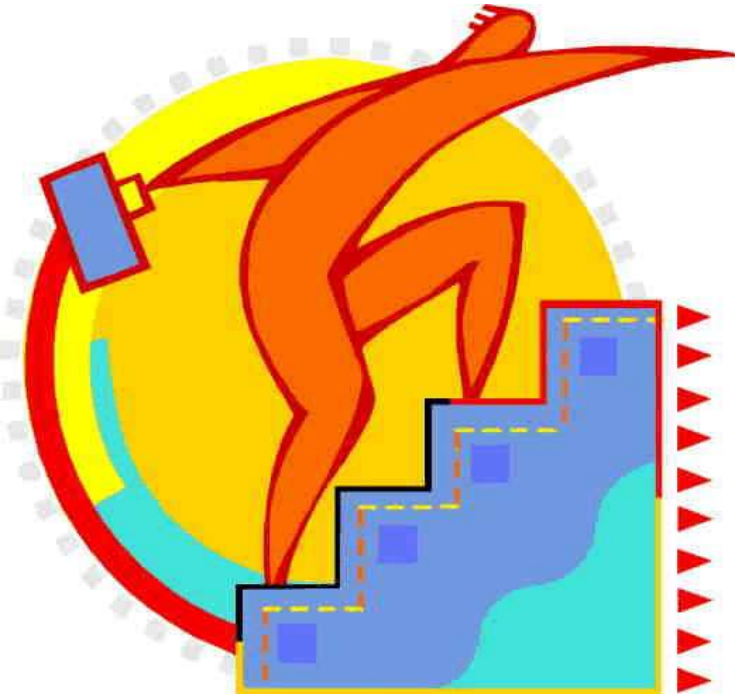

THE CHANGING FACE OF CAREER AND TECHNICAL EDUCATION

Dr. Michael F. Fitzpatrick
Superintendent-Director

Blackstone Valley Vocational
Regional School District

PREFACE

Recent news articles have reported that, due to high demand, space limitations, and a greater appreciation of the opportunities presented by quality career and technical programs, many students who desire to enroll in area vocational technical high schools now must remain in local systems. Several middle school and traditional high school administrators have noted their concerns about how local school systems are ill-prepared to respond to the needs of these students. This state of affairs, which is becoming increasingly common across the Commonwealth of Massachusetts, can be attributed to heightened interest in career-specific technical programs and greater awareness by students and parents of the value of acquiring marketable skills in high school. Simply put, more students are applying to vocational technical high schools and the bar is being raised for all.

Vocational technical schools, by the very nature of their mission to prepare students for the workforce, are closely linked to business, industry, and the trades. As the information age workplace has required more complex technical skills, employers have let their needs be known, and career and technical programs have become more sophisticated in order to produce the type of workers needed in the global market.

This new direction of career and technical education is driven by greater awareness of true employment needs. Today's career and technical systems are recruiting talent, not troublemakers; and the bias that these schools are somehow intended for less academically motivated students needs to be removed. The sophistication and significant investment of quality vocational technical education necessitate student candidates who can truly benefit from that investment. While the uninformed observer argues from emotional justifications that career and technical education should provide an alternative pathway for less talented students, it would be a disservice to students and employers alike to plunge unprepared youth into programs which meet the rigors and standards for employment if they don't possess an aptitude for those skills.

In response to the demand for career preparation programs for some of the neediest students, a number of voc-tech systems created highly successful and cost-effective alternatives to expensive out-of-district placement of students with significant learning disabilities. The recent financial constraints of local school systems, however, have resulted in fewer students being recommended for these substantially separate tuition-in programs, exacerbating the unmet needs of students with moderate to severe learning or behavioral issues in the local systems.

The Changing Face of Career and Technical Education is a position paper available through the Blackstone Valley Vocational Regional School District central office which describes how today's vocational technical schools must meet the higher skill requirements of the global workplace. This paper builds upon five current national education reform reports, including the Report of A National Task Force on Public Education and the National Assessment of Vocational Education's Final Report to Congress, and promotes a collective need for all school systems to find alternative ways to respond to the diverse needs of challenged youth. The Association for Career and Technical Education has also prepared a similar treatise which offers a professional perspective on the challenges facing schools today and the resources available through quality career and technical education. I encourage interested parties to seek out copies of these papers and to consider the various informed opinions that support the new, updated, and more rigorous version of career and technical education.

Dr. Michael F. Fitzpatrick - June, 2006
Superintendent-Director, Blackstone Valley Vocational Regional School District, Upton

The Changing Face of Career and Technical Education

Foreword

Today, there is nationwide debate about how education must be tailored to meet the needs of the new global economy. There are many viewpoints on how to prepare students to be productive members of a new, technologically-savvy, global society. What is the mission of career and technical education (CTE) in the 21st century quest for excellence in education?

As a CTE practitioner for some thirty-six years, I have long battled the stereotype that vocational technical education is an alternative educational path for students who have experienced limited academic success and require an educational program that focuses primarily on the psychomotor skills needed for a particular trade. While this faulty perception is commonly held, federal legislation has always defined a mission for CTE that is more workforce-responsive and economy-sensitive.

At a recent School Committee meeting, discussion concerned whether to sanction an international school vacation trip being organized by highly regarded social studies and Spanish teachers. The discussion brought to light the lingering existence of the stereotype and the unfortunate unfairness that even the most ardent CTE advocate must guard against. One member expressed concern about international travel by vocational technical students. He pointed out that he is constantly on the defensive from local citizens who feel that their vocational technical system has lost sight of its mission. From his remarks, it became all too clear that the impression somehow remains that vocational technical students do not need or deserve the opportunities for cultural enrichment that are applauded in the non-vocational technical high school setting.

In a similarly disconcerting encounter, a member of another nearby school committee expressed the sentiment that he would prefer to see more students from our system directly enter the trades as plumbers, carpenters, etc., rather than first go on to a two- or four-year college. He noted that the interest in attending our award-winning system is keen and all applicants cannot be accepted. This constituent, an otherwise staunch advocate for educational excellence, unabashedly affirmed his concern that, when a student attends a vocational technical high school and then goes on to college, the college bound student has unfairly displaced a student who desires a trade education.

Have CTE delivery systems lost sight of their mission? Is the investment in vocational technical education no longer paying the dividends that it did when carpenters, machinists, and auto mechanics graduated from high school and became immediate, productive additions to the local workforce?

This paper outlines the compelling reasons for significantly upgrading the public perception of the mission of CTE today. Many of us who work in the field have seen the changes evolve gradually and have embraced new approaches which enable us to better serve the needs of our students and the demands of the information-age workplace.

The Changing Face of Career and Technical Education
Dr. Michael F. Fitzpatrick

In today's increasingly global and complex society, it is no longer possible for the United States to maintain its economic advantage without tapping into the potential of all its workers. Every student, whether he or she chooses a traditional educational path or career training by way of a CTE system, must be equipped with a set of basic skills that is far more sophisticated and advanced than that required in the manufacturing-based economy of fifty years ago.

The workforce of the 21st century demands greater knowledge and more complex computational, communication, teaming, and technological skills of its workers. The American public must therefore acknowledge a new role for the CTE delivery system: a role that prepares students for lifelong learning in order to effectively respond to our nation's ever more challenging workforce development needs.

The Changing Face of Career and Technical Education
Dr. Michael F. Fitzpatrick

An Evolution with Multiple Roots and Branches

With the onset of the industrial revolution in the early 19th century, the United States and other developed countries shifted away from an agricultural economy where the focus was on manual labor. At that time, most young people were required to help out on the family farm and few received an education beyond literacy and computational basics. The curriculum that most traditional high schools follow today has its roots in the 19th century when two kinds of knowledge were clearly distinguished from each other. Practical knowledge helped people make a living and contribute productively to the community; while theoretical knowledge, like the study of poetry, philosophy, and religion, was reserved for the elite upper classes. The vast majority were trained to service the rapidly growing industrial and manufacturing economies and were taught the basic skills needed to do so. Creativity was often squelched in the average person in favor of the useful knowledge that put food on the table.

The Smith-Hughes Act of 1917 is widely recognized as the decisive piece of federal legislation which created vocational technical education. This law provided federal funds to support the teaching of agriculture, the trades, home economics, and industries. It created a Federal Board for Vocational Education to consist of the Secretary of Agriculture, the Secretary of Commerce, the Secretary of Labor, the United States Commissioner of Education, and three citizens appointed by the President. The three citizens were to be representatives of manufacturing and commercial interests, agricultural interests, and labor. The language of the Act made it clear that the controlling purpose of vocational education at that time was to produce workers that were "fit for useful employment." The composition of the Federal Board also evidenced the close connection between the new educational format that was being introduced and economic influences impacting our nation's prosperity at that time.

The Smith-Hughes Act and the Wagner Act of 1935, which protected workers' right to unionization, responded to a manufacturing-driven economy. The intention of vocational technical education was to train students to do repeatable tasks with dexterity in an environment where little judgment was required. At the time, about 20% of students were considered to be college-bound, 20% of students were destined for vocational technical training, and the remaining 60% were thought to just need a general education.[1] The high school diploma became the entry-level credential for an industrial-age factory job, although the availability of well-paying manufacturing jobs paved the way for even high school dropouts to achieve a middle-class lifestyle.

In the early vintage of assembly line vocational technical education, it was fashionable to offer students academic basics and a blend of trade psychomotor activity and related theory. Although the intent of Smith-Hughes was clearly focused on meeting overriding national workforce needs rather than the educational needs of a few, the vocational technical setting offered an opportunity

[1]Cynthia G. Brown, et al., Report of A National Task Force on Public Education, *Getting Smarter, Becoming Fairer: A Progressive Education Agenda for a Stronger Nation*, (Washington, DC, 2005), 15.

for those with manual dexterity to thrive. Eventually it was seen as a second chance for students who had struggled in the traditional classroom or who were deemed better suited to hands-on learning. The vocational technical school of the mid-1900s would allow so-called "behaviorally-challenged students" to become wage earners and to escape the rigors of a "traditional" education. By shifting the educational responsibility of those students to the vocational technical delivery system, the non-vocational technical local educational agency (LEA) had a convenient and potentially justifiable referral.

Ironically, if the sending system could not transfer the educational responsibility to the technical partner, the most common alternative for the academically challenged was the local "general track" program.

Eventually, the general track found itself with a bulging enrollment, declining relevance, and educational pundits clamoring for its demise. With image issues and empty seats, the vocational technical network was ill-prepared to challenge the status quo, and thus the stereotype of CTE as a lower echelon educational option evolved.

Pulitzer Prize-winning novelist Frank McCourt describes his experiences as a teacher in the vocational technical high schools of New York City in his new book, *Teacher Man*. He introduces the subject with his own observations dating back to 1958 when he first began teaching, saying, "Vocational schools were seen by many as dumping grounds for students ill-equipped for academic high schools. That was snobbery. It didn't matter to the public that thousands of young people wanted to be auto mechanics, beauticians, machinists, electricians, plumbers, carpenters."[2]

This view point should not be misconstrued to suggest that qualified and capable candidates were absent from the sending pool. Unfortunately, the more talented admissions had to overcome additional obstacles. Teachers, coaches, guidance counselors, and peers exerted pressure on successful students to remain within the traditional sending system. Nonetheless, alumni rolls of vocational technical schools across the country are filled with success stories of both adolescent late bloomers and career-minded youth with extraordinary talent who flourished in the CTE system.

The number of vocational technical systems across the country grew in response to the educational demands of the post-World War II baby boom. Vocational technical instructors, armed with experience, knowledge, and expertise in their respective trades, dominated the vocational technical delivery system setting and their academic counterparts often assumed a merely ancillary role. By the 1970s, however, information, technology, and knowledge propelled a new economy which began to replace the manufacturing-driven economy. The focus of vocational technical education was forced to change with the times, and that change was accompanied by a gradual transition in terminology from 'vocational technical' to 'career and technical.'

---

[2]Frank McCourt, *Teacher Man* (New York: Scribner, 2005), 13-14.

The Changing Face of Career and Technical Education
Dr. Michael F. Fitzpatrick

The works and impact of 20th century management gurus heralded a new perspective on business and industry in a fast-paced global economy. They defined "knowledge workers" decades before the trend was widely accepted; advanced management philosophies which sought continuous improvement in performance of processes, products, and services; and recognized the need for discernment and judgment capabilities in all workers. The combined impact of Peter Drucker, Edward Demming, and Peter Senge, along with a myriad of continuous quality improvement (CQI) and quality assurance (QA) approaches which have made inroads among the world's predominant businesses and industries, have made it impossible to ignore the changing role of education in the global workplace.

As testimony to the federal government's understanding of the changing economic landscape at that time, the Carl D. Perkins Vocational and Technical Education Act was originally authorized by federal legislation in 1984 and re-authorized in October of 1998 as Perkins III. The purpose of this legislation was to provide individuals with the academic and technical skills needed to succeed in a knowledge- and skills-based economy. Unlike the language of the Smith-Hughes Act, which indicated clearly that "such education shall be of less than college grade," the language of Perkins III stipulates support for career and technical education that prepares its students both for post-secondary education and the careers of their choice.

The legislative intent of Perkins III offers a glimpse into the new vision for CTE in the 21st century. The Act envisions that students will achieve challenging academic and vocational standards, be prepared for post-secondary education and further learning, and attain the skills needed to pursue high-skill, high-wage careers, not just entry-level jobs. Current Perkins law allows for more state and local flexibility and raises expectations for CTE students by holding them to the same high academic standards as all other students. States and localities have accepted the new accountability requirements of the 1998 Perkins law, along with the mandates of the No Child Left Behind Act of 2002, and are working to develop effective methods to improve programs and measure student progress and success. Federal resources made available through Perkins now help ensure that CTE programs are academically rigorous and up-to-date with the needs of business and industry. The federal contribution to CTE, which risks lack of funding in the FY07 budget, supports innovation and expands access to quality programs.

According to the official position of the United States Department of Education, as found on the Office of Vocational and Adult Education website, federal involvement today administers, coordinates, and recommends policy for improving quality and excellence of programs which prepare students for post-secondary education and careers through strong high school programs and career and technical education.[3] Specific strategies ensure that students achieve challenging vocational and technical skill standards, improve and expand the use of technology, involve parents and employers, and provide quality professional development. Thus, on the federal level,

[3]U. S. Department of Education, Office of Vocational and Adult Education http://www.ed.gov/print/about/offices/list/ovae/index.html (3/23/2006).

the focus on CTE is on ensuring that students are well-prepared for further education, including four-year post-secondary institutions and beyond when appropriate, as well as being prepared for life-long learning and satisfying careers.

The vocational technical learning environment of today is clearly no longer the culminating educational experience that was the trade school of the manufacturing economy. The skill set required of employees in the 21st century is leaps and bounds over the old. The CTE delivery system, along with all educational delivery systems serving America's youth, have been challenged to move in a new and significantly different direction.

The Call for Nationwide Educational Reform

The call for change in our nation's public education system is widespread, with education reform in the forefront of state and federal legislation during recent years. Local newspaper editorials, letters to the editor, and feature sections repeat the resounding call for revamping our schools to better meet the needs of the new global economy. In Massachusetts, charter schools have created competition in public education, challenged the status quo, banished complacency from the educational mind-set, and caused parents and students alike to more closely evaluate the variety of educational pathways available to them.

With business and industry clamoring for a more insightful and technologically astute workforce, national and regional think-tanks have conducted surveys, held forums, and written reports which substantiate that the information-age economy requires that most students have a college education or post-secondary occupational credential.

Getting Smarter, Becoming Fairer: A Progressive Education Agenda for a Stronger Nation is the report of a National Task Force on Public Education, a joint initiative of the Center for American Progress and the Institute for America's Future. In their analysis of the globalization and competitiveness which now challenges the effectiveness of public education in our nation, the authors of this report note, "The United States now finds itself in an increasingly competitive global economy. The European Union and Japan today are formidable advanced industrial competitors. Developing countries like China and India offer the world economy workers of increased education and sophistication at far lower costs than the United States can match. Global competition is growing ever more intense ..." [4]

This report, which is extensively researched and carefully documented, echoes the warnings of "A Nation At Risk," the 1983 call for radical improvement in the nation's schools. Arizona Gov. Janet Napolitano, one of the three co-chairs of the task force, noted that, when that earlier report came out, China and India were not what they are now - emerging economic powerhouses whose rapid

[4]Brown, et al., "Executive Summary," iii.

education strides pose a challenge to the prosperity of all Americans.[5] Other nations have recognized the need for making education more relevant to the new economy and have already initiated widespread reform. For example, the United Kingdom is introducing 8 a.m. to 6 p.m. school days and mandatory education up to age 18, combined with a huge investment in vocational training. The report states that today, "the United States economy, which supports and sustains our democracy, is under persistent and unremitting pressure from places that are eagerly developing their human capital in order to become more productive, to transform their societies, and to compete on the world stage."

The Task Force findings further conclude that education in America "must be modernized for all students. If we don't make simultaneous, even radical changes, the American education system will end up with inadequate results for most students, even for those from advantaged groups ... We must prepare students for the 21st century, a time in which the basic skills and credentials necessary to hold a middle-income job are much different than they were 50 years ago. Excellent education today requires that every student be prepared to succeed in post-secondary education or technical training, as all students now require some level of education beyond high school."

The ability to digitally transmit massive amounts of information to faraway places has led companies to send jobs overseas in such high tech areas as architecture, computer software, medical services, and engineering. The Task Force report further suggests that "we can no longer dismiss these trends as simply the result of large populations working for low wages or isolated nations opening heretofore inaccessible markets. The jobs being outsourced ... are no longer limited to low-skill, low-wage professions, but now also include sizeable numbers of jobs requiring significant skills and education, such as those in the engineering, information technology, and healthcare fields."[6]

The National Task Force is not alone in its understanding of the relationship between our national economic prosperity and the advancement of human capital. David Heenan, in his new book *Flight Capital*, warns of the danger of losing foreign-born talent to their home countries, noting that the next global war will be fought over human capital. Decrying the exodus of many inventive and ambitious immigrants who have returned to improved economies in their homelands, he worries that many Americans are unprepared for space age work and notes that the 2004 American Diploma Project found that 60 percent of employers rated the proficiencies of graduates of United States high schools as only "fair" or "poor."[7]

---

[5]David Broder, "Nation's education reforms must surpass present test law," *Sunday Republican,* (August 28, 2005), C4.

[6]Brown, et al., 9-13.

[7]David Heenan, *Flight Capital*, (Davies-Black, 2005), as excerpted in *Training Magazine*, (October 2005), 31-37.

Similarly, a report commissioned by the National Association of Secondary School Principals and KnowledgeWorks Foundation notes that international comparisons have brought increased attention to the lack of academic adequacy of American high school students contrasted against those of other countries.[8]

In further testimony to the connectivity of economic and educational interests, the November 2005 edition of *Phi Delta Kappan*, the professional journal of educators, included a special focus on education in a global era. It incorporated editorial comments about how questions of economic competitiveness crop up whenever international questions relative to education are raised.[9] In that same edition, guest editors Vivien Stewart and Sharon Lynn Kagan stress the importance of creativity and problem solving in a knowledge-intensive, high-tech, global environment. They note that creativity and problem-solving abilities of American students are seen as great strengths of America's culture and its comprehensive education system and they express optimism about new commitments and new approaches for renewal of our schools.[10]

In a nationally syndicated column, *Washington Post* columnist David Broder also recently called upon the nation's leaders to work together to formulate a coordinated and sustained attack aimed at assuring this country's competitive position in the new global economy by keeping the United States in the forefront of innovation and technology. He cites a series of reports from business, academic, and government groups, including a blue-ribbon panel of the National Academy of Sciences, which note warning signs that America's current healthy economy conceals significant long-term threats to our prosperity.

Broder points out that these reports all come to similar conclusions: that there has been a decline in American inventiveness and in the cultivation of the kind of brainpower that keeps a nation competitive. He notes that Asia and Europe are graduating many more engineering and science majors than the US and the gap is growing. According to Broder, almost half of all U. S. patents now go to foreign-born inventors and foreign-owned companies; and U. S. high school students test poorly in math and science compared to those of our major trading partners.[11] Between 1980 and 2000, American job openings in science and engineering grew at an average annual rate of

---

[8]Monica Martinez, *Advancing High School Reform in the States: Policies and Programs*, National Association of Secondary School Principals, (VA, 2005), 2.

[9]Bruce M. Smith, "The Editor's Page: Questions and More Questions," *Phi Delta Kappan*, (November 2005), 178.

[10]Vivien Stewart and Sharon Lynn Kagan, "A New World View: Education in a Global Era," *Phi Delta Kappan*, (November 2005), 241-245.

[11]David Broder, "Math and Science Test for Bush," *The Washington Post*, (December 18, 2005), B07

4.9%, compared to the 1.1% growth rate in the entire labor force for the same time period. Within that same time frame, jobs in mathematics and computer science exploded by 623%.[12]

A more regional view, but just as compelling, is put forth in a special section of a Massachusetts newspaper which featured a number of arguments for reinventing high school and detailed how the global economy requires much more sophisticated skills of workers. Local columnist Paul Andrew notes that, when Ronald Reagan took office in 1980, less than ten percent of the world's manufacturing exports came from developing countries. Items that were labeled "Made in Taiwan" were generally considered to be of lower quality and lower cost than those "Made in the USA." Now a third of manufacturing exports originate in developing countries and China, India, and the rest of Asia represent a third of global trade. These countries are no longer considered the mass producers of inferior, cheap goods, but full-fledged competitors, leading in the new knowledge economy. Andrew asserts that this far-reaching economic transformation must cause educators to challenge the old assumptions that were once appropriate. We must equip future generations of Americans not just to survive in this new world, but to innovate, succeed, and prosper as global villagers. Andrew stresses the need for policymakers, parents, and communities to embrace and enact innovative approaches in public schools. He notes that innovation requires vision. It requires that labor unions, businesses, parents, education leaders, and politicians grasp the immense opportunity afforded to us to create a workforce and an economy that will succeed and prosper.[13]

According to a 2005 Accenture survey, attracting top notch talent is one of the greatest concerns of business executives. Accenture's global survey of 425 high-ranking executives sought to identify and prioritize the issues of most significant concern to senior managers in the United States, Europe, and Asia. One of those top executives, Microsoft founder Bill Gates, has joined the swelling ranks of industrial giants offering personal testimony about the difficulty of recruiting workers with math, science, and engineering skills. Gates has delivered many speeches and written a number of editorial pieces in which he asserts that America's high schools are obsolete. He states that, even when they are working exactly as designed, they cannot teach our kids what they need to know today. "Training the workforce of tomorrow with the high schools of today is like trying to teach kids about today's computers on a 50-year-old mainframe. It's the wrong tool for the times."[14]

---

[12]Brown, et al., 29.

[13]Paul Andrew, "Reinventing High School: Global economy demands U.S. scrap the old model," *The Daily News - MetroWest Agenda*, (October 2005), 19-20.

[14]Bill Gates, "American High Schools Aren't Getting the Job Done," *The Daily News - MetroWest Agenda*, (October 2005), 22-23. *This speech was delivered by Bill Gates to the 2005 National Education Summit on High Schools, held by the National Governors Association and Achieve, Inc. and has been reprinted in a number of forums.*

Gates goes on to say that high schools were designed 50 years ago to meet the needs of another age. They must be redesigned to meet the needs of the 21st century and should be designed to prepare every student for college. A convincing case can be made that this applies equally to CTE. Indeed, when one considers the historical precedent that the mission of vocational technical education is to fit its students for gainful employment, it would appear to apply to career and technical schools most particularly.

Implications for Career and Technical Education Today

The National Assessment of Vocational Education was charged by Congress with evaluating the status of vocational education and the impact of Perkins III. In the executive summary of the NAVE Final Report to Congress, it was noted that "in an era in which strong skills and life-long learning are rewarded, the nature and impact of student experiences in vocational education could have important implications for the nation's workforce and America's place in the global economy."[15]

While there are many viewpoints on how to meet the challenges it presents, there is little disagreement on what defines this new global era. All concur that the age in which we now find ourselves can best be described in terms of diversity and complexity. With a more diverse population and commerce that easily crosses national and continental divides, gainful employment today requires teaming, communication, and technological skills like never before. At a time when new information, communication, and media technologies connect people, ideas, and data across the world simultaneously, workers must function effectively in international contexts and the ability to function in cross-cultural situations has become a critical part of the 21st century skill set. With global competition, the demand for skills equivalent with menial tasks is at an all-time low. The American workforce has to become more sophisticated if it is to maintain its competitive edge and public education in America must find a way to attain that higher level of sophistication.

A study conducted by TNS, a market information group, and the Conference Board, a business consulting firm, reported that by 2012 the American workforce will be considerably more diverse in terms of workers' ages and ethnic backgrounds. Middle managers will need to sharpen their skills or risk having their jobs become obsolete. The study predicted that much of the nation's middle management simply won't have the skills needed to grow with their companies while staying competitive. "Changing demographics combined with the changing needs of American business will create two substantial tests for employers: finding ways to attract, retain, and motivate high-quality employees regardless of age, ethnicity, gender, or occupation," the study noted, and developing "workforce management practices that balance the corporate bottom line with the needs and expectations of a diverse, global workforce."[16]

---

[15]National Assessment of Vocational Education, "Final Report to Congress," (Washington, DC, 2004), 1.

[16]Nathan Hurst, "A changing workforce will put skills to test," *Boston Sunday Globe* (9/25/05), G2.

In August, 2005, Zorica Pantic-Tanner became the first female engineer to lead a U. S. technology institute as she assumed the role of president of Wentworth Institute of Technology in Boston. In an interview with the *Boston Globe*, she was asked what technology-based companies are looking for in graduates. Her response was that they are looking for people with a strong background in theory and who have skills that can be implemented right away. "But they are also looking beyond that to someone who can pursue lifelong learning because technology changes so quickly. They need people who can reinvent themselves and think globally because that's the direction the economy is going."[17]

What are the implications for CTE in this vibrant and energetic ongoing conversation about the role of education in this new global economy?

The National Task Force report, which covers public education from early childhood to post-secondary, touches upon the necessity to include changes in vocational technical delivery in its recommendation for radical high school redesign. The report affirms that high schools must prepare every student for the challenges of post-secondary education by ensuring that all students complete a rigorous, four-year course of study in high school. "This will benefit not only those who pursue college, but also those who choose vocational routes, which today demand increasingly high levels of skills. For example, tool and die makers must complete a multi-year apprenticeship or post-secondary training program; to enter one of these programs, students must have completed algebra, geometry, trigonometry, and basic statistics."[18]

The report goes on to say that, while not all students will opt to enroll in higher education directly after high school, most will ultimately conclude that some degree of college-level education is the key to a better life for themselves and their families. Public education, including CTE, must therefore guarantee that students who enlist in the armed services or pursue immediate employment are equipped with the academic preparation that will allow them to re-enter the educational setting at some later date.

Successful companies attribute a large part of their success to an endless drive for excellence, quality, and the highest standards of customer service. CTE systems need to blend the best of the private sector into successful public sector enterprises with the future workforce as their diverse customer base. Vocational technical training must focus on providing college, business, and industry with candidates who are capable of meeting today's demands and tomorrow's challenges. It must encourage learning activities and student research projects which include the geographical, economical, cultural, social, and other considerations of a global economy; and it must provide maximum opportunities for future advancement for all students. This includes the expectation that each student will be prepared to qualify for post-secondary education.

---

[17]Peter Schworm, "Wentworth president to engineer changes,"*Boston Sunday Globe* (8/28/05), E20.

[18]Brown, et al., 33.

The NAVE report confirms that over the last decade of academic reforms, CTE students have increased their academic course taking and achievement, making them better prepared for both college and careers than were their peers in the past. In fact, the National Assessment of Educational Progress (NAEP) 12th-grade test scores of CTE students increased by 8 scale points in reading and 11 scale points in math from 1990 to 2000, while scores of non CTE students increased by only 4 points in reading and experienced no increase in math during that same time frame.[19]

The State of California recently poured an additional $20 million into its vocational education program, recognizing the potential of CTE and calling for improved CTE as a timely response to some significant challenges facing California schools. *IQ: Irvine Quarterly*, the online publication of the James Irvine Foundation of California, has been watching a rising drop-out rate among the state's ever more diverse student population. *IQ* reports that educational reformers in that state are calling for a diversity of possible paths to educational success and that CTE promises to do that by linking academic curricula with the working world through work-based learning, internships, job training, and mentorship programs.[20]

An article which appeared in the January 2006 edition of *The School Administrator* also focuses on the growing conversation about the role of CTE. Gary Hoachlander, president of MPR Associates, a Berkeley, California-based educational research consulting firm, confirms that his research leads to the conclusion that it is no longer beneficial to treat students bound for college and those pursuing other options after high school differently. Hoachlander asserts that CTE is no longer a second tier educational option. He describes it as more diverse, more compatible with academics, and more conducive to further post-secondary study than most people typically believe. He calls attention to promising new CTE models which aim to prepare students for both college and work, not one or the other; and notes that nurturing comprehensive, challenging programs of academic and technical study to prepare students for a wide range of post-secondary and career options is surely a promising strategy for more effective high school reform.[21]

Setting a New Agenda

Those of us who work in CTE at the secondary level have long understood the value of using the world of work to engage and motivate students. Trying to make someone learn what he or she doesn't want to learn can be a frustrating endeavor. Unless the subject matter is actually used in real life, the student will very quickly forget what has been taught. Long-lasting learning occurs when a student is interested in the subject matter and can see the connection to his or her future

[19]National Assessment of Vocational Education, 6.

[20]"Not Just College but Career: A New Direction for School Reform," *Irvine Quarterly*, Vol. 5, Issue 2, Fall 2005.

[21]Gary Hoachlander, "Ready for College and Career," *The School Administrator* (January 2006), 38-41.

life. Vocational technical teaching, which is grounded in preparation for specific careers, serves as a fulcrum between learning and real life work. It is individualized, realistic, and relevant and will appeal to a large and diverse group of high school students.

CTE recognizes that different students learn in different ways. Our students learn by both traditional and non-traditional means; through simulations, one-on-one coaching, in small groups, by imagining, and by the purposeful curiosity of tinkering. In this new mode of CTE, students are engaged and interested as never before, employing their minds and hands to learn and create in new and unlimited ways.

As technology has advanced in rapid-fire progression, vocational technical educators have watched their fields of expertise expand and become more technical and sophisticated. With the higher level of technicality have come more strict standards and credential requirements. Virtually every workplace now establishes quality standards for its employees. Nurses, HVAC technicians, cosmetologists, electricians, airline pilots, accountants, automobile mechanics, lawyers, physicians, and teachers all earn certifications and/or licenses. Some of these credentials are national and some are state-specific, but all require an established level of proficiency and an ability to communicate that proficiency effectively. Therefore, while vocational educators cannot lose sight of their focus on teaching the specific skills required for a particular career path, they must also accept the challenge to provide a more rigorous course of academic preparation which will allow their students to meet the higher standards they will encounter in the workplace.

The new definition of CTE must therefore involve integrating specialized career training and citizenship with challenging academic learning in order to provide the global community with a highly qualified and prepared workforce. A quality CTE system today will combine specialized training using state-of-the-art technology, individualized academic instruction which recognizes diverse learning styles, a competency-based counseling program and personal enrichment initiatives, and a wide variety of self-actualizing and team building extracurricular activities. When these four complementary functions are intertwined and integrated in a safe learning environment, they form a cohesive effort that can help students identify their own gifts and strengths, and which will empower them to develop positive and productive thinking and work habits.

In order to provide the highest caliber of specialized training and maintain its relevance to the ever changing workplace, CTE systems must establish solid partnerships with local business and industry. Schools currently are required to establish and utilize program advisory committees in order to qualify for federal Perkins funding. These committees should not function merely to meet state and federal requirements. They should be seen as ambassadors for CTE and as vibrant and energetic partners with the school in promoting public/private collaboration and cooperation. Program advisors work hand-in-hand with vocational technical teachers to constantly monitor trends in business and industry and suggest curricular modifications and enhancements. These advisors also serve as excellent resources for potential grant funding and student placement opportunities. They can suggest community service projects that will enhance students' learning

experiences and can help secure corporate donations of supplies and equipment to ensure students have access to the latest technology they will encounter in the workplace.

Like industrial workers who have been forced to develop new technical skills to adapt to the knowledge workplace, specialized training in the new CTE must be flexible in its adaptability. Quality technical programs and their competency validated skill sets should be linked and regularly cross referenced with economic prognosticators. Economic indicators need to drive curriculum upgrades and adequate fiscal resources need to be made available if CTE is to respond effectively to the constant improvement mission.

Michael D. Goodman, director of economic and public policy research at the University of Massachusetts Donahue Institute and managing editor of a quarterly journal on the Massachusetts economy produced in collaboration with the Federal Reserve Bank of Boston, notes that recently Massachusetts employers have reported difficulty in obtaining workers with the skills and experience they require. He points out that a Job Vacancy Survey conducted by the Mass. Dept. of Workforce Development reported nearly 72,000 vacant positions during a period in which there were more than 140,000 unemployed workers statewide.[22]

Survey results from the latest Massachusetts Job Vacancy Survey, released January 12, 2006, indicate that for the first time in the three years that the survey has been conducted, the number of job vacancies requiring an associate's degree or higher now surpass those requiring a high school or vocational school education. According to the survey, 42% of the positions posted during the quarter required an associate's degree or higher while just 39% required high school or vocational training. A year earlier, 40% of open positions required an associate's degree compared to 44% needing just high school or vocational training.[23]

These findings support Goodman's contention that we need to make sure that future employees achieve the education and skills training they need to be able to thrive in the knowledge economy and that everyone should have better and easier access to quality and affordable higher education as well as lifelong learning opportunities. The school board and the superintendent, as CEO of the educational delivery system, must acknowledge this trend and embrace practices aimed at preparing every student to qualify for higher education.

Letitia Chambers, Executive Director of the New Mexico Higher Education Commission, told the National Task Force on Public Education that, by 2010, 67 percent of jobs will require some form

---

[22]Michael D. Goodman, "Why Massachusetts is losing people," *The Boston Sunday Globe* (10/23/05), E12.

[23]Commonwealth of Massachusetts Department of Workforce Development, "Skilled Workers in Demand in Bay State" press release (1/12/06).

of higher education. She used that projection to reinforce calls for greater rigor in the high school curriculum.[24]

A study by the 7,600-member Associated Industries of Massachusetts also found that young workers in the Bay State are not living up to their employers' expectations. Thirty-eight percent of employers surveyed complained that recently hired young workers had "fair" skills, while 25% said they had "uneven" skills. Only 22% of employers rated new workers as having "excellent" or "good" preparation for their job, which includes everything from college education to trade school and on-the-job training programs. The newer workers were found to be lacking in critical thinking and problem solving skills that characterized an older working population. The survey was intended to focus on the ability of the state's high schools to prepare students for the workforce. The survey did find that younger workers outperform their older counterparts in computer skills in a variety of industries, and they generally impressed employers with strong basic literacy and math computational skills. Older employees, however, were rated as having better personal skills and work habits.

AIM senior vice president Andre Mayer said, "These findings indicate that for the substantial proportion of high school graduates who go straight into the world of work, preparation in strictly academic fields is less of an issue than their lack of soft skills. The good showing of these young workers, often from less advantaged backgrounds, on computer literacy points to the successful introduction of information technology into our schools in recent years."[25]

With these more sophisticated demands of the new economy in mind, curriculum in the vocational technical setting must be viewed as a dynamic process which promotes active, thought provoking, facilitating, and individual assessment activities to develop each student's potential as a learner. Students must be given the opportunity to acquire an understanding of the technical application of the math, science, and communications essential to their given trade area and to improve their total skills if they are to reach their individual potential in the new workplace.

Across-the-curriculum approaches to reading, writing, and mathematics have proven to be effective ways of reinforcing academic learning across classrooms and in the vocational technical laboratories. In a system-wide approach, resources to promote reading, writing, and math in all classes and training programs should be developed and shared among all academic teachers and vocational technical instructors. Academic teachers will routinely coordinate lesson plans with their vocational technical colleagues, using topics, themes, and subject matter related to students' career fields to reinforce academic concepts and ideas. For example, a math teacher will regularly use food measurements to teach math concepts to students who plan careers in the food service

---

[24]National Task Force on Public Education, "A Report on Workforce Development: Ensuring Students Have the Tools to Succeed," (Albuquerque, NM, 9/28/04), 4.

[25]Nathan Hurst, "Younger workers not meeting expectations," *The Boston Sunday Globe* (10/23/05), NZ.

industry; social studies lessons on the industrial revolution are correlated with welding and manufacturing technologies instruction; and students preparing for careers in the painting and design field may be asked to write descriptions of painting techniques in English classes.

Dr. Cecilia Cunningham, Executive Director of the Middle College National Consortium, addressed a forum on promising innovations conducted by the National Task Force on Public Education. She identified three important student needs that must be met in order for them to succeed: long-term relationships with teachers, leadership experiences, and real-life work or school experiences in which they can ground their expectations about the future. She attributed the success of Middle College Charter High School at LaGuardia Community College in New York to the school's intensive focus on literacy to address the entering students' low skill levels, and to linking students' work with real world experiences. She noted that teachers need longer class periods, a reduced student load, sustained professional development, and greater control of the hiring and learning processes. Cunningham also pointed out that the standards-based education movement has placed greater demands on students, but that these higher expectations must be accompanied by increased levels of school support, including the resource of time.[26]

Syndicated columnist Ruben Navarrette notes that "Whenever there is a survey of how well students in the United States are doing in math, science, or reading compared to those in other countries, we learn that our kids are trailing the pack. It's no wonder that companies in the high-tech industry are increasingly looking abroad for job applicants, turning to countries such as China or India to fill jobs that once went to Americans." He blames the U. S. job market success of foreigners on differences in competence and qualifications and points out that in China the school year is 270 days; in India it's 220 days. Due largely to this difference in time devoted to education, America is falling behind in relation to those in other parts of the world. Navarrette suggests that reducing the length of a traditional summer vacation may be an effective strategy to help our nation catch up with educational advances made across the globe.[27]

Because CTE students earn a dual credential and must integrate their learning between academic and vocational technical skill attainment, the resource of time is a particularly valuable commodity for them. CTE systems should therefore seriously consider a longer school day or school year. While Massachusetts calls for a minimum of 180 school days in each school year, the Blackstone Valley Vocational Regional School District in that state has been operating on a 193-day calendar since 1997. With more time on task and a continuous improvement plan in place, the district's students have improved their performance on MCAS, the state-mandated academic competency determination, without ceding a significant amount of time from their specialized vocational technical training.

---

[26]National Task Force on Public Education, "A Report on Redesigning Schools for the 21st Century: Promising Innovations," (New York, NY, 12/10/04), 4.

[27]Ruben Navarrette, " Start of school is no vacation for parents," *The Republican* (Springfield, MA, 8/31/05), A10.

Whether in the academic classroom or the vocational technical laboratory, teachers must be recognized as a system's most valuable asset. Acknowledging that students tend to pursue a level of achievement consistent with teachers' expectations, teachers should be encouraged to set high standards, insist that students put forth the effort required to meet the school's academic requirements, and prod students into judging themselves via performance. Active recruitment and support of teachers with intellectual curiosity, the discipline to make a difference, and the drive to follow their passions is therefore essential.

A recent survey conducted by California-based education think tank EdSource found that the top factors for a high-achieving school were lofty expectations for all students; clear, measurable goals; a consistent curriculum; and a staff that uses data to see where teachers and students can improve. Such schools have teachers who are willing to push students and who are armed with up-to-date textbooks and other modern resources. The survey also noted that parental involvement, while important, is not as influential a factor as the ones identified above. Higher achieving schools have a "shared culture" that allows them to function in a sense as if there were no parents at all. In a *Washington Post* story on the survey, a parent was quoted as saying that a principal told her, "We don't have an expectation of the home. We don't blame the home. We can't teach parents. We don't worry about whose responsibility it should be. We just consider it ours."[28]

As publicly supported institutions with a direct link to the diverse and technical workplace of the future, CTE systems must foster an atmosphere of tolerance and respect, promoting equity and an appreciation for diversity. As partners with parents/guardians in the task of helping young people navigate the often turbulent waters of adolescence, they have an opportunity to impact student lifestyle decisions and should be charged with encouraging physical and emotional well-being. Forward-looking CTE management will examine the many external influences on student achievement and seek creative and innovative ways to mitigate any of the roadblocks students face.

Realizing that health and social problems can interfere with academic attendance and success and with subsequent employability, a student wellness initiative which offers a wide array of adolescent support services in a setting that is comfortable, convenient, and non-threatening to the students has proven invaluable at Blackstone Valley Regional Vocational Technical High School. In partnership with a local hospital, the system's school based health center now offers preventative health care, primary care, mental health, nutrition and fitness testing and evaluation, and health education. In addition to providing diagnosis and treatment of minor and acute medical conditions and first aid for minor injuries, the health center staff is available whenever school is in session to answer students' health related questions and concerns and to provide counseling, mental health evaluations, and other support services as needed. This has resulted in a significant enhancement to

[28]Derrick Z. Jackson, "Why school achievement isn't reaching the poor," *The Boston Globe* (11/30/05).

traditional school nurse services and directly correlates the CTE mission to the healthy and productive workforce the new economy demands.

Newly emerging curricula for enrichment programs in the CTE setting focus on workplace readiness and allow students to develop and demonstrate personal, social, technical, and employability skills for career and life management. For example, an employability course at the ninth-grade level will encourage students to develop an awareness of their personal skills, interest, and abilities as they relate to career choices. They learn how to apply decision making skills and explore the attitudes, behaviors, and interpersonal skills needed to work with and relate to others. In subsequent courses, students participate in job shadowing experiences and career fairs to broaden their understanding of the skills necessary for employment retention and advancement in various careers. They develop an awareness of how personal and environmental conditions impact post secondary planning and how life-long learning is necessary to maximize workplace opportunities and earning potential. They also explore the skills necessary for managing cultural diversity in one's personal life and in the 21st century workplace.

Complementing the employability classes, technical competency enrichment courses should ensure that each CTE student has the ability to use computers, computer applications, and the Internet as tools for life-long learning as well as for time and task management.

While the trade school of the 20th century offered few extracurricular opportunities for students who were focused solely on attaining trade skills, one cannot ignore the power of the arts and extracurricular activities for engaging students and broadening their horizons. Sports, student government, competitions on technical competency, and the arts are essential to the well-roundedness of the future workforce. These activities contribute significantly to the shaping of a student's perception of his or her place in society. Programs should be designed to promote life-long learning and career development, encourage the total growth of the student, and develop in him or her a responsible commitment to the principles of freedom, equality, social justice, personal worth, economic independence, and concern for the environment. Activities which encourage community service, entrepreneurship, healthy competition, employment survival skills, real world application, computer literacy, and teamwork must be promoted and sustained in the new CTE environment for their significant contribution to the development of a positive self-image and a vision of a successful future.

In a discussion on the importance of leadership in the school setting, which also took place during the National Task Force forum on promising innovations, Dr. Cunningham noted that leadership among high school students is about responsibility for oneself and for others. She identified travel as a prime chance for students to expand their view of the world and to exhibit leadership skills. She emphasized that opportunities for leadership must be incorporated into school redesign.[29]

[29]National Task Force on Public Education, "A Report on Redesigning Schools for the 21st Century: Promising Innovations," 7.

Leadership is an important trait in the new global workforce and developing leadership skills must be seen as integral to the CTE mission. We should no longer have to justify cost-effective extracurricular activities, field trips, or even international travel by CTE students.

The Challenges Continue

Perhaps the biggest challenge facing CTE systems today is the dichotomy of the employers' preference to hire only the strongest talent and the still common feeder system perspective, as McCourt bluntly expressed, that vocational technical systems exist to extend an alternative opportunity for less talented or more troublesome students to succeed. Given the more sophisticated demands of the global workplace, it is simply invalid for anyone to suggest inappropriate behavior, failing grades and poor attendance should ever be a passport to CTE enrollment. What employer would seek or accept negative traits as a member of the work place? With a whole world of potential employees to choose from, today's employers have the ability to go elsewhere to find capable and qualified workers if our schools do not provide them.

As the general public becomes more aware of the advantages and opportunities available for the talented career-minded student, serious concerns remain about the referral process which directs a youth to a career and technical education. There is a disconnect between the primary referral person in the K-8 school system and the CTE system. The most ardent counselor, seeking to find the most appropriate placement for each student, may have little or no background or expertise in the vocational technical setting or in business or industry. As a result, they continue to refer students who simply will not succeed in the new workplace unless drastic changes in work habits and communication skills take place. It is a disservice to encourage students to attend a vocational technical school to acquire skills for a dead-end job.

While local schools have historically enjoyed the convenience of transferring educational and fiscal responsibility for the most needy and/or troublesome candidate to its CTE partner, the burden of responsibility to provide cost-effective education for problem students can no longer fall simply on vocational-technical schools. Local schools need to address the general track and to find ways to educate difficult students effectively. Fortunately, many of the new high school reform models seem to be focusing on just that.

According to Bill Gates, who certainly knows what employers are looking for in the high tech workplace and who has become a strong advocate for a new high school design, the basic building blocks of better high schools are the new three R's: Rigor, Relevance, and Relationships. In a speech delivered to the National Education Summit on High Schools in 2005, Gates said that "the idea behind the old (high school) design was that you could train an adequate workforce by sending only a third of your kids to college - and that the other kids either couldn't do college work or didn't need to. The idea behind the new design is that all students can do rigorous work, and - for their sake and ours - they have to."[30]

[30]Gates, 22-23.

Gates describes relevance as making sure kids have courses and projects that clearly relate to their lives and their goals. He says that relationships include making sure kids have a number of adults who know them, look out for them, and push them to achieve. These have always been among the distinguishing characteristics of effective CTE systems. Spending as much as half of their school days in one career area with the same vocational instructors throughout the four high school years, CTE students have typically forged strong bonds with their shop teachers in studies that relate to their career goals. Incorporating academic rigor and the more complex problem-solving and communication skills which accompany higher order thinking to this successful formula is the new challenge facing career and technical high schools of the 21st century.

Fortunately, career and technical schools in America do not have to re-invent the wheel in order to meet this challenge. *High Schools That Work*, an initiative of the Atlanta, Georgia-based Southern Regional Education Board, has been helping schools incorporate greater academic rigor since 1987. The SREB, when asked by state leaders to help high schools integrate academic and vocational studies in order to raise the achievement of students, identified ten key practices and now promotes their implementation via the *HSTW* program. First and foremost of these practices is high expectations: setting higher expectations and getting more students to meet them.

HSTW provides a framework for raising system expectations; encouraging students to complete more challenging courses; changing classroom and laboratory practices; involving parents, employers and the community; and improving student assessment.

A variety of educational studies, including one conducted by MassINC in 2005, point out the benefits of stronger relationships between teachers, kids, and parents; and many reform efforts encourage a transition to smaller, more personalized school units. Newly designed small high schools or small school units within larger schools have recently proven to be successful at improving student performance. Small learning communities, such as the individual shop model in the vocational technical setting, are promoting better relationships between students and teachers, more student interest in specific careers, and better student performance.

Given the cohesiveness that is evident in the CTE shop setting, and the way this has arguably contributed to student success, it would appear that CTE already has a head start on a very large facet of high school reform championed today. Rather than making drastic changes to those aspects of CTE which have proven effective, the real focus of CTE reform should be on finding new ways to help students attain the “soft” skills needed in today’s high tech jobs.

As vocational schools focus on career skill attainment, no skill is more important in the information age than the ability to communicate with and relate to other people. Today’s workers need to be able to exchange ideas, form relationships, understand human nature, and to master the complex ways of modern society. Incorporating these skills into the CTE curricula will require vision and willpower to replace outdated, but familiar, practices with new approaches. It will necessitate turning away from comfortable paths that all too often have led to dead ends for many students; but the potential rewards are enormous.

By long term legislative and education reform design, CTE is expected to cost twice that of a purely academic experience. Given this double per pupil investment, the taxpayer is entitled to a fair opportunity to experience a lucrative return. The public, students, and employers all deserve more from this added investment. In fairness, the non voc-tech LEA must also have access to sufficient funding, especially to enable it to service the more challenging student who was formerly farmed out.

While CTE has clearly benefitted from a greater taxpayer investment, the lingering stereotype has continued to create additional challenges for students. It is unfair for vocational-technically inclined students not to be able to have access to scholarship and discounted tuition opportunities due to the absence of SAT and ACT preparation or a generally accepted expectation that they will not require further education beyond high school. CTE educators seeking to secure financial resources for students have witnessed rampant ineligibility of the vocational technical student and have had to strongly advocate against discrimination in scholarship applications and a variety of value-added opportunities. When contacting gifting organizations, a common response included an apology and an explanation that they had simply never been asked to include voc-tech students who met their other selection criteria.

CTE systems therefore need to push for scholarship eligibility and for inclusion of vocational technical students in civic/government activities such as Boys/Girls State and in speech/debate competitions. In Massachusetts, where vocational technical students have the same opportunity as all other high school students to qualify for full-tuition scholarships at state colleges under the John and Abigail Adams Scholars program, twice as many students at Blackstone Valley Regional Vocational Technical High School as in the previous year qualified as Adams scholars based on their MCAS performance and standing among their peers. Some of these students will perhaps opt to forgo this scholarship assistance and move directly into the workforce. For those who choose the route of further education, however, they enjoy the added benefit of finely honed technical skills which can be used to secure meaningful part-time employment during college or which can serve as a solid base for related post-secondary course work leading to a rewarding and satisfying career. The effective merging of academic and technical skill attainment is clearly a win-win situation for both students and their prospective employers.

With today's technology, all students – including those in the CTE setting – should no longer be limited to a small number of course options that are restricted by fiscal resources of the LEA. On-line course opportunities, including AP courses offered through Virtual High School and other distance learning initiatives, create new avenues for unleashing the potential of vocational technical students. As new technology is incorporated into the everyday learning experience, CTE can advance more diverse teaching methodologies and enhance the learning environment for its students.

Summary

As the NAVE Final Report to Congress concludes, CTE is a long standing program whose place in American education continues to evolve. The broadening of its goals, the ongoing diversity of

participants, and the changing education and labor market climate in which it operates, suggest CTE will continue to be a viable and flexible option for many American students.[31] The historically rich role of CTE in responding to the nation's workforce demands provides a solid base and fertile ground for the design of new and innovative approaches to the challenges of today's global economy.

Proponents of the new CTE agree with the National Task Force assertion that democracy demands citizens that are productive, engaged, critical, energetic, and free; and that the education they receive will have everything to do with whether our students become these kinds of citizens. The report reminds us that "if a meritocracy such as ours truly reveres equality of opportunity and rewards tenacity and talent, then schools should serve to equip all children with the skills and knowledge necessary to propel them as far as they can go."[32]

The tenets of excellence which should drive all educational systems must characterize the quest of CTE institutions. An updated and more rigorous version of CTE has enormous capacity for helping our country meet the challenges of the new global economy. By helping its students achieve to their fullest potential, the new version of CTE will prove its invaluable ability to bolster the economy and strengthen our democracy for the benefit of all.

[31]National Assessment of Vocational Education, 21.

[32]Brown, et al., 1, 6.