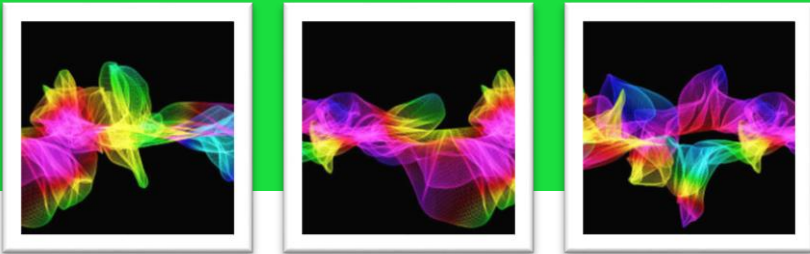


Public Education, Career and Technical Education, and Dropout Prevention

A National Dropout Prevention
Center/Network White Paper

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A National Dropout Prevention Center/Network White Paper

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The mission of the National Dropout Prevention Center/Network (NDPC/N) is to increase high school graduation rates and reduce school dropout rates through research, research dissemination, and the provision of evidence-based solutions. It accomplishes these goals by serving as a clearinghouse and network for evidence-based information that supports dropout prevention. The NDPC/N provides technical assistance and other professional assistance to school districts in the United States, all in support of dropout prevention. Fifteen effective strategies (National Dropout Prevention Center/Network, n.d.) guide the work of the NDPC/N. This paper focuses on one of those strategies: Career and Technical Education (CTE), specifically CTE as a dropout prevention/intervention/recovery strategy and how CTE can be engaging and of value to all students, including and perhaps especially for those at-risk of dropping out of school.

Findings from *The 49th Annual PDK Poll of the Public's Attitudes Toward the Public Schools* (Phi Delta Kappan, 2017; PDK), the latest report from the longest continuously running national survey of American attitudes toward public education, show that Americans overwhelmingly support investments

The most recent PDK poll shows that Americans overwhelmingly support job or career skills classes, even if at the expense of fewer academic classes.

in career preparation and personal skills, even if it means less focus on pure academics. Even though the poll indicates desire for change in some elements of education, there is good news from the PDK poll that the proportion of Americans who give their communities' public schools "A" grades is at its highest in more than 40 years of PDK polling. Fifteen percent—one in seven Americans—give their local schools a grade of A, up from 9% a decade ago. The majority of those surveyed also oppose using public funds to send children to private schools. Findings related to career and technical education include that

- 82% of Americans support job or career skills classes even if that means students might spend less time in academic classes;
- 86% say schools in their community should offer certificate or licensing programs that qualify students for employment in a given field;
- 80% see technology and engineering classes as an extremely important or very important element of school quality; and
- 82% say that it is highly important for schools to help students develop interpersonal skills such as being cooperative, respectful of others, and persistent in solving problems (Phi Delta Kappan, 2017).

The last point also relates to vocational/career and technical education because it is often in CTE programs that such soft skills and persistence in problem solving are integrated into the curriculum. The recent PDK poll information makes it clear that vocational and career education are high on the priority list of programs desired by a large portion of the adult American public. Such interest is also shared by the student population, according to other surveys, research, and anecdotal evidence. Reports such as the *Silent Epidemic* (Bridgeland, Dilulio, & Morison, 2006)

and *Engaged for Success* (Bridgeland, Dilulio, & Wulsin, 2008) indicate that students, especially those who have lost interest in school and are disengaged from participating in secondary school programs, strongly desire to have more opportunities to connect schooling with life and to focus on career preparation for adulthood. While most high school dropouts blame themselves for failing to graduate, students who have dropped out of school clearly state several things that schools could have done to help them to stay in school. One improvement called for would be to

improve teaching and curricula to make school more relevant and engaging and enhance the connection between school and work. [About] four out of five (81%) [high school dropouts] said there should be more opportunities for real-world learning, and some in focus groups called for more experiential learning. They said students need to see the connection between school and getting a good job. (Bridgeland et al., 2006, p. iv)

There is clear and growing consensus among the public, and among students, that career and technical education should be a high priority for program development in public schools.

Clearly career and technical education should be a high priority for program development in public schools.

Given this common interest in developing and expanding CTE, there is also good news that today's career education is much different, and much better in many ways, than what has been considered traditional vocational education (Voc-Ed). When Voc-Ed began in the U.S. with the Smith Hughes Act (1917) it definitively stated that vocational education was to be separate from and not include academic learning. It was assumed that hands-on approaches to learning vocational skills and knowledge precluded academic instruction. However, over the next 100 years, Voc-Ed was transformed and now connects academic learning with career knowledge and skills and creates a new, holistic program that prepares young people for work, for college, and for life.

Several of the more recent events in the transformation of Voc-Ed occurred in 2006 under the renewed Perkins legislation that changed the name to Career and Technical Education. Along with a new name came new definitions of CTE program offerings called Programs of Study, which required that such programs connect academic learning with hands-on learning. Perkins began a more formal discussion and definition of pathways connecting secondary and postsecondary programs so that there was articulation and cooperation between the two educational levels, with programs leading to actual certificates and entry positions into various occupations. At minimum, Programs of Study needed to

- incorporate and align secondary and postsecondary education elements,
- include academic and CTE content in a coordinated, non-duplicative progression of courses,
- offer the opportunity, where appropriate, for secondary students to acquire postsecondary credits, and
- lead to an industry-recognized credential or certificate at the postsecondary level, or an associate or baccalaureate degree.

Programs of Study connected academic learning with applied settings in the world of work. This was important because it supported, encouraged, and helped students who may have had a tendency to drop out of school (perhaps because they couldn't pass their academic classes such as English or math) to actually connect their academic instruction to how specific skills would be applied, so they could earn credit and skills in both the academic and the applied. It made more clear to students the value of the academics to specific careers, and thus strengthened the perception of the value of education and school completion to those students.

The emphasis on Programs of Study has now evolved in some places into efforts described as Career Pathways, which take students into fields that correspond to their interests and career choices and is often offered to all students, not just traditional CTE students. Students not only learn about various related careers in a particular field, they learn about multiple pathways that lead to occupations that connect their interests with real jobs and lifelong employment pursuits.

There has also been a broadening of CTE into core academics and core academics into CTE that is proving to be a strong dropout prevention and engagement tool for schools and educators as well as an attractive workforce preparation tool for employers and potential employees. These efforts to more

strongly connect core academics to careers, skills, and CTE are in many ways still in the early stages of development and thus have potential yet to be tapped.

Schools and school districts still need help supporting effective and efficient collaboration among academic and

Efforts to more strongly connect core academics and CTE are in many ways still in the early stages of development and thus have potential yet to be tapped.

CTE teachers working together to make this integrated effort operational. However the benefits of careful integration of certain CTE and core curriculum components, as well as increased faculty collaboration across both arenas could be significant. It is fairly rare that a core academic teacher has spent much if any time working in any occupation other than teaching prior to being hired at a school. And on the other hand, many CTE teachers have not focused on teaching and learning core academic knowledge through a career context. Most workplaces cooperating with school CTE programs also have most likely not emphasized the teaching of academic content through their jobs and procedures in the world of work. Thus, much staff and community development remains to be done to highly perfect this holistic approach. Fortunately, the National Dropout Prevention Center/Network focuses on CTE and school-community collaboration as dropout prevention strategies, and the Association for Career and Technical Education, as well as many other educational groups in the country, are working to make the integration between academics and careers happen.

Considerable changes have occurred in recent years in occupational education at the high school level. CTE has evolved from Voc-Ed and the purposes and programs in CTE have responded to the changing needs of the workplace and the workforce. In the past, Voc-Ed appealed mainly to students seeking specialized skill training for immediate employment directly from high school. In addition, some Voc-Ed programs were mainly designed to reach students who had struggled academically and were in danger of dropping out of school. This “second

chance” purpose was rooted in the idea that a hands-on education would be more effective for the student who struggled academically. This somewhat narrow view of Voc-Ed as a dropout prevention strategy for struggling students historically has tended to stigmatize and constrain Voc-Ed. Today’s new CTE is less likely to be viewed negatively by parents and students who do not struggle academically and thus the traditional stigma associated to some degree with Voc-Ed as well as CTE is fading. While CTE continues to respond in its traditional role for many students, other purposes are now part of the expanded CTE available to students today.

Contemporary CTE is much broader in scope than traditional Voc-Ed. In effect, CTE appeals to virtually all high school students. The new CTE is especially well positioned to meet the current expectation of College and Career Ready and lifelong learning is a major goal in all programs. Lifelong learning equips potential employees with the capacity to grow and change in concert with their employers. This is an especially important 21st century skill.

The broader appeal of CTE is also being integrated into more traditionally core subjects such as math, ELA, and social studies. For example, CTE is found in the National Council for the Social Studies’ C3 (College, Career, and Civics) initiative, where K-12 social studies courses have curricula and learning activities that broaden the social studies to integrate social learning with workforce preparation and civic involvement. In many ways this models the more holistic approach advocated by the Association for Supervision and Curriculum Development (ASCD), which considers social and emotional learning as well as personal learning to be as important as academic learning. A volume (Summer 2007) of ASCD's journal, *Educational Leadership*, emphasizes "Engaging the Whole Child." This journal volume is filled with articles, such as John Miller’s "Whole Teaching, Whole Schools, Whole Teachers," that addresses the challenges of reclaiming and reshaping the “vision of human wholeness held by our ancestors and endorsed by many spiritual traditions" (Miller, 2007). Connecting head, hands, and heart has been the legacy of education throughout the ages. It is now a renewed challenge of modern education.

CTE students often have higher graduation rates than the overall student population.

CTE should always have a seat at the table when schools and systems are discussing, developing, and implementing instructional, fiscal, dropout prevention, and other strategies.

Related, and perhaps not surprisingly, CTE students often have higher graduation rates than the overall student population. In Ohio, for example, a state that has made many efforts to utilize CTE as a dropout prevention, whole child support, and workforce preparation vehicle, the graduation rate for CTE students was reported for FY2013 to be a very high 98.7% (Ohio Department of Education, 2015). Other states and localities are tending to see similar results from the whole child, student engagement, practical value, and multipronged approaches to learning

used in CTE. For this reason and many others discussed in this paper, CTE should always have a seat at the table when schools and systems are discussing, developing, and implementing instructional, fiscal, dropout prevention, and other strategies.

TODAY'S CAREER AND TECHNICAL EDUCATION

CTE has multiple purposes with the intent to offer programming that meets the needs of all students and can be a model for all curriculum career pathways. The new CTE programs capitalize on the importance of experiential, authentic learning in blending theory and application. The new CTE responds to both the student's and the employer's needs to be prepared and have a prepared workforce to work and compete in a global economy. Considering constant change in technology, the new emphasis is on career programming rather than narrow preparation for specific jobs. In fact, current CTE programming is focused on 16 career clusters (see Figure 1) identified by the federal government. Many and varied occupations fall within the 16 career clusters and 79 pathways.

Another effective CTE program of study element not mentioned yet is that each program features a career and technical student organization (known as a CTSO) that reinforces program standards as well as soft skills. Soft skills are emphasized in CTE and are recognized by students, families, communities, and employers as important for a young person's lifelong success. A student is a member of the CTSO that relates to his or her career area. Both hard and soft skills, as well as social skills, are reinforced via the CTSOs. In many cases, the soft skills so highly prized by employers are taught in CTE programs through DECA, SKILLSUSA, Business Professionals of America, and others. In a pre-test/post-test comparison study of high school students in CTE classes that included a CTSO, Alfeld et al. (2007) found a positive association between amount of CTSO participation and academic motivation, academic engagement, grades, career self-efficacy, college aspirations and employability skills.

The elements of CTE have a place in all curriculum programs and could benefit all students. In many ways, formal Perkins-defined programs of study can be models for the more informal career pathways and real-world learning that can support all students' engagement in learning. CTE programs blend education and foster development in all three learning domains:

Agriculture, Food, & Natural Resources	Architecture & Construction
Arts, A/V Technology, & Communications	Business Management & Administration
Education & Training	Finance
Government & Public Administration	Health Science
Hospitality & Tourism	Human Services
Information Technology	Law, Public Safety, Corrections, & Security
Manufacturing	Marketing
Science, Technology, Engineering, & Mathematics	Transportation, Distribution, & Logistics

Figure 1. The National Career Clusters® Framework represents more than 79 career pathways in 16 clusters to help students navigate their ways to greater success in college and career. Source: Career Clusters, Advance CTE, <https://careertech.org/career-clusters>

CTE programs blend education and foster development in the cognitive, the psychomotor, and the affective domains of learning.

cognitive, psychomotor, and affective. Theory, terminology, and concepts in an occupational area are taught in a traditional instructional format. Application of the theory is taught, practiced, and reinforced in a laboratory setting that is a replica of the actual workplace. And all related skills and knowledge elements are reinforced through the CTSOs. The classroom, the lab, and the CTSO are interconnected, reinforcing content and skill development. In addition, students enrolled in CTE are often motivated by their interests in a career area. CTE also offers smaller classes and instructors who interact and teach students in all three settings. Students are also with like-minded peers who share a career interest. These modes of instruction and interaction prove to be practical, engaging, and effective for a great many students.

The following examples reflect the expanded CTE purposes and programs offered to today's high school students.

Skills training—CTE continues to prepare students for specific skill training in occupations. In addition to the traditional skill training in trades such as cosmetology, welding, and auto mechanics, many students learn skills associated with careers in biotechnology, information

Today's expanded notion of CTE includes

- *hard and soft skills training and preparation,*
 - *postsecondary education identification and articulation, and*
 - *special needs programming.*
-

technology, performing arts, athletic training, engineering, and other career areas. Some students will pursue occupations directly from a high school CTE program (cosmetology for example) while others will continue their skill training after high school. Post high school options include apprenticeships, diplomas, specific industry certifications/credentials, and

employer sponsored training. Some students may continue their occupational preparation through military education or college/university. The soft skills (communication, teamwork, problem solving, etc.) so desired by employers are also usually stressed in CTE programs and classes.

Postsecondary education—Most jobs and careers today and into the future will require education beyond the high school level. Looking at Ohio's data again, as many as 62% of high school CTE program completers go into either employment or advanced training and more than 50% enroll in college (Ohio Department of Education, 2015). Employment and advanced training build upon skills acquired in high school. Postsecondary education consists of programming at the associate and/or bachelor's level which is often articulated with high school CTE programs.

Completers of CTE programs often pursue associate degree education based on their career plans. High pay or high wage middle skill workers are much in demand. Many jobs in these fields require associate degrees. Many, if not most, high school CTE programs offer dual credit so students matriculating to associate degree programs have credits upon entering the community college, technical institute, or regional campus of a university.

A number of CTE students also are preparing for bachelor's degree programs as this is what their occupations will require. Students in manufacturing, engineering, information technology,

business, health, and performing arts often seek bachelor's degrees. In some cases, high school CTE programs are aligned in a two-plus-two fashion enabling students to move from high school to a two-year associate degree and then on to two more years to complete a bachelor's degree.

Special needs programming—In recent years, CTE programs have expanded dramatically to serve the needs of students with special needs and disabilities. Advances in technology have enabled many programs to offer adaptations and modifications enabling special needs students to be successful. In addition, many special needs students now have interest in and access to occupations requiring postsecondary education and are prepared for such education by the new CTE programs.

A TRANSFORMED CTE

Discussions about CTE often focus only on the formally-defined CTE programs of study and the many occupations and pathways related to those programs. However, there have been very recent spillovers of CTE into all academics and for all students related to career awareness, hands-on learning, real-world applications, career coaching/mentoring by teachers or career counselors, and many other elements traditionally associated with Voc-Ed or CTE. The transformation of Voc-Ed into learning about careers and lifelong employment skills and opportunities has produced outstanding results for students, their families, and employers. A body of research has begun to show that career and technical education has indeed begun to make a real difference in high school completion and progression to college and other postsecondary advanced education venues for students who typically have either dropped out of school or done very poorly in traditional educational programs.

The programs reviewed in the recent National Dropout Prevention Center/Network's meta-analysis of dropout prevention programs and strategies (Chappell, O'Connor, Withington, & Stegelin, 2015) included several programs utilizing career and technical education as a

Career and job training as a program strategy for dropout prevention has the largest measured effect size of dropout prevention strategies.

strategy. Although there were confounding issues that kept the statistical significance measure low, career development and job training as a dropout prevention strategy had the largest effect size measured of any strategy analyzed impacting dropout rates.

America's Promise has issued a series of GradNation reports from 2010 to the present that discuss the kinds of things that are necessary to improve the graduation rates of U.S. students. In every report, and especially in the last two (DePaoli, Balfanz, & Bridgeland, 2016; DePaoli, Balfanz, Bridgeland, Atwell, & Ingram, 2017), there is a powerful recommendation to include high quality career and technical education as well as work-based learning as strategies to address the dropout issue.

In a 2016 youth voice article from America's Promise Alliance (Populorum, 2016), we find a story from a student, Anna Populorum, who participated in a forum on issues of graduation for

students. She told of her movement from a traditional school to a career and technical education program, where she found meaning and purpose in her education. What she claimed students need is guidance and help in finding schools and programs that connect learning with real life.

To support efforts in CTE and stories from youth, we have many studies to show that career and technical education makes a difference. Two studies, one from Massachusetts and one from

Philadelphia CTE students' on-time graduation rates were 22% higher than those of non-CTE students, even when their reading and math performance were similar.

Philadelphia, demonstrate the power of CTE and internships/work-based learning. In the Philadelphia study we learn that the on-time graduation rate for students who participated in CTE programs was 22% higher than non-CTE students, despite the fact that the reading and math test scores of the two groups in eighth grade were statistically similar (Socolar, 2015).

Dropout rates from a Massachusetts study also show dramatically lower rates in CTE and vocational schools.

The study from Massachusetts indicated similar findings. The dropout rate for students enrolled in vocational technical education (VTE) programs was lower than comprehensive schools,

and the rates for regional vocational schools were even lower. “The statewide dropout rate at regular/comprehensive high schools averaged 2.8 percent in 2011, but was only 1.6 percent among the 39 VTE schools, and averaged a mere 0.9 percent among *regional* CVTE [career vocational technical education] schools” (Fraser & Donovan, 2013, p. 3).

These numbers were actually more dramatic because the enrollment of special needs students in vocational-technical schools was significantly higher. The Massachusetts report cites some very impressive differences in the “at-risk” student populations.

Though the average percentage of special needs students in Massachusetts is 17 percent, the average percentage of students with special needs in the regional vocational schools is 24 percent. Four schools have greater than 37 percent of their students on IEP’s, ranging up to 41 percent special needs students at Minuteman Regional Vocational Technical High School in Lexington. Still, the graduation rate of special needs students at vocational schools is almost 20 percentage points higher: 82 percent vs. 62.8 percent. (Fraser & Donovan, 2013, p. 5)

Fraser and Donovan (2013) cite several key reports about the effectiveness of career/vocational programs. They refer to a report on a study conducted by the University of Michigan that found that high-risk students are eight to 10 times less likely to drop out in the 11th and 12th grades when they enroll in a career and technical education program instead of a general program (Kulik, 1998, as cited in Fraser & Donovan, 2013). They also mention a report from the National Research Center for Career and Technical Education that showed students entering high school at a typical or younger age had a decreased risk of dropping out of high

school when they added vocational technical courses to their curriculum (Plank, DeLuca, & Estacion, 2005, as cited in Fraser & Donovan, 2013).

Schargel and Smink (2001) point to a U.S. Department of Education’s Office of Vocational and Adult Education three-year demonstration project of exemplary dropout prevention programs that analyzed thirteen successful dropout prevention programs. In each case, the four main components of the curriculum included

- a strong emphasis on academics,
- a varied array of occupational studies,
- a varied but structured set of employability skills, and
- a set of life-coping skills designed to help students with personal and social issues of daily living.

Schargel and Smink suggest that these four components, along with a comprehensive guidance program are key to successful dropout prevention through a CTE and workforce readiness strategy.

They also suggest that that a dominate theme in successful programs is a

customer-driven one, asking “How can the school system fit the needs of our children?” rather than “How do we make these kids fit the system?” (Hamby, 1992, as cited in Schargel and Smink, 2001, p. 213).

A recent study (Hammond et al., 2014) from the National Dropout Prevention Center/Network examined South Carolina’s 2006 legislated career pathways for all K-12 students as well as P-20W (prekindergarten to college and career) school, community, and business linkages with schooling. Every student in South Carolina must have an Individual Graduation Plan (IGP), created and reviewed yearly by the student, a career counselor, and a parent/guardian. The IGP tracks course credits but also helps link courses to career pathways (which is SC, are related to the 16 national career clusters).

Using a mixed methods approach, Hammond et al. found that for a majority of the students surveyed and interviewed across sample schools, the IGP process helped them to feel more engaged in school, less likely to want to drop out, and more motivated to make

better grades. The state’s policy elements also were found to have increased awareness and knowledge of CTE at sample schools. In large part due to the IGP process, the state policy

The CTE strategy for dropout prevention is enhanced by

- a strong emphasis on academics,
- a varied array of occupational studies,
- varied but structured skills acquisition,
- life-coping skills instruction designed to help students with personal and social issues of daily living,
- a comprehensive guidance program, and
- being responsive to the needs of students.

Quality career guidance as well as written and periodically reviewed individualized graduation plans that connect school to post-school options appear to be important to increasing student engagement via broader CTE efforts targeting all students.

increased school personnel and student awareness and knowledge of CTE courses and programs and their importance to programs of study. This increase in CTE awareness and the IGP process were also found to be facilitating more appropriate placement of students in courses based on interest and ability levels and reducing stigma attached to taking CTE courses at a number of sample schools. This study is mentioned because of the application of CTE as a model for other curricula, the importance of counseling or mentoring (historically a strong component of Voc-Ed and CTE, but not so much for traditional academics), and the findings about motivation toward better grades, reduction of likelihood of dropout, and increased engagement in school through focus and awareness of careers and postsecondary options.

The National Dropout Prevention Center/Network promotes CTE as a dropout prevention strategy based on years of evidence and increasing evidence-based research. CTE is growing and transforming to meet the needs of students, parents, schools, and the economy. Students and

With more deep and detailed longitudinal data becoming available and new methods of analysis being used, additional, rigorous, and strong research connecting CTE and dropout prevention is emerging.

parents are asking for more CTE. Policymakers, however, while interested, tend to wait for hard evidence of effectiveness. It can be difficult to study CTE experimentally and rigorously, and to separate out the effects of career and technical education as opposed to students' related day to day influences and other research challenges.

Research on CTE has not kept pace with policy interest and there is still much to be done there (Alfeld, 2016). The gold standard of research, the randomized control trial and to a lesser degree quasi-experimental research, is what is required by What Works Clearinghouse. A recent article in the online journal, *Education Next* (Jacob, 2017), points out that there is only one study currently in the What Works Clearinghouse in the area of secondary CTE, and it is from the 1990s, before much of the transformation of CTE took place. However, Jacob brings our attention to new rigorous research just out on regional vocational and technical high schools (RVTS) in Massachusetts. The MA study controls for selection bias (one of the challenges Alfeld [2016] mentions). According to the Dougherty research,

attending a RVTS dramatically increases the likelihood of high school graduation. Poor students are 32 percentage points more likely to graduate if they attend a RVTS, which represents a 60 percent increase given the baseline graduation rate of 50 percent. The effect for non-poor students is somewhat smaller, but still quite large—an increase of 23 percentage points from a baseline of 67 percent, suggesting a nearly 35 percent improvement. (Dougherty, forthcoming, as cited in Jacob, 2017)

We look forward to reading, learning from, and further disseminating the forthcoming findings from Dougherty. And we look forward to continued rigorous research on the effects of CTE on students' dropout rates and life success.

SUMMARY

Traditionally, CTE programs and classes include opportunities for students to have more engaging educational activities, smaller class sizes, more opportunities for students to interact with teachers, and more capacity and inclination to connect academic learning to real-world settings. In many ways CTE involves several of the 15 effective strategies identified by the National Dropout Prevention Center/Network as necessary for successful high school completion by students (see National Dropout Prevention Center/Network, n.d.) including school-community collaboration, mentoring, alternative schooling, after-school/out-of-school opportunities, active learning, individualized instruction, career and technical education (of course), and others.

Clearly there is ample evidence to suggest that including career and technical education in the offerings of schools and districts has a positive impact on graduation rates and student success in school and afterwards. Including CTE is what parents and students want: programs that make school interesting, engaging, and relevant to future life as an adult. It is hoped that school administrators and legislators will heed the advice of the research and the stated desires of the public to ensure that more CTE efforts are implemented in schools and districts across the country.

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