

Gayle Christiansen
Urban Labor Markets
Final Paper
May 22, 2009

Career and Technical Education in Theory and Practice

Career and Technical Education (CTE) is presented as a holy grail of education reform, however in practice it falls short, leaving CTE at a critical juncture. Fully enacting its unique educational framework of contextual, hands-on, integrated learning will lead CTE graduates to high wage, skilled jobs, a college degree, and great labor market gains. But this will require overcoming the traditional perception of voc. ed, enacting government legislation to increase accountability, and working through environmental constraints, like teaching low-income students in an area that lacks a strong labor market, outside the control of CTE schools. The following paper considers the different forms of career and technical education over the years, the general history of CTE, and its current value as a type of high school education. I then explain how CTE works in practice both from a review of the literature and a visit to the Greater Lawrence Technical School in Andover, MA. Finally, I offer recommendations for the future direction of CTE.

Forms of Career and Technical Education

CTE, formerly known as Vocational Technical Education (VTE), enables students to enter the labor market immediately after graduation armed with job skills and career training. Students who attend a vocational high school or a comprehensive high school but concentrate in career training, are stereotypically viewed as unmotivated or unintelligent, with low-standards for academic achievement and unable to handle a rigorous education. They may be special

education students, misfits, or troublemakers who in the future will have hands-on or labor intensive, low-paying jobs.

CTE exists today in multiple forms given federal and state legislation, discussed below, and other school reform initiatives. It is useful to briefly note the range of vocational training here, as many specific CTE programs are hybrids of these models. Additionally, high school vocational education research mostly consists of studies about these specific high school models and not CTE more generally. As mentioned later, this makes drawing generalizations about the field problematic. Below is a description of different ways high schools teach CTE.

Comprehensive High Schools offer but do not specialize in CTE. Students may choose carpentry or automotive classes as an elective or even a concentration, but these courses are listed alongside academic, college prep options. They offer something for everyone, attempting to prepare all students for a future career, whether or not they attend college before entering the labor market. An example of comprehensive high school is a neighborhood school, which serves the needs of an entire community.

Tech Prep is a school model first funded by Perkins II where students spend their freshman and sophomore years in high school and then attend community college during their last two years. This system helps students transition to community college and reduces course duplication at the two institutions. In practice, tech prep has not been implemented comprehensively or on a large enough scale to be considered a successful school reform model (Silverberg 2004). Community colleges have not changed enough to fully welcome the tech prep students (Bishop 2004). In many cases it resembles other vocational programs after the most recent school reform wave.

School-to-Work, funded by the School to Work Act of 1994, aims to reduce youth floundering by providing students with marketable skills in an education *through* work, instead of *for* work program (Brassi 2000). While no longer federally funded, the Southern Education Regional Board continues to support this model because it prepares students to enter high-skill, high-wage jobs through using workplaces as learning environments and firm capacity for some student training (Bottoms 2005). The School-to-Work model has been very successfully helps students identify career goals, but struggles with implementing some of its more difficult aspects, like finding firms willing to employ student workers (Castellano 2003).

Career Academies are a school reorganization model readying students to follow a career path through postsecondary education. Its broader conception of “vocation” includes hospitality and tourism, human services, business, law, government, public service, and communication arts. Students share the same teachers over several years within a small learning community, which takes the form of a school within a school (Lynch 2000). The Urban Learning Center career academy model has been particularly successful in organizing students around certain career pathways followed throughout high school and after graduation (Kazis 2005).

Career Magnet High Schools have greater familiarity in the general population. They are large schools centered around one career theme, such as medical arts or creative arts. Unlike many vocational technical schools, academically high performing students typically attend career magnet high schools, which in many urban districts have a better reputation for academic success than the comprehensive high schools (Bishop 2004). Magnet high schools provide CTE, but this paper is rooted less in their literature given the different population of students served.

Regional Vocational Technical High Schools, on the other hand, are the focus of this paper. These schools are often their own districts and draw students from a wider geographic

area. While explained in much greater detail below, they emphasize on CTE more than comprehensive high schools. Students at the vocational technical high schools spend half their time in career training and half on academic subject matter. Many of these schools also offer a greater variety of career training tracks. When vocational technical high schools go through school reform, many take the form of like career academies (Karnow 2009).

Career and Technical Education Legislation

The different forms of CTE result in part from different education legislation. The federal government first provided financial assistance to public schools for vocational technical programs with the Smith-Hughes Act of 1917 (Hayward 1993). This led to greater secondary school enrollment across the country (Bishop 2004). Supply side theorists, cite this legislation as the beginning of CTE stereotypes (Lynch 2000). Vocational education trained blue-collar students for work on the farm, factory, or in the home. These students were considered unable to keep up with the classical high school curriculum, which was not necessary for their future careers anyway. Demand side theorists view this act as responding to the need for greater vocational skill and training arising with increased economic development at the time (Bishop 2004). Either way, CTE becomes an institutionalized high school option.

In step with other movements of its time, the second major piece of federal CTE legislation, the Vocational Education Act of 1963, set aside money for high school training programs serving the poor and handicapped. If it had not previously, the general public now considered vocational technical programs as a way of aiding minorities and the underprivileged (Hayward 1993). Amendments in 1968 instituted cooperative education and work-study programs. Additional amendments in 1978 attempted to reduce gender stereotyping and

authorized the National Assessment of Vocational Education (NAVE), which reports on the government's direction for CTE and draws attention to the need for additional resources.

The Carl D. Perkins Vocational Education Acts of 1984, 1990, 1998, and 2006, have had the greatest impact on recent vocational education developments. The first act in 1984 emphasized “access, program improvement, cooperation between the public and private sectors, advanced technology and training, and retraining and upgrading workers” (Hayward 1993). This Act continued to stress CTE as a solution to the problems associated with disadvantaged youth. Perkins II in 1990 drew, added that a skilled and highly competitive workforce, ideal at the time, would only develop from the integration of vocational and academic content. It also stressed the importance of a smooth transition from secondary to post-secondary training by providing funding to start Tech Prep. Reauthorized in 1998, Perkins III changed the name of Vocational and Technical Education (VTE) to Career and Technical Education (CTE) as part of its attempt to overcome the stereotype of vocational training being for students who cannot handle a rigorous education or plan to attend college (Castellano 1993). This Perkins Act iteration pushed students with a CTE background to graduate high school and obtain further education. Other federal programs like financial aid, tax credits, and the Workforce Investment Act, provided potential student access to postsecondary education and training, which reinforced Perkins III goals (Silverberg 2004).

On the state level, Massachusetts became the first to publicly fund CTE with the Industrial and Technical Education Act of 1906. In 1962 it started Regional Vocation High Schools for those students who did not plan to enter four-year colleges. Today there are twenty-six of these “schools of choice” across the state, serving 27,000 students (Fraser 2008). Like other CTE models, these regional high schools post Perkins reforms focus on preparing students

for postsecondary education. Most recently, the state introduced Vocational Technical Education Curriculum Frameworks (VTECF) and the Competency Technical Vocational Tracking System (CTVTS). These pieces of legislation mandate standardized statewide vocational curriculum with benchmarks, sequenced objectives, and performance tasks. Students must demonstrate an applied competency of academic knowledge, work attitudes, general employability skills, and occupation specific skills for economic independence (Fraser 2008). Each student also has an electronic portfolio that follows him or her if they transfer to a different school within the state. They can now seamlessly continue their CTE. Massachusetts serves as an example for other states because it has a greater understanding and accountability for CTE already in place.

More general high school reforms like the No Child Left Behind (NCLB) Act of 2002 have also determined CTE programs. Teachers are now expected to prove themselves, through standardized test, to be experts in their content area, to spend time planning cross-content units or projects with other teachers, to integrate technology into classroom learning, to attend professional development, and to set high expectations for students. Many high school campuses now consist of multiple small learning communities with an interdisciplinary team of teachers assigned to the same students and instructing them on a block schedule. School administration stresses student and staff attendance and engaging, student centered, situated learning. In many ways the issues CTE grapples with today results from this most recent federal legislation.

Value and Importance of Career and Technical Education

Can and should CTE survive the reforms placed over it in the last twenty years? Can and should it overcome the perception of being a dumbed-down curriculum that doesn't teach necessary skills? The number of CTE courses offered students continues to shrink (Kazis 2005,

Silverberg 2004, Lynch 2000). Is this a sign that we should let CTE end entirely? Why not incorporate it in other high school reforms? Doing away with CTE would discount its many strengths. CTE has reduced the high school drop out rate, provided special needs students with an accessible education, engaged students through hands-on, contextual learning, prepared students with both soft and hard skills through integrated academic and vocational training, met the needs of local labor markets, entered students on career ladders, produced economic gains for students in the labor market, and saved the government money. All of these are discussed in detail below.

Currently nearly one third of public high school students fail to graduate, a number higher for disadvantaged minorities (Hughes 2005, Kazis 2005). However, students completing CTE courses tend to stay in school. Bishop finds a significant and positive correlation between the number of vocational courses students take and graduation rates (2004). This builds upon Plank's 2001 study finding those least likely to drop out take three career courses for every four academic ones. These results are strongest among students with the greatest risk of dropping out. In Massachusetts, 90.5% of students graduate from CTE schools, which is greater than the state high school graduation rate of 80.9% (Fraser 2008). It appears CTE programs reach students considered low-achievers, who are uninterested in school. Perhaps comprehensive high schools can incorporate CTE methods to decrease the student drop out rate.

Another valuable tenant of CTE is contextual learning. An occupational focus allows students to learn academic knowledge through real world skills with direct career applicability (Brand 2005). For instance instead of answering math word problems straight from a textbook, students learn measurement and metric conversion when they need to increase a recipe from four to twenty people in a culinary arts class. Because students are engaged in the content of these

lessons, many do not realize the amount of academic work and learning taking place. The students no longer ask, “Why are we learning this?” because they are too engaged in the lesson and excited to learn about using this information on the job. High school students who find the subject matter useful overcome, become engaged and motivated to attend classes. School has a purpose. Teachers can now immerse students in higher order critical thinking without students giving up or resisting. Once students see the connection between the subject matter in school and their future careers, many want to continue their learning until they have deep understanding of the content being taught. Students may even decide to continue their study through college. For some uninspired by internal incentives and who have discovered grades do not matter, they will be passed to the next grade level no matter their academic performance, learning in a career context might be the only way to provide students with the external motivation to keep learning (Bottoms 2005, Rosenbaum 2001).

In addition to learning in context, CTE instruction consists of hands-on learning. Students spend time in shop wiring walls, constructing cabinets, practicing CPR on dummies, and designing marketing campaigns. Hands-on learning follows NCLB reforms for student centric learning that engages all students, especially those who struggle to learn through reading or listening to class lectures. To this effect, CTE is extremely effective at teaching special needs students, who attend Massachusetts CTE high schools at higher percentages than non-CTE students (Fraser 2008). Special needs students also graduate from CTE schools (82%) than non-CTE high schools at a higher rate than non-CTE schools (82% versus 63%) (Fraser 2008). Seeing the number of special needs students they serve and the potential for these students to graduate, some CTE schools have created remedial courses taught by specialists. Whether a special needs or not, hands-on classes activate students who are not “book learners.”

Another related aspect of CTE is learning through work instead of learning about or for work. Students learn vocational skills through working in the labor market either in an apprenticeship, internship, or co-op program. The participating firm pays students a small wage for their work and students gain career knowledge. The employer benefits from having work completed at a lower wage, and if the apprenticeship is well structured, they may hire the student after he or she graduates. It is often less expensive for the firm to train CTE high school students through an apprenticeship period and then hire them than it is for the firm to hire and retrain workers from other firms (Brassi 2000). These programs also have potentially strong labor market outcomes for participating students. After an internship or apprenticeship, a student hired directly by the firm is ideally a part of the firm's internal career ladder. Rosenbaum finds students helped by an apprenticeship program in finding their first job after high school, have 17% higher earnings ten years later than those who did not have the same opportunity (2001). This is especially important for low-income students who lack a strong connection or network tie to the labor market and often wind up in low-paying jobs. In addition to aiding students in entering the labor market, firm employees build connections with and serve as mentors for the apprentices. These role models can encourage students to continue their academic studies and help them develop a sense of adult responsibility. This limited work in the labor market during high school allows students to practice necessary skills and provides them with a way to smoothly transition out of high school.

Contextual classroom lessons and an out of school apprenticeship or internship teach students soft skills. These include problem solving, managing information, analysis, big picture perspective, effective listening and communication, initiative, and ethics. Being successful in a career requires these skills and so it is troubling that comprehensive high schools do not teach

them (Murnane 1996). And even if students change careers, these skills remain valuable no matter their next job. CTE is clearly about more than just vocational or academic knowledge; it includes being able to be a productive and respectful team-playing employee.

In addition to these soft skills, CTE students have marketable hard skills. In Massachusetts, graduating students earn a Certificate of Occupational Proficiency (COP) proving their skill set knowledge (Fraser 2008) A strong technical background means students can find a higher paying job directly after graduation, reducing the time young adults spend goofing off or shuffling between menial jobs. For those that want to attend but cannot immediately afford college, working higher wage technical leads to more quickly amassing funds for college (Bishop 2004). If the technical job skills learned in high school set students up for success in a firm, the employer may pay for the former student to take additional career courses or obtain advanced certification from a community college. For students directly entering college, vocational courses were not a waste of time. Students can still use their technical skills and labor market connections in summer and other school recess jobs (Bishop 2004). More colleges are also offering vocational career tracks than before, making the transition out of high school easier for students (Kazis 2005). Students entering post-secondary education in the same career path as their high school CTE have an advantage over other students who are learning about the occupation for the first time. The hard, technical skills learned through CTE can be valuable for all students after graduation whether working in the labor market or attending a post-secondary educational institution.

CTE today provides students with an integrated academic and vocational background. College might not be for all students, but graduating high school with grade level competencies is essential for higher levels of technical training. For instance, students must be able to read well

enough to understand and follow a heating unit's installation manuals. CTE accomplishes both academic and vocational preparedness through the previously discussed method of learning in context. For example, students learn physics and automotive repair by studying hydraulic brake systems. CTE has had a grasp on vocational training but is now working to strengthen its academics. Pushed by school reform measures CTE students have started closing the academic achievement gap with non-CTE students. Occupational concentrators increased their scores on the 12th grade National Assessment for Educational Progress (NAEP) by eight scale points in reading and eleven scale points in math. Non-occupational concentrators also increased their scores but at a slower pace; four scale points in reading and no improvement in math (Silverberg 2004). CTE lays the academic foundation for students to attend and be successful in college, while at the same time providing them with vocational skills.

By engaging students through hands-on, contextual lessons, and real world work experiences, CTE motivates students to stay in school. While there, they learn the hard and soft skills necessary to be successful in either the labor market or college. Researchers find these occupational concentrators have made earnings gains in the labor market. Of those attending high school between 1988 and 1992, CTE graduates spend more time employed post-graduation and earn significantly more than students who did not take any advanced CTE courses (Bishop 2004). CTE graduates are also less likely to have their first jobs be in short-term or temporary positions (Griffith 2001). In the short and medium-run CTE graduates see positive earnings benefits (Silverberg 2004). While these decline over time, seven years after graduation students earned 2% more for each additional high school career or occupation oriented course they complete (Silverberg 2004). If annual earnings are \$24,000, this is about \$450 for each vocational course. A CTE background also has large effects on earnings after an individual

obtains licenses, certificates, and post-secondary degrees (Bishop 2004). Fortunately for students, participating in CTE does not harm but benefits their future labor market earnings.

Finally, CTE benefits students, employers but also the greater local labor market and government. CTE graduates can fill the 10,000 manufacturing jobs that will open in Massachusetts in the next decade (Fraser 2008). This training background meets the demand for people with “general employability and specialized technical skills in areas related to computer science and computer science technology, high-tech manufacturing, software development, biotechnology, biomedical applications, sales and services, and health care” (Lynch 2000). CTE is also flexible to labor market demands. Enrollment in career fields like auto mechanics has declined but those in health care courses tripled and computer related courses has sextupled (Bishop 2004). This reflects general shifts in the labor market. Students who graduate with CTE skills also save the government money as they do not rely on government funded GED courses or subsidized remedial community college classes. These graduates have the hard and soft skills to obtain and keep a job, and so will not rely on welfare programs.

Career and Technical Education in Practice

CTE provides students with the skills to be successful in further education and a career. It aids employers in obtaining qualified workers at the right price and reduces overlapping educational programs saving the government money. CTE appears to be the answer to failing traditional vocational high schools and comprehensive high schools. But are these claims too good to be true? Before integrating all high schools with technical education, we need to further consider how these institutions behave in practice. For instance, how well do these schools infuse academic and vocational studies? Are students really learning soft and hard skills? Can these

schools meet local labor market demands? To answer these questions I rely both on the literature and a site visit to the Greater Lawrence Technical School (GLTS).

Greater Lawrence Technical School (GLTS) was established in 1963 and serves 1,172 primarily Lawrence, but also from Methuen, Andover, and North Andover students. It is a regional vocational technical school with the mission of providing a rigorous, constantly updated, standards based, comprehensive education incorporating an integrated project-based curriculum that prepares students for the workplace and further education (School 2009). It strives to implement education reform initiatives, provide faculty professional development, ensure accountability at all levels, and infuse technology into a high quality education (School 2009). While not a nationally recognized career academy, GLTS uses this language in describing its occupational concentrations. These include cosmetology, fashion technology, marketing, office technology, carpentry, electricity, plumbing, manufacturing, health careers and biotechnology, pre-engineering, information support services and networking, automotive collision repair and refinishing, automotive technology, and culinary arts. Students in 10th through 12th grade alternate weeks between core academic subjects and career concentrations. 9th grade students spend half their days in career courses and the other half in the academic core. Instead of one career focus, 9th grade students rotate through each of the “shops” before making a decision on their concentration for the remaining years. This allows the students to try and become familiar with all the offerings and encourages students to participate in non-traditional gender role careers.

Graduating GLTS students have a strong vocational background. An advisory council consisting of local industry and business professionals, some of who graduated from GLTS, oversees that each academy’s curriculum prepares students for future careers. Career changing

industry professionals bring their expertise to instructing vocational courses. Students have the option of participating in a co-op program, where they work for pay in a career field before graduation. Some of this is done in house as students staff the front desk and work at a credit union in the building.

GLTS is also proud of the students' academic achievements. As of the beginning of May, 73 of the 260 members of the graduating class have notified the counselor's office with which colleges they will be attending next year (Karnow 2009). Middlesex Community College, Northern Essex Community College, and Salem State College will have at least ten graduating GLTS students in next year's class. Last year, 46% of graduating students planned to attend a two year college, 17% a four year college, and 4% an other form of post-secondary training (Education 2009). A 93% attendance rate means students maximize their learning time and small class sizes of approximately ten students allow for more student teacher interaction (Karnow 2009).

Students must apply to attend GLTS. Admissions criteria include student grades, attendance, discipline, guidance counselor recommendation, and an interview, which is most heavily weighted (School 2009). This is a school of choice, which, like many other vocational educational schools, has become more competitive over time and has a waiting list. For next year's class, GLTS received 653 applications and accepted 425. They are hoping for a class of 350 students (Karnow 2009). It is helpful to remember the potential selection bias resulting from who decides to apply and who is accepted in considering the arguments below.

GLTS's curriculum and setup is similar to other vocational high schools in the Boston area. Minuteman High School is better known and could have been used for this paper, but I wanted to see how well CTE claims held when the population primarily resides in a poorer, post-

industrial city. At GLTS, 75% of students qualify for reduced or free lunch, 77% are Hispanic, 37% do not speak English as a first language (Education 2009). Griffith finds positive effects of CTE on employment and college enrollment, but his study considers only suburban schools where students are not poor (19% on free or reduced price lunch), majority minority (24%), nor English language learners (14%) (2001). Griffith cannot explain if his outcomes are due to the population studied or the CTE model. This qualitative paper looks to tease out his findings by using a different population to push the limits of CTE effectiveness.

For GLTS and other CTE schools, vocational education being for unmotivated, low academic achievers is not a perception but reality. Overall, students who concentrate in occupational courses are more likely to have single parents, limited English proficiency, be in the lowest quarter in terms of socioeconomic status and standardized test performance, have a C grade point average, earn lower grades in 8th grade, and be in remedial courses (Levesque 2006, Silverberg 2004, Lynch 2000). GLTS students enter 9th grade at on a 4.5 grade level in math and reading. Instead of being able to convert fractions to decimals and percents, they can only add and subtract fractions with similar denominators. And while curriculum calls for reading “Romeo and Juliet,” most of the students can only comprehend Beverly Cleary books (Karnow 2009). CTE programs have to work harder than other high schools providing an educating preparing students for post-secondary study because students enter so far behind and then spend half their days in career classes. Many comprehensive high schools with similar populations use the entire school day working solely on raising academic achievement and they still struggle. Starting with a student body lacking the necessary knowledge, skills, and drive is an extremely large obstacle for any school but especially CTE high schools.

The Perkins Act mandates CTE schools to set high expectations for students. For instance, schools now push for a strong academic curriculum in addition to their vocational program. At GLTS, as is likely at other CTE schools, there is talk of high expectations, but little evidence of increased teaching and content quality. Teachers at GLTS display lesson objectives and agendas on their boards, which shares expectations with students, but does not guarantee students are being asked to complete challenging work that requires higher order thinking or soft skill development. In a graphic arts classroom the students are asked to use the Adobe Illustrator program to create a mother's day card. This is a nice idea, but it lacks academic rigor. A lesson with high student expectations would require student teams to use Illustrator to create a brochure for a marketing campaign and then have the students present their product to the rest of the class. This modified lesson now has students learning the tool to solve a problem and then persuasively communicate their ideas to others. More generally, the school talks about high expectations but then does not offer any advanced placement or higher level courses like Calculus. The students will not succeed in their post-secondary education without a strong academic base, which is currently not being offered at GLTS. If excuses about being second language learners, having no one at home to read to them, and living in poverty lead educators to demand less of these students than their peers growing up under better circumstances, the students will never attain the strong academic background put forth in CTE rhetoric.

Academic expectations are low and an integrated curriculum proves problematic in practice. At GLTS, academic and career instructors rarely communicate. There are not enough hours in the day to have teachers sit down and plan rigorous, project based lessons together. On their own, teachers do not have an extensive enough knowledge of other content areas to integrate career and academic skills. CTE suffers from an imbalance between vocational and

academic classes. Vocational courses do not contribute to academic improvements (Silverberg 2004). Replacing occupational classes with academic ones raises academic achievement, but goes against the dual education structure. A truly integrated curriculum would support teachers enough to incorporate academic and vocational competencies in each class. Students would then graduate with dual competencies.

We have seen CTE claim students will be prepared to enter college, but in reality CTE are less likely to attend college than their college prep peers and when they do, they tend to be older, take more career credits, and then graduate with an associate's instead of a bachelor's degree (Levesque 2006). Overall, only 18% of CTE students complete a bachelor's degree. About two thirds of CTE students complete a year or less of college coursework within five years of high school graduation (Silverberg 2004). These statistics might be because students are not academically prepared to be successful in college. At GLTS, the 10th grade MCAS, the state standardized test, shows students behind state averages in every tested subject. Last year, 8% of students scored proficient in science and technology, 49% scored proficient in language arts, and 43% scored proficient in math. The corresponding state averages are 77% proficient in science and technology, 74% proficient in language arts, and 72% proficient in math (Education 2009). The lack of academic achievement may prohibit many students from attending college, even if it is one of their goals. In summary, graduating with a vocational concentration does not mean one is prepared to enter college or that ones probability for future academic achievement increases, and without more education, these former students do not work high in wage jobs (Silverberg 2004, Kazis 2005).

At the same time, completing a college education may not be a problem if the jobs available do not require a bachelor's degree (Rosenbaum 2001). But the Merrimack Valley,

where GLTS is located, suffers from a different problem: lack of employers in general. There are not enough jobs for people with degrees or without. A stronger labor market would help the CTE model. As it is, there are few firms in the area available to provide quality internship opportunities for students. Those who participate in off campus co-ops work only in health careers (Karnow 2009). Members of the advisory councils try to place students in their own firms, but they also have limited resources. Once students graduate, there are not enough employers to hire them. The idea that CTE students can easily transition into the labor market breaks down because of local labor market deficiencies. Without seeing their careers in action while in high school, students lose the motivation brought by contextual learning. They can once again ask, “Why are we learning this?” because they do not see people in their community employed in jobs requiring these skills. This problem will require greater systemic changes than can be provided by CTE reforms. Until these take place, CTE not be able to live up to its potential.

Finally, occupational courses require a great amount of expensive equipment increasing the cost of education (Kazis 2005). In Massachusetts, the average cost per student at a vocational school is \$16,945, which is approximately \$5,000 more than the state average of \$11,870 per student (Fraser 2008). If CTE does not live up to its claims, and maybe even if it does, is it too expensive to fund? At the same time, CTE supporters argue they cannot reach their aims because they are under funded. Instead of budge cuts meaning they cannot hire staff to better integrate the curriculum, CTE school leaders call for greater public financial support (Karnow 2009). Deciding whether CTE deserves more or less funding depends on how one justifies CTE’s strengths and weaknesses.

Conclusion and Recommendations

Concerns about students entering CTE academically behind, being taught an undemanding, yet expensive, curriculum leaving students unprepared for college success, and then graduating to a labor market without employment opportunities, questions whether we should continue to invest in CTE. Maybe the better choice is to focus on early childhood education so students will not be entering high school with academic deficiencies. This should be done, but in addition to better implementing the unique and results oriented CTE framework. CTE has undergone transformations since its original federal funding in 1917, proving it is a flexible form of education that can meet the demands being placed on it today. For the students who learn best with hands-on, contextual lessons, giving up on CTE, means giving up on their abilities to learn. Going forward, CTE should consider the following recommendations.

Pass greater federal and state accountability standards. Previous legislation has led to better CTE alignment with student and employer needs. States, like Massachusetts, with strong rules for occupational programs, also have more successful vocational graduates (Fraser 2008). In general, there should be a national standardized vocational curriculum so all schools provide students with the necessary skills. At the end of high school, students should complete a performance exam proving all the vocational and academic competencies learned at a high level of thinking. Students who pass this exam will be awarded a national certificate. Overtime employers will associate this designation with a certain work competency and be more willing to hire graduates. Federal legislation should also clearly outline different career pathways from high school to higher education and provide funding incentives for apprenticeships and internships (Kazis 2005, Brassi 2000).

More specifically, Perkins III requires greater focus. It seeks to improve academic achievement, technical skills, high school completion, postsecondary enrollment and degree completion, employment, and earnings, but does not outline how these will all be accomplished (Silverberg 2004). In being comprehensive it lacks depth and clear description of these measures. It is no wonder schools struggle with upholding high expectations when a definition is never articulated nor are examples of high expectations in practice provided. The term of “high skill, high wage job” should also be clearer and point to specific industries and jobs (Kazis 2005, Wiener 2005). Finally, to accomplish all it outlines, Perkins III must provide greater financial support to school districts. This funding accounts for approximately 5% of school budgets, but dictates a much greater proportion of school policy (Castellano 2003).

Improve vocational teacher quality. These teachers are currently exempt from a certification process and the “highly qualified” requirement (Weiner 2005, Silverberg 2004). Recent teacher improvement efforts have targeted academic teachers, but the same mandates should apply to vocational instructors who have a strong background in industry but lack knowledge of teaching pedagogy, student assessment measures, and classroom management. Many vocational teachers began before the government enacted stricter reforms and so require professional development to learn how to create thematic, contextual, and cross-discipline learning opportunities. CTE schools should also offer vocational teachers sabbatical years to return to the workforce and refresh their skills. These teachers then return and teach the students their updated knowledge. Vocational teachers, with an understanding of both industry and education, will better instruct students.

Raise academic and vocational expectations. Expectations for student achievement must increase if CTE wants to meet its goal of providing a dual education. We have seen that CTE

students are more likely to enter the workforce directly after graduation in comparison to students who follow a primarily college preparatory track (Plank 2001). CTE also shows no increase in the academic outcomes of grade point averages or test scores (Hughes 2005, Plank 2001). And vocational programs continue to struggle with the image and reality of being a less demanding academic track. In addition to enacting greater federal and state legislation, schools should provide teachers with professional development explaining and showing with evidence, case studies, and examples the concept of “high expectations.” They should also offer students the option to take advanced placement and higher level courses.

In terms of vocational expectations, students should be training for living wage jobs. Courses should stress soft skills as well as the technical career aspects and make sure vocational offerings reflect the needs of firms. This requires CTE schools to be forward looking and set aside resources for developing new career pathways. The lowest performing or least relevant career concentrations should be dropped. Finally, vocational courses lack the same accountability as academic courses. Students should demonstrate their abilities through performance tasks, portfolios, and essays.

Fully integrate career training and academics. CTE wants a strong linkage between career and academic courses, but this is not the reality. Better alignment will result when teachers can take advantage of common planning time with other content area teachers who work with the same group of students in one small learning community. Instructors can more easily plan collaborative assignments when they share the same students. At least one math, reading, and science content standard should be included in each vocational assignment. A more holistic integration can be modeled from the Southern Regional Education Board. Students should be able 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, principals, and processes for application in a given career field; use technology to complete projects and authentic tasks in a broad career field” (Bottoms 2005). Graduating students should also be required to complete a senior project in which they show their understanding of their vocational and academic courses.

Extend the school day and year. Students entering behind academically require more time in rigorous study. This is especially problematic for CTE because students spend half their day in career courses. With greater integration, these vocational classes will offer more academic practice, but this alone will not close the academic achievement gap. Apprenticeships, internships, and coop work should take place outside the academic day. If they cannot take place after school hours, evening classes should be available. Alternatively, the school year could be increased providing students with several additional weeks to focus solely on academic courses.

Create greater partnerships in local and greater community. CTE programs have the advantage of responding directly to local labor market needs. This is an edge they should strengthen by building stronger relationships with firms. And if, like in the Merrimack Valley, there are few employment opportunities, schools should consider partnerships with firms further from their campuses. Partnerships with community colleges will ease students’ transition to post-secondary education and firm relationships will increase student real world work experience. Reaching out to form strong, trusting relationships will require time and energy (Rosenbaum 2001). School policy should support and encourage teachers to create and maintain these ties.

Conduct further research about CTE. At the moment no scientific way exists to follow students through college or other post-secondary education (Karnow 2009, Kazis 2005). If students could be tracked via social security or student identification number, we could measure

CTE impacts on post-secondary degree attainment. Additionally, current assessment measures are not sensitive enough. For instance, survey measures lump together earning a high school diploma with a GED, even though labor market outcomes differ greatly for these groups (Wiener 2005). Also, no current, generalizable studies answer whether contextual learning has positive impacts on future academic success (Kazis 2005, Medrich 2005). The previous studies available suffer from selection bias (Kazis 2005). Research data is especially important in education reforms during an era of data driven NCLB decisions. States should know what career tracks are most successful and have action plans to improve those that are the lowest performing. They should also know how CTE students perform on academic and vocational measures in high school and beyond and constantly and consistently be working to improve these results.

With implementing the above recommendations, career and technical education can more successfully fulfill its goals and produce students prepared for work and further education. A thoughtful framework currently exists, but it must be followed more comprehensively. These changes will not come easily and will look different because CTE schools are located in different states and local labor markets, but if done well, they can all produce successful graduates and serve as a model for other school reforms.

References

- Bassi, Laurie J. and Jens Ludwig. 2000. "School-to-Work Programs in the United States: A Multi-Firm Case Study of Training, Benefits, and Costs." *Industrial and Labor Relations Review* 53:219-239.
- Bishop, John H. and Ferran Mane. 2004. "The Impacts of Career-Technical Education on High School Labor Market Success." *Economics of Education Review* 23:381- 402.
- Bottoms, Gene 2005. "The SREB Model: Academic Rigor, Technical Relevance, and a Head Start on a Career." *Remaking Career and Technical Education for the 21st Century*.
- Brand, Betsy 2005. "What a 21st Century Career and Technical Education System Could Look Like." *Remaking Career and Technical Education for the 21st Century*.
- Castellano, Marisa; Stringfield, Sam, and James R Stone. 2003. "Secondary Career and Technical Education and Comprehensive School Reform Implications for Research and Practice." *Review of Educational Research* 73:231-272.
- Education, Massachusetts Department of Elementary and Secondary. 2009, Retrieved May 18, 2009 (http://profiles.doe.mass.edu/mcas/performance_level.aspx?linkid=32&orgcode=08230000&orgtypecode=5&).
- Fraser, Alison L 2008. "Vocational-Technical Education in Massachusetts." Pioneer Institute.
- Griffith, James and Julie Wade. 2001. "The Relation of High School Career- and Work-Oriented Education to Postsecondary Employment and College Performance: A Six-Year Longitudinal Study of Public High School Graduates." *Journal of Vocational Education Research* 26.
- Hayward, Gerald C; Benson, Charles S. 1993. "Vocational-Technical Education: Major Reforms and Debates 1917-Present." edited by U.S. Dept. of Education.
- Hughes, Katherine L. 2005. "Toward Better Outcomes: Lessons from New York and National Research." *Remaking Career and Technical Education for the 21st Century*.
- Karnow, Illene. 2009. "Interview regarding GLTS."
- Kazis, Richard 2005. "What Role for High School Programs?" *Remaking Career and Technical Education for the 21st Century*.
- Levesque, Karen. 2006. "The Postsecondary Educational Experiences of High School Career and Technical Education Concentrators." Institute of Education Sciences: National Center for Education Statistics.

- Lynch, Richard L. 2000. "High School Career and Technical Education for the First Decade of the 21st Century." *Journal of Vocational Education Research* 25.
- Medrich, Elliott A 2005. "Change or Die: The Challenge Facing Career and Technical Education Today." *Remaking Career and Technical Education for the 21st Century*.
- Murnane, Richard and Frank Levy. 1996. *Teaching the New Basic Skills: Principles for Educating Children to Thrive in a Changing Economy*. New York: Free Press.
- Plank, Stephen. 2001. "Career and Technical Education in the Balance: An Analysis of High School Persistence, Academic Achievement, and Postsecondary Destinations." University of Minnesota.
- Rosenbaum, James. 2001. *Beyond College For All: Career Paths for the Forgotten Half*. New York: Russell Sage Foundation.
- School, Greater Lawrence Technical. 2009, "Greater Lawrence Technical School", Retrieved May 18, 2009 (<http://www.glts.tec.ma.us/education/district/district.php?sectionid=1>).
- Silverberg, Marsha; Warner, Elizabeth; Fong, Michael; Goodwin, David. 2004. "National Assessment of Vocational Education: Final Report to Congress ", edited by U.S. Dept. of Education.
- Wiener, Ross 2005. "How the Federal Government Could Promote Academically Rigorous Career and Technical Education." *Remaking Career and Technical Education for the 21st Century*.