully is limited—and the results have been mixed at best.

Researchers have probed two sets of questions about the relationship between career-focused education and academic success.

- Do work, work-based learning, or a focus on technical education in secondary school have any *negative* effects on academic performance and postsecondary attainment, either because of diversion from academic learning or enticement into work and away from postsecondary learning?
- Are there *positive* effects on academic performance and educational attainment from participation in these programs that might be the result, among other things, of greater motivation to learn, reinforcement of school-based learning, or connections to adults that improve self-image and determination?

Does working while in school have a negative impact on academic success?

In the 1980s and 1990s, many researchers looked at the impact of after-school work on academic performance. The findings differ widely. Some studies find a high correlation between part-time work while in school and lower GPA and career aspirations. However, no causality can be inferred; it is not clear from these studies whether work gets in the way of academics or whether poor students look to work for satisfaction, accomplishment, and connection. Several studies conclude that *some* work during high school is correlated with better grades, though this is not the case for students who work more than 15 to 20 hours a week. Still other researchers find that when they control for student characteristics, part-time work has no negative effects upon grades or on hours spent reading or doing homework.

On this question, the safest answer is the sensible one: students can work a reasonable number of hours without academic risk, but those who want to succeed academically should keep school their central focus (Bailey, Hughes, and Moore 2004).

Does work-based learning have any positive impacts on academic success?

Another set of studies has explored whether structured work experiences tied to school programs accelerate or deepen learning in ways that can be measured.

Thomas Bailey and his colleagues have looked closely at the research on whether participation in work-based learning programs, particularly internships and extended workplace experiences, have any positive effects on academic performance. Their conclusion: the evidence is inconclusive.

Some studies have found increases in GPA for participating students (e.g., in work-based learning experiences of a sample of black students at four Philadelphia high schools; in a Flint, Michigan, program tied to the automotive industry). Other studies report no significant academic impacts, though they find other benefits to students (e.g., in the Cornell Youth Apprenticeship program).

And a few studies find that students in work-based internships take less math and science in senior year than students with after-school part-time jobs (e.g., the 1996 High Schools That Work Assessment) (Hughes et al. 2001).

Researchers advise caution in interpreting these studies. Since many school-to-work, career academy, and other program models are typically organized as small learning communities with personalized attention and support, it is difficult to separate out the effect of the work-based component from that of the small learning community. In many of these studies, the research design underspecifies the work-based “treatment”: it is not clear which students received which level or quality of work-based experience, making it difficult to tie the work-based experience to any reported student outcomes.

To try to add to the knowledge base on this question, Bailey and his colleagues studied closely the work-based learning experiences of 25 student-interns. They wanted to understand whether work experiences were linked in any significant way to what students were learning in school. They asked whether school-based learning was reinforced at the workplace through either references to school content or the use of reading, writing, and other academic skills on the job.

They found great variation in the quality of learning in the students’ workplace experiences. For about a third, there was no apparent reinforcement; for others, the reinforcement was episodic and frequently not sustained. Because these students were already quite motivated to succeed in school, few expressed any change in academic motivation due to their internship. The authors conclude that academic impacts from typical work-based experiences in high school are limited and that integrating the experiences at school and work, while possible and powerful when done well, poses significant curricular challenges (Bailey, Hughes, and Moore 2004). The researchers do not reject the value of work-based learning. Rather, they find that value in non-academic benefits, a point to which I return below.

Does a career focus, independent of work-based learning experiences, have positive effects on academic performance?

The research is clear on one thing, which common sense would also tell us: career exposure itself, absent a quality core academic curriculum, will not raise academic performance. Schools can't ignore academic learning and expect to see academic learning gains. At the same time, there is evidence from recent years that it is possible to upgrade the academic content and rigor of CTE programs without sacrificing the technical and occupation-related component of the curriculum.

MDRC's decade-long study of ten career academies, which followed students through and beyond high school, found that if students "trade in" core academic courses in order to take more CTE offerings, they are less likely to complete their program and succeed academically. In fact, that strategy of substituting technical for academic courses not only hurts academic performance, it also undercuts any positive employment impacts for academy students. Gene Bottoms, senior vice president of the Southern Regional Education Board, which runs the High Schools That Work initiative, agrees that a high-quality vocational program requires a rigorous college-prep level academic component if the technical classes are to be of value after high school.

The typical vocational concentrator—about one in four high school graduates—is less likely to complete a rigorous college prep curriculum than the graduate who is not a vocational concentrator (29 percent of vocational concentrators versus 46 percent of non-concentrators). However, the gap between academic courses taken by non-concentrators and concentrators narrowed in the 1980s and 1990s to about a 1.1 credit variation (Silverberg et al. 2002).

The tradeoff between academic and technical learning in high school need not be inevitable. In the 1990s, the academic rigor of many CTE concentrators programs rose significantly. According to the National Assessment of Vocational Education, the percentage of CTE concentrators

taking four years of English and three years of math, social studies, and science rose from 18 percent to 51 percent between 1990 and 2000. The proportion of CTE concentrators taking a college prep curriculum jumped from 10 percent to 29 percent (Silverberg et al. 2004). This can be looked at as a glass that is half full or half empty: on the one hand, these proportions are still too low; on the other hand, the trend provides evidence that it is possible to ratchet up the academic program from a very low floor for large numbers of high school CTE students.

High Schools That Work schools have found that, with block scheduling, it is possible to fit both a full core curriculum (without a foreign language) and a technical concentration into the high school years. Many career academies and other programs that include a work-based component schedule those experiences in the summer so as not to undercut academic course-taking time. However, both Jim Kemple of MDRC and Bottoms conclude that it would be difficult to add a foreign language requirement to a program that offers both a quality academic core and a technical concentration curriculum (Kemple and Scott-Clayton 2004, Bottoms 2003).

The National Research Center for Career and Technical Education is exploring whether a career-focused program with a strong academic component can improve academic performance. The center is studying cohorts of students at three schools serving predominantly disadvantaged students and where a career and technical curriculum has been integrated with a whole school reform initiative: a vocational high school using the High Schools That Work model; a career academy using a reform model called Urban Learning Centers; and a comprehensive high school organized around career pathways. From early results, the authors are "cautiously optimistic" that the reform is increasing students' math learning. Across the three schools, there is some evidence of students staying in math sequences longer (i.e., into senior year), taking higher-level math courses, and passing more math courses than students at control schools that are similar in demographics and other

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characteristics but without the “CTE-enhanced” reforms (Castellano et al. 2003). These results are both preliminary and mixed across the three schools; reliable results will not be available for a number of years as the student cohorts being studied pass through and out of high school.

Does career-focused education increase college-going?

Studies of school-to-work programs in the 1990s frequently found high college-going rates among students in intensive programs (e.g., Wisconsin Youth Apprenticeship Program; ProTech in Boston). Researchers who found these trends argued that high college-going rates were a significant accomplishment for programs that targeted students less likely to continue their education after high school. Others expressed skepticism. One recurring problem in the school-to-work research, as in much educational research, was the possibility of selection bias: students who entered these programs might be more motivated than their peers, so if college-going rates were higher, the studies might say more about the participants than about the program. Researchers also wondered whether programs that make work more compelling and attractive to high school students and create close ties with employers might undercut college-going by influencing more students to go right to work rather than to college.

Three studies shed light on this question.

MDRC found that career academy students indeed had high college-going rates. However, there were no significant differences between post-secondary enrollment rates (in Bachelor’s degree, Associate’s degree, occupational license, or certificate programs) for academy students versus those in the control group, which was comprised of students who had wanted to enroll but were not selected in the lottery for participation. These students also had high college-going rates.

For more at-risk academy students, MDRC found some drop in initial enrollment in postsecondary programs compared to the control group. However, control group members dropped out of



college programs at a higher rate so that, by four years after high school, there was no college-going impact from academy participation (Kemple and Scott-Clayton 2004).

An analysis by David Neumark (2004) of a large longitudinal database, the National Longitudinal Study of Youth (NLSY:97), concludes that some types of career-focused high school programs have positive effects on college-going while others do not. In his analysis, school-based enterprises boost post-high school education (perhaps because of emphasis on self-management skills, planning, and decision-making autonomy, though this is speculation). In contrast, participation in Tech Prep programs appears to reduce post-high school enrollment rates and attainment (though the variation among Tech Prep programs nationally is so great that it is difficult to draw powerful lessons about program design). Job shadowing, mentoring, internships/apprenticeships, and cooperative education appear to have no impact on college-going. Neumark reports an encouraging result: career-focused programs appear to have a more beneficial effect on college enrollment among students with the lowest test scores. (Neumark’s analysis omitted the variable on whether students took a career pathways or career major.)

Finally, the recently released National Assessment of Vocational Education concludes that vocational courses neither hurt nor help most students’ chances of going to college. However, they are associated with a shift away from earning a Bachelor’s degree and toward earning an Associate’s degree or a certificate (Silverberg et al. 2004).

A fair summary of available evidence on the academic impact of career-focused programs or work-based learning in high school might be this:

Taking an occupational program in high school runs the risk of detracting from academic achievement, but this effect is not inevitable. Well-implemented CTE programs with solid academic curricula can contribute to gains in persistence, GPA, and college-going. Large-scale studies find the impact of vocational studies on academic achievement to be essentially neutral. However, this absence of effect may have as much to do with the limits of the database as anything else. Overall, the current state of research leaves more questions than answers about the academic value of secondary vocational and technical programs.

Can career-oriented education have other benefits that are powerful enough to warrant continued support and investment?

There is another arena in which the value of career-focused education must be explored: the non-academic aspects of preparation for adulthood, including employment and career decision making. Here, the story might be summarized as follows:

Well-designed career-focused programs can improve employment, earnings, non-academic skills, and career choices, particularly for at-risk and low-income youth. These programs can have positive effects without any significant negative impacts on participants' academic or educational progress.

In today's labor market, this is an important conclusion.

Does work-based learning have non-academic benefits independent of employment and career preparation?

The study of work-based learning and its value to students conducted by Thomas Bailey and his associates (2004) argues that there can be significant non-academic value derived from student internships and other work-based experiences. In this view, the potential value (it is by no means inevitable) lies not in learning about careers and career paths through work experience, as some would argue, but rather in two aspects of the experience: exposure to adults in settings that can help young people identify paths to adult responsibility; and exposure to non-school forms of thinking and problem solving that work provides, including ways to define problems, solve them in the context of limited information and multiple goals, work in teams, understand social relations, etc. These researchers found sufficient value from these learning opportunities, beyond either academic or narrow career-planning value, to conclude that “work-based learning is worth pursuing and expanding.”

SREB's High Schools That Work model specifies as one of its seven key practices that schools should “provide access to work-based and school-based learning planned cooperatively by educators and employers” (Bottoms 2003). SREB's Gene Bottoms argues that at the schools that report implementing the HSTW model most faithfully, adult mentors provide important supports and guidance, with both non-academic and academic benefits for participating students. In these schools, more students have a richer set of learning experiences at work with mentors who help them use more math, acquire good work habits, and practice good customer relations. Importantly, Bottoms notes that at high-implementation schools compared to those that did not implement the model well, significantly more African-American students reported having worksite experiences in which the employer showed them how to use mathematics (61 to 51 percent) and in which they used communications skills (67 to 59 percent) on the job (regardless of students' socioeconomic background).

Does career-focused education provide labor market benefits for high school students?

We expect career-focused education to pay off in the labor market, through more success in employment, earnings, and career trajectories. This is not always the case. A majority of vocational program concentrators do not continue on in their vocational field, losing potential direct gains that might result. However, the recently released National Assessment of Vocational Education concludes that, at least in the short- and medium-run, taking vocational courses does increase annual earnings. Seven years after high school graduation, each high school occupational course taken was associated with an almost 2 percent increase in annual earnings (Silverberg et al. 2004).

The career academies study has found a significant labor market payoff for young men (though not for young women). The effects were strongest for those young men most at-risk of not graduating high school—without any trade-off in educational attainment or success. Career academy participation increased young men's post-graduation earnings by an average of \$212 per month over 48 months, an 18 percent increase in average monthly earnings. These participants benefited from steadier work and more hours of work in a week, as well as better opportunities paying higher wages than did control group members. MDRC researchers speculate that the power of these programs is in the relationships and connections that they make for students with employers who provide internships and jobs.

These positive outcomes in earnings and employment are larger than has been documented for other rigorously researched youth programs over the years. The gains are higher than those found in studies that compare the earnings of young people with one to two years of postsecondary studies to the earnings of those with only a high school diploma or GED. This finding is particularly encouraging at a time when labor market prospects have been eroding for young men, particularly minority men (Kemple and Scott-Clayton 2004).

The relationships and connections that CTE instructors and programs have with local employers can be a boon to those who enter the labor market right after high school. James Rosenbaum of Northwestern University has found that students who get their first jobs after high school with help from their teachers or programs have 17 percent higher earnings ten years later than those who do not. Particularly for students with weak social and job networks at home, CTE can provide entrée to jobs that relatives or other connections cannot. Rosenbaum finds that blacks and females are more likely to get this kind of labor market assistance from their instructors. In a setting where students can see the real-world advantage of impressing their instructors, Rosenbaum (2001) argues that students can be particularly motivated to succeed.

Is there value to the career exploration component of school-to-work or career-focused programs?

The school-to-work movement spurred many high schools and districts to expand the range of career guidance and career exploration activities. According to a national evaluation of school-to-work, career exploration activities, such as individual career planning, were the most commonly implemented school-to-work activity (Hershey et al. 1999). Students surveyed felt that their participation had helped them identify career goals. The study concluded that career options were expanded for participating students. More realistic understanding of career options and information sources and more attention to the process of career decision making might help students navigate their futures more effectively: school-to-work students were more likely than other students to choose a major once they got to college, which is one characteristic associated with higher completion rates (Hughes et al. 2001).

A recent study by MPR Associates (Visher, Bhandari, and Medrich 2004), using the same NLSY:97 database studied by David Neumark, found promising outcomes for students who participated in at least one of the seven types of career

The National Assessment of Vocational Education concludes that, at least in the short- and medium-run, taking vocational courses does increase annual earnings.

exploration activities tracked in that database. Students who participated in career exploration between 1997 and 2000 (53 percent of high school students in grades 10 through 12) were more likely to take AP and college entry exams than their peers who did not participate in career exploration, though Tech Prep and cooperative education participants were equally or less likely to take these exams. Career exploration participants were more likely to graduate from high school and more likely to go to college, particularly to two-year college. The researchers speculate that this trend might mean that career exploration was part of an educational experience that drew more students who were on the fence about postsecondary education to decide to enroll in college after high school.

A synthesis of the research literature on school-based career exploration published before the MPR study found some evidence of student benefits from a variety of programs: comprehensive guidance programs, career courses in high school, and computer-based guidance systems (Hughes and Karp 2004). But the authors are hesitant to make strong claims from the evidence. It is not clear if short-term gains—such as increased career planning, better knowledge of work and occupations, greater motivation to set goals, and greater satisfaction with school—are sustained over time. Most studies assessed changes in student attitudes and knowledge, not their behaviors. Moreover, the research has little to say about the relative effectiveness of different programs' content or delivery methods. Individual counseling appears preferable to group programming; more experiential activities appear to have better results in terms of school attendance and completion; academic counseling or advising appears to lead to better planning of high school course-taking. More definitive conclusions must await more research.

Implications for the Future of Secondary CTE

The research on career-focused education raises a number of school design, curricular, and youth development issues that have implications not just for career and technical programs and efforts to link school and work experience, but also for high school reform efforts more generally.

An effective career-focused education programs must have a quality academic core.

An inadequate academic program is not only an obstacle to academic success; it also stands in the way of technical learning at a level high enough to be of interest to quality employers. Most job-specific technical education has moved up to the postsecondary level: the math, science, and other academic skills needed to master technical disciplines have become too difficult for most high school students who would traditionally not take a college-prep curriculum. There can no longer be an either/or divide between secondary-level academic and technical programs. Researchers with diverse perspectives on the question of “college for all” agree that raising the quality of high school academic programs is critical to those who will go to college and those who will go directly into work after high school (Rosenbaum 2001, Barth and Haycock 2004).

However, this imperative raises challenging questions about how high school career and technical concentrations should be organized. How occupation-specific should CTE programs be? How targeted should they be to “education for work” as opposed to “education through work”? Should academic and technical learning be integrated in the same or linked courses, or is this too difficult for most high schools and high school teachers to accomplish? Can the half-day area vocational school model common in many states adapt to the demands for greater academic rigor *and* technical quality? (An ongoing experimental study of curriculum integration by the National Research Center on Career and Technical Education,

involving more than 3,000 students in schools in eight states, should shed some light on these complex questions of pedagogy.)

The academic value of work, work experience, and career exploration in high school may be limited, but their non-academic value for adolescents may be quite important.

The flip side of the need for a quality academic core to all high school programs is the need for adolescents, whatever their school program, to prepare for adulthood. As David Stern explains, “The purpose of high school is not to raise test scores. It is to prepare young people for adult responsibility—and the best way to do that is to engage them in adult responsibility.” The challenge for high schools is to engender a commitment to becoming adults from a broad range of students. The satisfaction of academic mastery and the future payoff of college can do it for some but appears unable to address the massive lack of commitment and motivation that is palpable in most high schools. Career exploration, career-focused courses of study, and work experiences linked to school might keep more weak students in school longer; they might also help more aimless students find a passion and focus, making the range of postsecondary options more real to them in ways that might spark a felt commitment to their futures.

In an era of scarce public resources, though, policymakers are right to ask whether that is sufficient justification for the level of investment being made in districts and states. Are there other ways to provide these non-academic, future-focused goals, ways that might require less capital investment or a less separate track of programs, infrastructure, curricula, and staff?

The economic value of work-based programs is also important, particularly for low-income youth who need to balance work and learning. Program-related employment can create personal ties to employers that pay off in better jobs during and after school. It can help less academically successful and socially connected students get a leg up on employment that can help them gain entry to competitive postsecondary technical programs

that lead to good jobs. And it can make the juggling act of earning and learning easier to sustain (Allen, Goldberger, and Steinberg 2004). The findings of the career academies study regarding at-risk young men provide powerful evidence on this point.

Career and technical programs might be particularly important for addressing the growing gap between male and female attainment and success in school—both secondary and postsecondary.

The career academies study found employment impacts for young men. This is impressive in an era when, across the nation, young men are falling out of the educational system at every level with far more frequency than their female counterparts. This problem is national, not local. Gene Bottoms, looking at the Southern states, calls it the “Where’s Bubba?” question. In Boston, according to a recent unpublished study by Andrew Sum at Northeastern University, 175 girls who start ninth grade in the public schools make it to four-year colleges for every 100 boys who make it. Among black men, the ratio is 210:100.

Changes in the focus of high school education away from career and technical education may be contributing to and accelerating this trend. James Rosenbaum argues that the push toward more academics has driven out many old-style vocational teachers who served powerful role-model, advising, and support functions for many adolescent young men. These older teachers, mostly male, often lack academic teaching credentials; their



Employer involvement with high school students can expand significantly with sound organizing and management strategies.

program enrollments have declined precipitously; their link to employers and job possibilities has also been lost. Gene Bottoms posits a feminization of the school experience for boys who had found a home in vocational education and are now spending more time at the media center or in literacy and basic academic skills classes.

James Stone of the National Research Center on Career and Technical Education has speculated that there may be an alternative explanation for some of the decline in male college participation in the 1990s. The hot technical job market in the 1990s may have drawn a significant number of computer- and other technically oriented young men away from school and into IT and other jobs. If so, then the gap should lessen in today's softer technology labor market.

The issue of the disappearing male student deserves more attention. Given the significant erosion of labor market participation among men, particularly minority men, gender variations in educational success are important to understand and address. Whether career and technical education programs at the secondary level can play a special role in engaging male high school students should be explored further.

The engagement of employers is not the obstacle to work-based learning and career-focused education that many predicted.

At the outset of the school-to-work movement, many economists and education planners assumed that it would be difficult to engage enough employers in work-based learning and school-to-work programs. Reality was somewhat different. The national evaluation of school-to-work found that close to 25 percent of U.S. employers participated in some way (from job shadowing to visiting classrooms to providing more structured and intensive experiences) during the 1990s (Hershey et al. 1999).

The quality of those experiences was certainly uneven. However, it appears that employer involvement with high school students can expand significantly with sound organizing and management strategies. The challenge is one of cost and cost-effectiveness. Are the costs associated with managing and sustaining employer relationships too high for the value that is added to student high school experiences? In particular, are the opportunity costs of the use of scarce educational resources too high?

School reformers grappling with systemic reform should be careful about generalizing from studies of programs that students select voluntarily.

Motivation is the key to learning. Students have to feel it is worth their while to work hard. The threat to students of negative consequences for not performing to a high standard can motivate some segment of the population, but others may be motivated more effectively by more intrinsic satisfaction and engagement. Most studies of promising programs or school models look at programs that students actively choose (or at least do not resist when steered toward them). Their participants demonstrate some level of motivation by choosing to participate. But consider, for example, a school system where enrollment in a career academy or other reform model is mandatory. Would the same learning dynamics hold? Would students, teachers, and administrators work together as effectively to support student success? Would the outcomes be less positive?

Similarly, all the career academies studied by MDRC enrolled a mix of high, medium, and low-risk students. If these programs were targeted only to young men, for example, or only to middle- and high-risk students, would the academies have similar results? These are critical questions as many districts plan not just for reform in a single school but across the system.

Student mobility poses significant challenges to careful research on student outcomes in particular programs or curricula.

The high level of geographic mobility, particularly in urban districts, should make reform designers cautious about strategies that are too school- or program-specific. Studies that follow a cohort of students long-term typically lose a lot of students who move out of district or change schools and programs before they complete. This can create methodological problems. Is there an identifiable set of differences between those who leave a program and those who persist? If yes, this raises concerns about the extent to which a study is generalizable.

This reality underscores a growing challenge. If some of the best high school reform models are small learning communities with particular career-focused or other themes, what happens to the academic progress of students who leave the program and move to another school or program? The more small schools, the more likely that students will make multiple transitions in high school to programs that have very different cultures, characters, and even curricula. The emphasis on high-stakes exit exams for high school should encourage common curricula and learning programs. Mobility might be another strong argument for a core academic curriculum.

At the same time, other approaches to minimizing the costs of mobility deserve further research and experimentation. The Quantum Opportunities Program (QOP) is one intervention that has demonstrated positive results in rigorous studies of its pilot and replication phases. This program increased high school completion rates for at-risk students, not an easy outcome for a non-academic program to secure. Postsecondary education and training enrollments also increased significantly. In the replication, the differences were smaller but still significant (Stern and Wing 2004).

QOP is not a school-based intervention. A community-based organization provides case management services 24/7, and participants, who join the

programs in eighth grade, engage in 200 to 300 hours a year of educational, developmental, and community service activities. Participants remain in the program whether they move, change schools, changes states, or go to jail: “Once in QOP, always in QOP.”

Researchers are not sure what has made QOP successful; other, larger initiatives that focus on individuals as opposed to institutions, such as Upward Bound or GEAR UP (which was modeled on QOP’s stick-with-a-cohort approach), have not achieved comparable results. The challenge of student mobility deserves further analysis and program development as high school reform moves toward more—and more varied—small schools and learning communities and as newer models of career-focused high school education are frequently launched as charter schools or small learning communities in urban districts.

Conclusion

Career-focused programs and schools—those that emphasize work-based learning, career and technical education, career exploration—remain a significant component of high school education in the United States. The past few years have been hard ones for these efforts and the future is uncertain, but it would be a mistake to dismiss the “education through work” strand of high school reform too quickly.

Work-based learning as promoted through the school-to-work movement has been hobbled by the sunset of the federal school-to-work law and pressures on states and districts to dedicate any flexible dollars to academic improvement. The infrastructure of local intermediaries connecting schools and employers has atrophied in this environment. Yet there is evidence that the social networks and connections created through internships and work experience, particularly for youth from poorer neighborhoods, can have a positive impact on future earnings and job advancement and, according to some, on non-academic learning

as well. Recent studies of career exploration participants point to positive outcomes in terms of persistence in school, graduation, and college-going, though the limitations of the database (NLSY:97) being mined for these studies should lead to caution and a commitment to further research. Career and technical education remains a significant high school curriculum for many high school students, and the Perkins Act still represents the largest federal investment in high school education. Progress has been made, but the challenges of modernizing a career and technical education system are real. Moreover, the solutions that might succeed for suburban or rural school systems are likely to differ from those that will enable more urban high school students to stay in school and to pursue a rigorous course of studies that prepares them for both careers and further education. The particularities of urban CTE—its opportunities and its obstacles—must be addressed.

For CTE, the challenge is clear: how to maintain program integrity and improve learning in an environment that demands academic progress as the bottom line and posits further postsecondary learning as an essential for all graduates. In state after state, policymakers and district officials are looking for ways to bring CTE into the 21st century. Connecticut recently launched a dramatic upgrading of expectations and standards in its CTE schools. New York and Maryland have been working for a number of years to integrate academic and technical learning and to raise aca-

demical standards and expectations for students, teachers, and employers. Across the Southern Regional Education Board states, these same themes have been at the heart of a decade-long reform effort: academic upgrading combined with closer ties to local employers and to the postsecondary institutions.

The pendulum tends to swing cyclically toward and away from an emphasis in high school on technical and career education. The next swing toward a rethinking of CTE and career-focused education may be in its early stages. It will be different this time: The discussion will be about how to use varied curricula and school programs to promote the achievement of a common set of high academic standards that can be a rigorous and effective route to college or career for a segment of secondary students. It will not be about education for the college-bound as distinct from that for the non-college-bound.

That said, the ways in which work, career exploration, internships and service learning, technical preparation, and occupational themes will be included in high school educational programs are far from determined. Further research on the impacts of these approaches will have some influence on their evolution. As in the past decade, though, the politics of education reform in states and nationally, as well as the kinds of pressure and support brought to bear from outside the educational establishment, will also shape how far the pendulum swings—and what forms a 21st century version of career-focused secondary education will ultimately take.

Change or Die: The Challenge Facing Career and Technical Education Today

By *Elliott A. Medrich, MPR Associates, Inc.*

The Carl Perkins Vocational and Technology Education Act of 1998 is on its way to reauthorization, and No Child Left Behind looms larger than ever on the high school screen. Can we all get along? The answer, of course, is maybe—if we are smart.

Career-focused education is searching for a 21st century mandate, particularly at the high school level. We know that career-focused education coursework is not always demanding. Indeed, most agree that more academic rigor may be an essential condition to CTE's survival. But that is only part of the challenge. There must be more. If career-focused education becomes just another way of teaching traditional academics, it may not be worth the bother. We also need to build a career-focused curriculum that can motivate students to stay in school and aspire to higher education (the goals of NCLB), expose them to career options that will offer opportunities for economic success, and provide the quality of instruction that builds skills and makes coursework an important learning experience.

Historically, educators have thought of high school career-focused education as an option for those who do not intend to pursue higher education. In its early formulation, the purpose of vocational education was to prepare students for entry-level jobs in occupations that did not require advanced training. That mandate has worn thin. When students today leave school—high school or postsecondary—they must cope with a vastly different economy. From the federal government's point of view, to meet these new demands on students high schools should focus on delivering a strong academic foundation. By the same logic, this may mean reducing the role of high schools in career-focused education and shifting the real occupational training function to the postsecondary level.

We need to be careful here. Career-focused education still serves an important high school constituency. We should not forget that, in the largest sense, participation in career-focused education is broad and substantial. Virtually every high school student takes at least one course from the vocational curriculum. In 1998, as a point of comparison, over 40 percent of high school graduates earned three or more Carnegie units in career-focused education; 25 percent had “concentrated” in a career and technical program area. Further, among those participating in career-focused education are many of the 35 percent of high school graduates who are not non-college bound. I doubt policymakers and educators mean to offer these young people no opportunity to gain a toehold in the labor market.

Richard Kazis quite correctly notes, however, that the literature provides scant evidence of results that can be generalized. While some studies show positive gains for students, systematic research is the exception not the rule, and we do not know nearly as much as we should about the impact of these programs on students' lives. We do not know whether they help keep students in school; we do not know whether, or to what degree, participation in career-focused education improves student academic performance; we do not know whether, or to what degree, career-focused education improves transition rates to higher education. Each is an important goal of NCLB. Further, labor market benefits of career-focused education appear modest and employment outcomes beyond the very short run are unclear for those who do not go on to postsecondary. Finally, there is rather little systematic study of the benefits of participating in internships, mentoring programs, or other aspects of career-focused education.

We need to build a career-focused curriculum that can motivate students to stay in school and aspire to higher education, expose them to career options that will offer opportunities for economic success, and provide the quality of instruction that builds skills and makes coursework an important learning experience.



Given the investment, surely we, and those who pay the bills, should know a lot more. Equally important, if we do not show that career-focused education helps schools meet some contemporary education goals, whatever benefits students derive may not matter that much to policymakers or practitioners committed to strengthening the rigor of the academic core.

The road ahead will be rocky, and between Perkins and NCLB, career-focused education has to face some challenges head on. Here are several things to think about as we look forward from here.

Pay attention to changes in the labor market and redefine career-focused education in response to emerging trends.

The labor market continues to mature and change. Career-focused education must provide a 21st century education for a 21st century economy. There is evidence of change, but the changes are slow in coming. Remember, students respond to market forces. Those attracted to career-focused education today are gravitating toward new kinds of concentrations in emerging fields like information technology, communications, and marketing, and reducing participation in traditional career education sectors—trade and industry and business (National Center for Education Statistics 2000). Students can be wise. They want a forward-looking curriculum. There must be a strong response from those who provide career education or we will find ourselves wondering where the students went.

Career-focused education must change if it is to maintain its place at the table.

High school students face many demands that influence their coursework choices. If policymakers, administrators, and teachers begin to view career-focused education as peripheral to the mission of schools, support will melt away. Some high school reformers are working hard to make certain that career-focused education does not lose its place in the current pressure-filled secondary environment. Two models are High Schools That Work and the Talent Development project. Both show real promise and both are willing to accept the challenge of blending career-focused education and academic rigor. There are also career academies that show some promise, but there is little data to support claims of success with students. Nevertheless, at the high school level, its time to take stock: change or die.

Think hard about teaching and instructional practice.

How we teach career-focused education is as much an issue as what we teach. As noted by Medrich, Calderon, and Hoachlander (2003) and others, there is room for improvement—especially if the objective is to provide students with the variety of skills they need in order to prepare for either work or postsecondary education. Many approaches to instruction that fall under the banner of contextual teaching and learning can help keep students engaged and also can provide ways of increasing the real-world quality of career-focused instruction. But take those approaches at your peril. Contextual teaching methods are not simple instructional tools. They are difficult for instructors to master and, if done poorly, they are best not done at all. To bring career-focused education into the 21st century, we need to worry about how we teach as much as we worry about what we teach. Meeting the professional development needs of career-focused education should not take a back seat to curriculum.

Support new forms of career-focused education that promote rigor.

Eliminating career-focused education from the high school curriculum rests as an option, but to do so would come at a real cost and it would reduce, not increase, the motivation of many students to persist through graduation and to make the transition to postsecondary education or a career. As we debate the place of career-focused education in high school, some feel that high schools should eliminate the objective of providing occupationally specific preparation or entry-level job skill preparation. From my perspective, a better outcome would be to build a curriculum that can achieve these objectives in the context of high academic standards. Teach occupational knowledge and skills in a framework that recognizes more advanced requirements for entry into the labor market, and develops the kinds of skills that young workers need to have in order to learn and grow while employed. We are only just beginning to see curricula at this level of rigor emerge. What we do not know is whether we can grow these kinds of curricula fast enough or assure that they become the new standard in career-focused education.

Is it worth the bother? If so, can career-focused education make the grade in the 21st century high school?

The four points above beg the larger question: Given the direction of high schools today and the focus on academic outcomes in traditional subject areas, is there still a place for career-focused education? Sure, career-focused education has a long history and an important place in the high school of the past. Sure, it is still a billion-dollar enterprise with a considerable constituency among policymakers at every level of governance. Neither of these are sufficiently compelling reasons for moving forward.

That said, I believe that it is entirely reasonable and appropriate to support a program of career-focused education that will have academic and

workforce preparation benefits for all students, whether or not they intend to pursue higher education or advanced training.

For career-focused education to remain a valued part of the high school curriculum a lot needs to change. First though, let us not fall into one trap. We should not talk about targeting career-focused education to one type of student, a conversation that will only lead back to the bad old days of tracking. And hopefully those days are behind us forever.

Here is a modest contribution to the larger discussion of where we go from here, assuming we can agree that it is reasonable to extend the mandate.

- First, recognize that career-focused education at its best will be secondary to academics in the high school curriculum. What to do? Combine career-focused education with a strong academic core. Not easy, but necessary.
- Second, weed out the less compelling program concentrations and get rid of weak course offerings. There is still too much of the “old voc” taught in the “old way,” and that does not help those working to develop new models. If you want to foster a new kind of career-focused education, create coursework that is valued by teachers and by students and that is as demanding as anything in the academic curriculum. And be prepared to provide the kinds of support to students that may be necessary in order for them to succeed in a more rigorous curriculum.
- Third, to find a place in the 21st century high school, focus on the fundamentals: *create* an engaging curriculum; *develop* instructional strategies that are appropriate to the subject matter and that demand a lot of students; *provide* support for students less prepared for rigorous coursework; and *design* quality assessments.

These elements are central to reviving career-focused education in high schools.

What a 21st Century Career and Technical Education System Could Look Like

Betsy Brand, Director, American Youth Policy Forum

Most high school reform efforts focus on improving academic achievement and closing the achievement gap. This is the right place to start. If we don't help young people learn the basic and critical skills needed to advance in postsecondary education and careers, other reforms may be meaningless. But as critical as it is to improve academic performance and close the achievement gap for many adolescents, most discussions about high school reform have been somewhat myopic by failing to address the full learning experience our youth face. Academic reforms in isolation may not be as successful as reform efforts that target the broader needs and interests of youth.

One area that is largely ignored in the high school reform debate is career and technical education. I find this somewhat surprising, given that a number of high school innovations have been led by or have their roots in CTE. From a reform standpoint, CTE has led efforts in performance stan-

dards and accountability, the integration of academic and occupational curriculum, and the creation of pathways from secondary to postsecondary education. Federal legislation supporting CTE has emphasized these elements for years.

Because CTE is a large part of the high school curriculum and experience, and because federal funds drive the use of most CTE dollars, the growing focus on high school reform makes it timely and appropriate to examine CTE's contribution to improved student outcomes. My organization, the American Youth Policy Forum (AYPF), spent almost two years examining these questions. In *Rigor and Relevance: A New Vision for Career and Technical Education*, we concluded that CTE is an essential strategy for reforming high schools and provides young people with important choices and skills needed for success in later life (Brand 2003).

Rigor and Relevance makes the case that there is a great need in today's classrooms for high-quality CTE—education that integrates rigorous academic coursework with a technical and occupational curriculum, emphasizes applied teaching and learning, uses the context of careers to help make learning relevant, connects with the labor market and employers, provides ongoing guidance and counseling and exposure to the world of work, and defines pathways from secondary to postsecondary education. However, CTE must embrace all these elements and not be a vestige of high school “shop.”

Richard Kazis provides a different lens for valuing CTE. He summarizes current research on the impact of CTE on student outcomes, including academic performance, postsecondary participation, and labor market success. Perhaps the most important and interesting research findings relate



to labor market outcomes, particularly the findings from MDRC's extensive career academies study (Kemple and Scott-Clayton 2004). Taking a concentration of CTE courses appears to lead to improved wages over time, at no expense to academic performance or participation in postsecondary education. The career academies data is particularly compelling for young men, who earned as much as \$212 more per month.

While the link between taking a concentration of CTE courses and higher wages in the short to medium run is strong, the link between a CTE concentration and academic improvement is weak at best. But to be honest, until recently, CTE was not designed to teach students academic skills. It would be surprising if CTE programs that did not have increased academic competency as a priority were to be successful in raising academic achievement.

In recent years, as Katharine Oliver and others note in this report, responsive CTE programs and systems have been adjusting their curricula to supplement the teaching of English, reading, math, and science skills. In schools where CTE curriculum has been integrated with solid academic skills and supplements and enhances the basic disciplines, students are doing better on standardized academic tests. Nowhere is this better seen than in long-time High Schools That Work sites.

Other innovative CTE programs have demonstrated increases in student graduation rates and entry to postsecondary education. For more than a decade, the Tech Prep program has helped develop pathways for high school students to advance to postsecondary education in a technical field. Many Tech Prep students have continued on to four-year colleges and universities, and the program is associated with expanding dual enrollment options for students.

If one agrees that there is value in offering CTE in high school, then we need to determine how best to align CTE with current high school reform efforts and how CTE can best contribute to high school reform. AYPF also addressed this issue in *Rigor and Relevance*.

The goal of most high school reform efforts is to provide all students with a rigorous curriculum, relevance in their learning, and meaningful and supportive relationships with teachers and other adults. These three principles—rigor, relevance, and relationships, which have been popularized by the Bill & Melinda Gates Foundation—are evidenced in the daily life of school, through curriculum and teaching, supportive and supplemental services, guidance and counseling, high expectations, accountability, partnerships with employers, opportunities to learn in the community, etc. As educators discover ways to create or transform high schools based on these new three Rs, many of which emphasize personalization of instruction and small school size, a common feature is emerging. These new or transformed schools frequently have a strong focus or unifying theme, be it the arts, math and science, serving a specific population, or a career theme.

The best CTE programs and school designs point the way for high school reform more generally: greater academic rigor, a clear focus or theme, pathways connecting secondary and postsecondary institutions, and increased time with adults.

We have probably all heard anecdotes about students liking their vocational classes because they understand why they are learning something. We now know through brain research that many people just learn better that way. Perhaps CTE's greatest contribution has been to make education relevant and keep students motivated and engaged in learning.

CTE career-themed academies or clusters—in law enforcement and public service, health and human services, culinary arts, information technology, and finance—are multiplying. While some complain this structure forces students to select a

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career too early, many schools are designed to have students select a theme in tenth, not ninth, grade. Most of these schools and programs are designed with a common core curriculum that allows students to transfer between career themes.

Tech Prep and articulated pathways between secondary and postsecondary education have encouraged thousands of middle-performing students, who might never have considered college, to pursue college classes. Clearly, CTE has contributed an important improvement strategy for increased access to postsecondary education.

CTE has provided opportunities for students to spend time with adults (teachers, counselors, and employers) working on real work problems. While there may not be quantifiable research on this topic, it is clear to me that the relationships established between CTE students and their teachers or employers have kept many a young person in

school and led to community college or a good job. Perhaps these kinds of relationships are easier to develop in elective classes, where there is less pressure, or in subjects that are naturally motivating and engaging to students. Whatever the reason, this lesson should not be lost by high school reformers.

In the end, in today's demanding economy, CTE will rise or fall based on its ability to prepare young people with academic skills that lead to postsecondary learning and credentials. Increasing academic rigor is the key challenge facing all CTE efforts. Yet, as more academic curriculum is integrated into CTE to reinforce what students learn in other classes, and as CTE systems become better integrated with high school reform more broadly, the academic performance of CTE students should improve.

A Governor's Approach to Improving Secondary Career Education

Governor Mark Warner

When I campaigned for Governor several years ago, one of the biggest applause lines I got was when I spoke of the need to strengthen career and technical education, particularly in our state's rural communities. As I often said, we need to value plumbers and electricians the same way we value lawyers and accountants.

People responded as they did for different reasons. Some were probably happy to see a candidate for Governor bury old stereotypes about “shop class.” Others were glad to hear their own professions compared favorably to jobs that traditionally pay extremely well.

But for me, the importance of career and technical education was based on trends I had seen emerging for several years in private business—namely the increasingly technical requirements for jobs that had once been viewed as semi-skilled or even un-skilled. The fact is that while a high school diploma was enough to earn a decent living at the dawn of the 20th century, it is insufficient now. Career and technical training beyond high school is an imperative in today's economy. In fact, in the years ahead, higher paying professional or skilled jobs will represent 62 percent of all jobs in the United States.

After three years as Virginia's Governor, I am more convinced than ever that I was right during my campaign. If anything, I understated the urgency of this challenge. Without more skilled workers, the United States will lose ground economically to our competitors in Asia, Europe, and the rest of the world. Business leaders understand that the off-shoring of American jobs comes about not just because of the low wages paid by our competitors, but also because of the skills of their workforces.

Readily available and effective career and technical education—combined with a firm grounding in mathematics, science, and technology for all students—should be an essential part of the high school reform effort that President Bush is now undertaking. And it is every bit as important as improving access to—and academic performance within—our colleges and universities.

My own experience as Governor bears this out. When we recruit new industries to Virginia, the first questions employers ask is about our workforce. They want to know not just about our K-12 system and the quality of our high school graduates, but also about continuing education opportunities available at our community colleges or four-year institutions. They are also interested in the flexibility of our workforce development programs to respond to changing needs from industry.

As the Chairman of the National Governors Association, and as the immediate past Chairman of the Education Commission of the States, I have seen first-hand how states are working successfully to strengthen basic skills and accountability for all disciplines and take specific measures to upgrade career and technical training. Both efforts go hand in hand.

We have taken several steps in Virginia along these lines. Our most important step was to launch a comprehensive high school reform effort that offers new opportunities to students pursuing career and technical training. This program, known as the *Path to Industry Certification*, encourages students who are not college bound to continue working toward high school graduation while pursuing technical training for a selected

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industry certification, such as a Licensed Practical Nurse or Auto Body and Collision Technician. Often, this technical preparation will continue after graduation from high school.

Under the program, participating students and their parents sign a Student Compact agreeing that the student will complete high school and then enroll in further technical training to acquire the appropriate skills and certifications needed to enter a higher-wage career. Typically, students will continue to take industry-specific training at their local community college during the summer and fall after graduation. Up to one semester of technical training will be available tuition-free to students in the same calendar year after graduation from high school, as long as that semester allows them to complete the certification program. In the pilot phase of the program, 63 students are enrolled in the Path to Industry Certification; for the upcoming year, our target is to expand that number markedly. We have had several students leave the program because they decided to pursue full-time studies at a community college.

Significantly, this initiative also establishes teacher-training academies to increase the number of high school teachers with appropriate industry certifications to teach the required course. As of this writing, 1,233 Virginia teachers have participated in training academies, and the vast majority of them have received industry certification. With this training and credential, these teachers will be far more effective in the classroom.

At the same time that we launched new incentives to encourage high school seniors to obtain additional career and technical training, we also established a statewide Career and Technical Education Foundation to help bridge the gap between the large number of technical jobs available throughout Virginia and the comparatively small number of qualified applicants to fill them. Through public-private partnerships, the foundation promotes and supports initiatives that facilitate greater awareness of career and technical employment opportunities, quality training programs, and the many positive benefits of related career choices. The foundation has also launched an exciting new Web site, www.knowhowvirginia.org, to serve as a clearinghouse for students, their parents, and teachers on career opportunities in technical fields, as well as certification requirements and available training. The Web site is part of a broader effort by the foundation to strengthen the image of career training among students.

In Virginia, we have also recognized that part of building a strong, competitive workforce is to save those who have fallen through the cracks of our public school system or who are at risk of falling through. Students who lack a diploma or GED are far less likely to obtain career training than are students who possess such credentials. Reversing the high drop-out rates within our system of public education is a key ingredient of building a more competitive workforce.

To this end, we established an initiative in the spring of 2003 called *Project Graduation*. Under the program, the Commonwealth works to identify students who have failed, or who are at risk of failing, the exit exams that are now required for graduation from Virginia's high schools. We have employed a variety of measures to walk the extra mile with these students so they will graduate. These measures include summer academies, on-line tutorials, enhanced mentoring, and distance learning. Thanks in large measure to *Project Graduation*, Virginia has met the challenge of high-stakes testing and has put more of our students in the position to graduate and thus go on to successful careers.

Our second measure to help Virginia elevate their skills is called the *Race to GED*. The program represents a unique partnership between the Commonwealth and its motor-sports industry to encourage some of the 700,000 Virginians who lack a high school diploma to obtain a GED. To this end, we have established GED prep courses that enable students to earn their certificate in as few as 180 days. Other parts of the program permit even faster completion of the GED requirements.

The *Race to GED* has been based at raceways around Virginia. It has been especially popular with men and women who have lost jobs in traditional industries, such as textiles, and who need a GED to take advantage of educational benefits under the federal trade act of 2002. That law provides assistance to workers who lose jobs because of competition from inexpensive foreign labor. In *Race to GED*'s first months of operation, almost 1,000 citizens qualified to participate in it, and we expect that number to grow this year.

Finally, as part of our efforts to strengthen our workforce and career and technical training programs, Virginia has created a new *Career Readiness Certificate* that will assure employers that the worker has achieved a competency level in several basic knowledge areas, including reading, math, and writing, as well as in practical skill areas, such

as writing business correspondence and locating information. Potential employees will earn a *Career Readiness Certificate* by taking basic skills assessment tests administered in a variety of settings.

Underpinning all our efforts to strengthen career training in the United States must be a shared, unwavering commitment to rigorous standards and improved teaching at the elementary and secondary levels. Whether a student is going to college after graduation or a job, they need the same thing: a strong background in reading, mathematics, and science and technology. Insisting on these requirements will, in large measure, determine the nation's economic success in the decades ahead.

Sustained progress in these areas will strengthen the competitive position of our nation's economy, create new jobs for our people, and improve the quality of our communities.

How the Federal Government Could Promote Academically Rigorous Career and Technical Education

Ross Wiener, *The Education Trust*

Too often, discussions regarding the future of CTE dance around the real issues. We need to get honest: honest about the fears that we have for students, honest about the best ways to help students, and honest about the fact that far too many programs are not helping—but are in fact hurting—students.

It is hard to find an education expert who disputes the need to infuse career and technical education with more rigorous academics. Yet there is only the most limited support to change federal law and demand increased academic rigor in federally supported CTE programs, as the recent reauthorization debate on the Perkins Act demonstrates.

This situation results, at least in part, from an all but unspoken article of faith among many policymakers and educators that career and technical education is the last best hope for those kids who cannot make it academically. Many earnestly believe that these programs—which all too often give short shrift to literacy, computation, and critical thinking skills—“protect” such students from academic failure, increase the chances that they will graduate from high school, and adequately prepare them for the best life that non-college bound young people can hope for.

This line of reasoning relies on two devastating myths:

- That high percentages of students are unable to acquire high-level academic skills; and
- That young people without such skills can operate successfully in the adult world of work and citizenship.

American students of all races and incomes can achieve at much higher levels than we, the adults, assume that they can. Despite conventional wisdom, the data strongly suggest that students learn more *and fail less often* when they are in the most challenging academic courses compared to low-level courses designed to meet them where they are. This is true even for those students who had not done well in the past—*and it is true for vocational students in particular*.

For example, one federal study found that the “weakest” students—those in the lowest quartile of performance in their eighth-grade year—saw much greater test score gains when they were placed on the college prep, rather than the vocational path (Levesque et al. 2002). Another study of students who were in the lowest reading quartile in eighth grade were 50 percent less likely to earn Ds or Fs in ninth-grade reading if they were placed in a college prep English rather than a low-level English class (Cooney and Bottoms 2002). If we assign students to CTE tracks lacking in academic rigor, we may actually be consigning them to exactly the kind of marginalization from which many CTE advocates would claim to protect them.

Everyone recognizes that the world has changed dramatically in a single generation. Success in the adult worlds of work and citizenship now is dependent on strong reading and computational skills. And it is likely that it will become even more so as we move deeper into the 21st century.

These rising demands confront all of our young people, not just the college-bound. The technical reading and computational skills required for jobs that pay a living wage are remarkably similar to those required for credit-bearing college courses. The ever-popular myth of the hard worker who can’t read well or divide fractions but owns his own air-conditioning repair company is just that—a myth. Peruse a technical manual for repairing one of today’s air conditioners. Or step into the repair bay at your local auto dealer—it looks more like a lab than a grease pit. Try operating one of the diagnostic computers used to work on today’s high-tech, computer-driven cars. You’ll quickly realize this is not your father’s Chevrolet—or his job market. Pipe fitters need trigonometry.

Airplane mechanics need strong reading skills, along with postsecondary-level physics and chemistry and advanced mathematics.

Some would argue that while all students need advanced algebra and then some, not all will learn it well in traditional college prep courses taught in the traditional way. That's a legitimate concern, and that's why studying successful models is so important. Some programs have risen to the challenge of the new world of work, introducing rigorous academic courses and bridging the divide between college prep and career-focused education. The most prominent example is the High Schools That Work program, now being administered in more than 1,000 high schools (Southern Regional Education Board 2004). The first principle of HSTW is that *all* students get high-level academics alongside career and technical studies. HSTW and other successful CTE programs combine real-world, applied learning experiences with the rigorous academic content that traditionally was reserved for the "college prep" track. It's not an "either/or" but a "both/and" proposition.

Despite the consensus that CTE programs must include strong academic components, despite the fine examples of programs that have successfully integrated rigorous academics into CTE programs, despite the evidence that young people can and must rise to the challenge of more rigorous programs—federal policy has yet to *require* the sorts of changes that young people need and that the new economy demands. Federal policy *encourages* changes. Federal officials and advocates for CTE talk about the desirability of more rigorous academics. They wax eloquent about "integrating" academics into career-prep programs. Yet federal policy continues to support outmoded programs that fail to adequately prepare students for the 21st century labor market.

Too often, discussions regarding the future of CTE dance around the real issues. We need to get honest: honest about the fears that we have for students, honest about the best ways to help students, and honest about the fact that far too many programs are not helping—but are in fact hurting—students.



To pursue careers that pay a decent wage and offer opportunities for advancement, students must be able to access postsecondary educational opportunities—in universities, community colleges, or industry/employer-sponsored programs. Federal support for career/technical education should be reserved for programs that ensure students are prepared to do college-level work, whether they intend to enroll in college or not. Good programs are already doing this. Congress must be clear that other programs need to upgrade their academic components or forego federal funding.

To signal this commitment to CTE that promotes high-level learning, Congress should make at least the following four modifications:

Define “academic rigor” and “high skill, high wage jobs.”

The Perkins Act relies heavily on these two catch phrases, but they fail to convey any substance or provide any meaningful conditions for federal support.

Not only does Perkins fail to define “academic rigor” or “high skill, high wage jobs,” *it does not even ask the states to define these terms*. Indeed, lobbyists for the vocational education community have insisted behind closed doors that defining these terms would be inappropriate because some existing programs wouldn't meet the standards that would emerge. This begs the question: Why

would Congress support vocational programs that do not prepare students for high-skill, high-wage jobs or that do not incorporate academic rigor?

Congress must define these terms so that they establish genuine eligibility requirements and to eliminate low-level, dead-end programs from participation in the federal program.

Account for the knowledge base of vocational teachers.

In 2000, almost 9 percent of vocational high school teachers did not hold even a baccalaureate degree (Silverberg et al. 2004). More striking is that prospective vocational teachers have lower scores in reading and writing (on the PRAXIS exams) *than those planning to teach at the elementary school level* (Silverberg et al. 2004). Many proposals to reform CTE education pay lip service to the need for vocational teachers to integrate rigorous academics but fail to acknowledge the depth and scale of the challenge. Currently, vocational teachers are exempted from the requirement to be “highly qualified.”

To get serious about integrating rigorous academics into federally supported vocational programs, we need a significant investment in professional development, and states need to set standards for acceptable levels of knowledge for these teachers.

Differentiate state-reported data for student outcomes that are clearly different.

Right now, states report the percent of vocational students who enter the military, go to college, or go directly into the workforce as one, undifferentiated outcome—even though they collect the data separately for each of these outcomes. Data on graduation rates is similarly confused (e.g., a GED is treated the same as a regular high school diploma).

These outcomes represent very different results for the students themselves and for society.

Graduating from high school with a regular diploma is not the same as getting a GED, and going directly into the workforce is not the same as entering higher education. Aggregating the data

on outcomes prevents Congress—or anyone else—from gauging the value of federally supported vocational programs.

Focus on valid and reliable data.

The data on which vocational education is to be evaluated are not reliable. For example, most states measure outcomes for vocational students using a direct-mail survey. Only those students who respond to the survey are counted in the denominator, making outcomes look rosier than reality. And many states use tenth-grade assessments to measure whether vocational education students are making enough progress on their academics, even though most vocational courses are taken after tenth grade.

In addition, although Perkins data is supposed to be reported for “disadvantaged groups,” there is inconsistent reporting in this regard. All Perkins data should be disaggregated by the groups for which NCLB requires separate reporting, so that we can determine differences in programs and success for students of different race/ethnicity, wealth, disability status, etc.

Meaningful accountability is not possible without meaningful data. The reauthorization of Perkins must require states to use better data, especially in their measures of academic skill attainment and in determining who is being served and how well.

Conclusion

Our fears about the limited academic abilities of some students ultimately stunt their intellectual growth. Moreover, these fears have stunted the development of national CTE policy such that these policies do a disservice to the entire national economy—in producing workers who don’t meet the needs of today’s workplace and hobbling our international competitiveness. The data strongly suggest that our fears about the abilities of young people are unfounded; that if they are challenged academically, they will rise to the challenge and become more successful students, employees, and participants in our civil society.

The SREB Model: Academic Rigor, Technical Relevance, and a Head Start on a Career

Gene Bottoms, Southern Regional Education Board

If we step back for a moment, I think we can agree that the overall goal of high school career and technical education is to prepare students for careers in business, industry, and human services. But we cannot stop there. We shortchange our youth and our country if we fail to dedicate ourselves to preparing students for continued learning and further study.

The primary role of career and technical programs is to prepare youth for careers and further study by raising students' achievement in technical literacy. By technical literacy I mean the ability to:

- Read, understand, and communicate in the language of a career field;
- Use mathematical reasoning and understanding to solve problems found in a career field;
- Understand scientific and technical concepts, principles, and processes for application in a given career field; and
- Use technology to complete projects and authentic tasks in a broad career field.

Further, it is the role of high school career and technical studies to add relevance and purpose for high school students by having them complete a planned sequence of career studies along with a coherent and rigorous academic core:

- Four credits in college-preparatory/honors English;
- Four mathematics credits, including Algebra I, geometry, Algebra II, and above;
- Three credits in a college-preparatory science sequence that is related to their career/technical field; and
- At least four credits in a planned career sequence.

Another role of career and technical studies in high school is to provide students with ways to explore broad career fields and to examine the career and related educational opportunities available to them.

Finally, it is the role of high school career and technical studies to provide students with opportunities to acquire or get a jump start toward a recognized employer certification credential that has value in the workplace. This is especially important for high school youth who do not plan to enter postsecondary studies. Starting youth on that journey may culminate in an Associate's degree, a certificate from a community or technical college, passing an employer certification exam, or receiving a journeyman's credential through apprenticeship programs. In summary, the Southern Regional Education Board advocates that career and technical studies advance students' technical literacy achievement by connecting high school programs to rigorous academic studies; it should do this through a planned program that gives students an opportunity to explore options available to them beyond high school, while giving many a jump start on obtaining a recognized employer credential.

Why Does SREB Advocate this Role?

First, high-quality career and technical studies leading to good-paying jobs may be the only way to encourage some students to see that high school matters to their future. A coherent blend of rigorous academic and career and technical studies can motivate them to take these courses when they see the advantage in the workplace. Making the effort necessary to acquire the academic and technical knowledge and skills opens the door to getting good jobs.

High-quality career and technical studies leading to good-paying jobs may be the only way to encourage some students to see that high school matters to their future.

Second, high-quality career and technical studies that give students opportunities to apply academic skills and knowledge in completing real-world tasks add value to academic achievement. This enables students to see the need for more rigorous mathematics and science studies and to understand how academic knowledge and skills are utilized in the workplace. Deepening their understanding and retention of essential mathematics and science concepts supports the good jobs with a future that they pursue.

Third, high-quality career and technical studies blended with a rigorous academic core will open up vistas of opportunity. More students will advance through their immediate goal to the pursuit of postsecondary studies at both two-year and four-year institutions. This increase has been one of the great success stories at High Schools That Work sites. As high schools more deeply implement the HSTW design, we have seen an increasing percentage of career-oriented students going on for further study. In the early 1990s, 50 percent of career and technical students pursued postsecondary studies. Now a decade later, more than 70 percent of students do.

Fourth, research findings continue to validate that high school students who complete a career and technical concentration, take a college-preparatory curriculum, and go on to further study are more likely to complete a college degree on time than are other high school graduates. It appears that

high school career and technical studies help students set very focused goals. They enter postsecondary studies with a definite purpose in mind that drives them to complete the program. These are not the youth who go to college for the purpose of going to college. These are the youth who go to college with the intent to achieve a career objective that often evolved out of their experiences in high school career and technical studies.

What changes are needed to advance the role outlined for high school career and technical studies?

State policies need to require or encourage that each year a higher percentage of students complete the college-preparatory academic core and one of three concentrations—mathematics and science, humanities, or career/technical. State policies are needed that give recognition to students who start and complete or who continue to work toward a recognized employers' credential while in high school. This means states establish policies of what a recognized credential might be, including passing an employer certification exam or a state license exam or earning an Associate's degree or a certificate from a community or technical college.

It means assessing technical literacy achievement that students have acquired through high school career and technical studies. In essence, approved high school career and technical programs ought to demonstrate that by completing a set of courses, students can read, interpret, and comprehend the language of the career field they have been studying; that they can solve the kind of mathematics problems that they would encounter in that field, not only at the entry-level but as they advance in the field; that they have an understanding of major technical concepts that undergird the career and technical field they are studying; and they can demonstrate that they can identify a major problem in the field, develop a plan for solving that problem, carry out that plan, describe it in written form, and make an oral presentation about it.



High schools will need qualified teachers, in each career and technical classroom, who can create and manage a learning environment where students are expected to prepare for success in postsecondary education and in the workplace. They will need teachers with sufficient core academic knowledge and mastery of teaching pedagogy to blend together higher-level academic knowledge and skills with real-world problems and projects. They need to know how to plan this kind of instruction and how to assess it to determine whether students are acquiring the technical literacy skills necessary.

We must have clearly defined conditions under which we link high school and postsecondary career and technical studies into a seamless pathway. Students need to know the conditions under which high school studies can count for postsecondary credit. SREB believes these conditions should: 1) require that career/technical teachers teaching high school classes for postsecondary credit meet the credentials required of postsecondary teachers; and 2) mean that career and technical studies can count as postsecondary credit when students have met the requirements for postsecondary studies without having to take remedial or developmental courses.

High-quality high school career and technical studies add value to academic achievement by having students apply those skills. It is difficult to see how this value can be added if students do not have the academic skills necessary for entering a community or technical college without having to take remedial courses. This means assessing students early in high school, at least by the end of grade 11, about their readiness for postsecondary studies. These conditions are essential if we are to join high school and postsecondary career and technical studies together in a seamless pathway that gives students an education that adds value to their future place in the workforce.

How can state and local school districts know that they have a high school career and technical program that is achieving these expected roles?

They will know this when students:

- Acquire the technical literacy skills needed to read, understand, and communicate in the language of the career field;
- Understand mathematical reasoning and concepts to solve problems found in a career field;
- Understand underlying technical concepts, principles, and procedures and can use technology to complete projects in a broad career field;
- Complete a solid academic core with academic knowledge and skills grounded in real-world projects and tasks that are both challenging and highly engaging;
- Learn and model technical knowledge and skills that provide a firm foundation in a given career field, not just a narrow set of skills to satisfy the requirements of an entry job;
- Gain valuable workplace skills as these programs either provide direct exposure to the workplace or create simulated work environments where students are challenged intellectually;
- Can address tough problems and uncertainties that adults confront on a regular basis and these programs contribute to the social development of young adults; and
- See the connection between high school and their future by placing before them authentic adult tasks by offering more applied and contextual learning opportunities.

Reform in Maryland: Achievement Matters Most

Katharine M. Oliver, Maryland Department of Education

Maryland's Strategic Plan for education—*Achievement Matters Most*—specifies five goals for the state's system of public education: improved achievement for each student; better alignment of instruction, curriculum, and assessment; outstanding teachers and principals; schools that are safe, drug-free, and conducive to learning; and involved parents and communities. Career-focused education, known in Maryland as Career and Technology Education, plays an important role as the state seeks to achieve all five goals, most importantly as it seeks to accelerate achievement for every student. CTE offers students focused programs of study that provide relevance to their high school experience—clearly positing high school as an important stepping stone to success in college, career, and membership in one's community. CTE serves to challenge students to engage in more rigorous academic studies often required by the technical major. And, finally, CTE offers the students the opportunity to learn in an applications-focused environment that advances student learning beyond rote memorization into deeper understandings of academic and technical knowledge and skills.

Maryland's extensive experience in school reform also included a major focus on CTE. In 1989, in concert with the release of the report of the Maryland Commission on School Performance, the Maryland Commission on Vocational-Technical Education issued recommendations calling for a new model of vocational education that soon became called career and technology education. The new model, the commission said, needed to prepare students for both employment *and* further education. High schools needed to ensure students access to, and success in, challenging CTE programs that developed academic, technical, and workplace skill sets.

The commission recommendations provided impetus for the establishment of CTE completer programs—sequential programs of study guided by industry standards. In 1992, the State Board of Education included state-approved CTE completer programs as one of the three elective, focused programs of study required for high school graduation. Three years later, the State Board of Education took the bold step of stating in its strategic plan that every student needed to graduate from high school prepared for both college and career. Today, more than 50 percent of high school students are enrolled in high school CTE programs. In 2004, 25 percent of that year's graduates completed a CTE program of study. Both graduate and employer follow-up studies support the added value these programs provide for students and employers. (See “Maryland Work-Based Learning Report” at www.mdctedata.org.)

As the number of CTE completers has risen, the number of students completing both an occupational program while also preparing for postsecondary study continues to increase. In 1993, when Maryland first reported on the number of CTE students also completing the coursework to prepare for college admission, only 14 percent of CTE completers followed the college-prep coursework pathway. Today that percentage has increased to 41 percent (Maryland Department of Education 2004). Moreover, the Maryland School Performance Report shows that students in certain CTE programs (Health & Biosciences and Arts, Media & Communication) outpace their peers in terms of rigorous course taking. Examples of rigorous course taking include one or more credits in mathematics beyond geometry and Algebra II with a grade of B or better or four credits of science with a grade of B or better. (See “Rigorous Course Performance for CTE Programs” at www.mdctedata.org.)

A critical element to the continued improvement of CTE programs and outcomes has been the use of high-quality performance measures that assess the progress of CTE programs. Four years ago, the Maryland State Department of Education's CTE staff began analyzing the data on Rigorous Course Indicators. At that time, a gap existed between CTE completers and all high school graduates on the measures. By providing the information to local school systems and focusing program development efforts on programs with high-level academic expectations for all students, there has been steady progress in closing that performance gap. The use of these and other student performance data help state and local efforts to accelerate student achievement and eliminate performance gaps based on race, wealth, and disability. The state requires that local school system Perkins plans and their strategic, district-wide Master Plans analyze and address improved student achievement based on disaggregated academic, technical, completion, and post-high school performance measures.

The 1989 Commission on Vocational Technical Education was not the last group to support high school CTE and to urge the state to continually recast development and implementation of high school occupational education programs in order to be responsive to the changing needs of the workplace. From the workplace has come continuous demand for expanding and improving high school CTE programs—and for ensuring alignment with appropriate next steps in the postsecondary arena. Three consecutive surveys of employers conducted by the Maryland Business Roundtable for Education (2001) identified secondary CTE as the most important public policy issue on its workforce development agenda. And for good cause. Maryland's knowledge-based economy, dominated by health care, medical research, aerospace, and other high-tech industries, depends on the K-12 system to prepare an increasing and more diverse group of students for these technical work environments. CTE, as it works to ensure a qualified

workforce for this 21st century knowledge economy, also positions the state to attract and retain businesses that will solidify and enhance the standard of living for Maryland's citizens.

To remain an integral part of education, workforce preparation, and economic development, CTE must demonstrate that it creates value for its customers and stakeholders. On the stakeholder side, this means listening to business and industry, postsecondary institutions, policymakers, and those who invest in CTE. It means responding to their expectations by promoting programs that meet their expressed needs. These needs require CTE programs to help students to:

- Gain an understanding of the full end-to-end business process, rather than learning skill sets in isolation;
- Apply and extend academic skills developed earlier in high school (or concurrently with their CTE program) so that they are prepared to succeed in postsecondary programs;
- Develop the attributes necessary for the high-performance workplace of the 21st century: problem-solving, task management, project management, teamwork; and
- Complete the coursework that makes up a seamless, non-duplicative pathway that articulates to postsecondary programs.

On the customer side, it means responding to students and parents by providing viable and attractive CTE options that can be seen as adding value to the high school experience. It includes ensuring students a systemic approach to career development that helps them make informed decisions regarding career pathways, as well as providing students with multiple options as they prepare for entry into careers and further education. It also means supporting local school systems so that resources are available to turn a proposed program of study into high-quality instruction in the classroom and technical laboratory. These resources include curricula, instructional materials, assessments, and professional development opportunities.

A critical element to the continued improvement of CTE programs and outcomes has been the use of high-quality performance measures that assess the progress of CTE programs.



To affect this balance and ensure that CTE programs are meeting the needs of both customer and stakeholder, Maryland CTE, with the assistance of hundreds of partners from Maryland business and industry, established a Career Cluster Framework. Organized by broad industry and economic sectors, the framework defines career pathways by core business functions. The career pathways guide the development of instructional programs to prepare students for the full range of career opportunities. Under development are new or upgraded instructional programs, called CTE Pathway Programs. After reviewing current CTE offerings in each cluster, existing and emerging programs at the postsecondary level, curriculum and assessment availability, and the recommendations of business and community experts, Maryland CTE agreed on 48 model secondary CTE Pathway Programs.

These 48 programs will be provided with development and implementation assistance by state CTE leadership. Comprehensive program adoption will take place when an external partner has already developed a program that includes resources and accountability at a sufficient level of quality to meet stakeholder requirements. Examples include the pre-engineering programs offered by Project Lead the Way and the Database Academy provided by Oracle. In other areas, where a complete end-to-end CTE program is not available, a high-quality assessment or certification that covers most of the scope of the program drives program devel-

opment. Recent redesigns of cosmetology and automotive technology programs followed this approach.

Finally, when neither of the first two options exists, Maryland CTE looks to partnerships for collaborative program development. New programs in business education and a proposed Teaching Professions Academy, created through collaborative efforts by local school systems, are examples of this approach. The result will be an improved approach to developing/renewing programs that does not require each local school to undergo the full development process on its own, as well as a vehicle for delivering targeted professional development for instructors across the state. It anticipates maximum alignment of the involvement of businesses, vendors, postsecondary partners, and others for the benefit of the state's CTE system.

The road ahead for Maryland CTE is a promising one, but one with significant challenges. Too many parents and educators know only of the "shops" that once characterized vocational education. There are too few opportunities for CTE teachers, who are well qualified in their content areas, to become better equipped to reinforce and extend the academic knowledge and skills required by the workplace. We still struggle for the resources to ensure easy access to state-of-the-art occupational laboratories for increasing numbers of students. And we still have not yet fully articulated the learning levels to ensure that students enter ninth grade ready for high school and graduate equally prepared for postsecondary studies. Yet expanded and stronger partnerships within K-16, a commitment of increased state dollars for education, and a strategically focused state workforce development system provide hope that solutions to these challenges are on the horizon.

Toward Better Outcomes: Lessons from New York and National Research

Katherine L. Hughes, Institute on Education and the Economy, Teachers College, Columbia University

As Richard Kazis correctly observes, the rumors of the death of occupation-oriented education in American high schools are exaggerated. One has to only visit high schools around the country to see that career and technical education is alive and well. And while occasional death threats are issued by the federal government, there does seem to be a national consensus that CTE is valuable and should be supported.

CTE and High School Persistence

There are many good reasons for preserving and strengthening CTE in our high schools, as Kazis describes, but one of the most compelling is its positive impact on high school retention and graduation rates. Recent reports from the Urban Institute's Education Policy Center and the Center for Social Organization of Schools at Johns Hopkins University point out the dire nature of the dropout problem. According to the Urban Institute, nearly one-third of public high school students fail to graduate, with disadvantaged minority groups faring even worse. The Center for Social Organization of Schools finds that the number of high schools with weak promoting power, meaning that less than 60 percent of the freshmen are there as seniors four years later, increased in the 1990s.

In reviewing the body of research on CTE and career exploration programs, the data from several studies are clear in showing positive impacts on persistence in high school. And those data are supported by high school principals and teachers who commonly share anecdotes such as: "S/he would have dropped out if it weren't for the auto tech program"—or health academy, or culinary concentration, or IT strand.

Yet aside from keeping students in high school and increasing their chances of completing, the remaining research evidence indicates that CTE positively influences non-academic outcomes, while having no impact on academic measures such as grade point averages and test scores. This, and the commonly heard criticism that CTE may not adequately prepare young people for postsecondary education, tells us that we must ensure that CTE has a quality academic core.

CTE Reform in New York State

In New York State, the Education Department has recognized the importance of CTE in preparing young people for the future and has engaged over the last several years in a process of review of existing CTE programs and the creation of new ones. All programs must go through a structured approval process that includes visits by school district officials and outside experts. The visiting group looks for evidence of several criteria, such as a quality curriculum that includes integrated academics, faculty with state certification in the appropriate academic and/or technical fields, technical assessments that certify that students meet current industry standards, and work-based learning experiences. Programs must also collect data on student performance and progress. Once approved locally, program documentation then goes to the state for its endorsement.

All CTE programs must also have articulation agreements with postsecondary institutions. And all New York students, those in CTE or not, must pass a series of academic examinations in order to receive a high school diploma. These are solid efforts, then, to ensure that students who choose to

One of the most compelling reasons for preserving and strengthening CTE in our high schools is its positive impact on high school retention and graduation rates.

participate in CTE leave high school with the same academic preparation as non-CTE students, so that their post-high school options are not limited.

Increasingly, in New York and elsewhere, today's updated CTE programs are connected to postsecondary coursework. While Tech Prep programs have provided pathways from high school to college CTE programs for years, new technical dual enrollment options seem to be less narrowly focused and provide better opportunities for college credit-earning. For example, students in Iowa's Health Sciences Academy take Kirkwood Community College courses that yield both high school and college credits, prepare them for the Certified Nursing Assistant licensing examination, and provide a basic background for a variety of health professions, including nursing, dental hygiene, and physical therapy.

Gender Issues in Secondary CTE

Finally, Kazis raises an important issue that deserves our attention: the growing gap between male and female attainment and success in school. Males do have a lower high school graduation rate than do females, and the research does show that CTE can help in this regard. Yet this does not mean we should focus on CTE as an intervention for males only. We should be very concerned about

the fact that CTE programs are highly sex-segregated. A May 2000 report from the New York City Board of Education's Task Force on Sex Equity found that the CTE programs in high-wage industry areas are heavily filled with male students, while female CTE students are concentrated in low-wage areas. Some of the New York City high schools with CTE concentrations are as much as 90 percent one or the other sex—entire high schools, not only the programs. And as the MDRC career academy study found, the positive employment impacts of career academy participation were for young men only. Thus, while we are seeing greater success for young women than men in school, we do not want CTE to continue to contribute to women's disadvantage in the labor market.

Conclusion

It behooves those of us who study CTE to broadly disseminate the research on CTE, rationales for its continued existence, as well as ideas for its improvement. Since even such a respected source as *The New York Times* recently mischaracterized CTE as “just wood shop and fender pounding” on its editorial page, we must provide information to the public so that CTE remains alive in our high schools and becomes ever healthier.

References

- Allen, Lili, Susan Goldberger and Adria Steinberg. 2004. "Pathways to Postsecondary Credentials: Schools and Programs that Blend Education and Employment." In Richard Kazis and Marc S. Miller (eds.) *Double the Numbers: Increasing Postsecondary Credentials for Underrepresented Youth*. Cambridge: Harvard Education Press.
- Brand, Betsy. 2003. *Rigor and Relevance: A New Vision for Career and Technical Education*. Washington, DC: American Youth Policy Forum.
- Bailey, Thomas R., Katherine L. Hughes, and David Thornton Moore. 2004. *Working Knowledge: Work-Based Learning and Education Reform*. New York: RoutledgeFalmer.
- Barth, Patte and Kati Haycock. 2004. "A Core Curriculum for all Students." In Kazis, Richard and Marc S. Miller, (eds.) *Double the Numbers: Increasing Postsecondary Credentials for Underrepresented Youth*. Cambridge: Harvard Education Press .
- Bishop, John H. and Ferran Mane. 2004. "The Impacts of Career-Technical Education on High School Labor Market Success." *Economics of Education Review*. 23.
- Bottoms, Gene. 2003. "High-Achieving Schools Lead in Deeply Implementing the HSTW Design." Presentation to HSTW Summer Institute.
- Castellano, Maria et al. 2003. *Early Measures of Student Progress in Schools with CTE-Enhanced Whole School Reform: Math Course-Taking Patterns and Student Progress to Graduation*. Minneapolis: National Research Center for Career and Technical Education, University of Minnesota.
- Cooney, Sondra and Gene Bottoms. 2002. *Middle Grades to High School: Mending a Weak Link*, Atlanta: Southern Regional Education Board.
- Hershey, Alan, et al. 1999. *Expanding Options for Students: Report to Congress on the National Evaluation of School-to-Work Implementation*. Princeton: Mathematica Policy Research, Inc.
- Hughes, Katherine L. and Melinda Mechur Karp. 2004. "School-based Career Development: A Synthesis of the Literature." *IEE Brief*. Number 30.
- Hughes, Katherine L. et al. 2001. *School-to-Work: Making a Difference in Education. A Research Report to America*. New York: Institute on Education and the Economy, Teachers College, Columbia University.
- Jobs for the Future. 2005. *Career and Technical Education in Pennsylvania: Opportunities for Commonwealth Policy*. Boston, MA: Jobs for the Future.
- Kemple, James and Judith Scott-Clayton. 2004. *Career Academies: Impacts on Labor Market Outcomes and Educational Attainment*. New York: MDRC.
- Levesque, Karen, et al. 2000. *Vocational Education in the United States: Toward the Year 2000*. Washington, DC: U.S. Department of Education, National Center for Education Statistics.
- Maryland Business Roundtable for Education. 2001. *Maryland Workforce Educational Needs: Assessment Survey*. Baltimore: Maryland Business Roundtable for Education.
- Maryland Department of Education. 2004. *2004 Maryland Report Card*. Baltimore: Maryland Department of Education. Available at mdreportcard.org
- Medrich, Elliott, Sarah Calderon, and Gary Hoachlander. 2003. "Contextual Teaching and Learning Strategies in High Schools: Developing a Vision for Support and Evaluation." In Betsy Brand (ed.) *Essential Forms of High School Reform: New Forms of Assessment and Contextual Teaching and Learning*. Washington, DC: American Youth Policy Forum.
- National Center for Education Statistics. 2000. "Changes in High School Vocational Coursetaking in a Larger Perspective," *Stats in Brief*, October.
- Neumark, David. 2004. *The Effects of School-to-Career Programs on Postsecondary Enrollment and Employment*. San Francisco: The Public Policy Institute of California.
- Plank, Steven. 2001. *Career and Technical Education in the Balance*. St Paul. National Research Center for Career and Technical Education, University of Minnesota.
- Rosenbaum, James E. 2001. *Beyond College for All: Career Paths for the Forgotten Half*. New York: Russell Sage Foundation.
- Silverberg, Marsha, et al. 2002. *National Assessment of Vocational Education: Interim Report to Congress*. Washington: U.S. Department of Education, Office of the Undersecretary.
- Silverberg, Marsha, et al. 2004. *National Assessment of Vocational Education: Final Report to Congress*. Washington: U.S. Department of Education, Office of the Undersecretary.
- Southern Regional Education Board. 2004. *Using Rigor, Relevance and Relationships to Improve Student Achievement: How Some Schools Do It*. Atlanta: SREB.
- Stern, David and Jean Yonamura Wing. 2004. *Is There Solid Evidence of Positive Effects for High School Students?* Berkeley: University of California Department of Education.
- Visher, Mary G., Rajika Bhandari, and Elliott Medrich. 2004. "High School Career Exploration Programs: Do They Work." *Phi Delta Kappan*. October.
- Wonacott, Michael E. 2002. "Dropouts and Career and Technical Education." *Myths and Realities*. ERIC Clearinghouse on Adult, Career, and Vocational Education. Columbus OH: Center on Education and Training for Employment.

About the Authors

GENE BOTTOMS has served as director of the Southern Regional Education Board's High Schools That Work initiative since 1987. In July 1997, he became Senior Vice President of SREB, reflecting his role in and the organization's interest in and commitment to the initiative, the largest effort in America to improve high schools for career-bound students. Prior to joining SREB, he served as executive director of the American Vocational Association and director of educational improvement for the Georgia Department of Education.

BETSY BRAND is director of the American Youth Policy Forum, a nonpartisan, not-for-profit professional development organization that provides learning opportunities for policymakers working on education and youth issues. Prior to joining AYPF, she worked for the U.S. House of Representatives and the U.S. Senate committees on education, covering PreK-adult education and workforce training legislation, served as Assistant Secretary for Vocational and Adult Education at the U.S. Department of Education, and was president of Workforce Futures, Inc., a consulting firm providing policy analysis on secondary education reform, career and technical education, and workforce development.

KATHERINE HUGHES is assistant director for work and education reform research at the Institute on Education and the Economy and the Community College Research Center, both at Teachers College, Columbia University. Since joining IEE/CCRC in 1995, she has conducted research on education reform and on changes in the nature of work, including projects on the national school-to-work initiative, employer involvement in high schools, and work-based learning. Her publications include *Working Knowledge: Work-Based Learning and Education Reform* (with Bailey and Moore); published by RoutledgeFalmer Press.

RICHARD KAZIS, senior vice president at JFF, leads its policy and research efforts. A graduate of Harvard College and M.I.T., Mr. Kazis' recent publications include: *Double the Numbers: Increasing Postsecondary Credentials for Underrepresented Youth*; *Ready for Tomorrow: Helping All Students Achieve Secondary and Postsecondary Success*; and *What's Next for School-to-Career?* Mr. Kazis serves on the boards of the Workforce Alliance and the Workforce Strategy Center and is President of the Board of the Brookline Foundation.

ELLIOTT MEDRICH is director of policy analysis and development, MPR Associates, Berkeley, California. His 30-year career has focused on education research and policy analysis, developing methodologies for the analysis of education data and statistics, survey design, and the evaluation of classroom instructional practice and student outcomes, with a special emphasis on career and technical education

KATHARINE M. OLIVER is the Assistant State Superintendent for Career Technology and Adult Learning at the Maryland State Department of Education. Appointed to her position in 1989, she is one of the nation's most senior state directors of career technical education.

GOVERNOR MARK WARNER of Virginia serves as chairman of the National Governors Association; under his direction, the NGA has launched an initiative to "Redesign the American High School." He also has served for two years as states' co-chairman of the Appalachian Regional Commission, and recently completed a term as chairman of the Southern Governors' Association and the Education Commission of the States, a national nonpartisan policy organization.

ROSS WIENER is policy director for the Education Trust, a nonprofit organization focused on closing achievement gaps in public education. Prior to joining the Education Trust, he served as a trial attorney in the Civil Rights Division of the U.S. Department of Justice, where he litigated education civil rights cases.



JOBS FOR THE FUTURE seeks to accelerate the educational and economic advancement of youth and adults struggling in today's economy. JFF partners with leaders in education, business, government, and communities around the nation to: strengthen opportunities for youth to succeed in postsecondary learning and high-skill careers; increase opportunities for low-income individuals to move into family-supporting careers; and meet the growing economic demand for knowledgeable and skilled workers.



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Jobs for the Future
88 Broad Street
Boston, MA 02110
617.728.4446
www.jff.org



The Aspen Institute
Education and Society Program
One Dupont Circle, NW, Suite 700
Washington, DC 20036
202.736.5800
www.aspeninstitute.org/ecs