



POLICY BRIEF

APRIL 2007

Making the Most of Career-Technical Education: Options for California

W. Norton Grubb
David Stern

Policy Brief 07-1

The authors are professors at the University of California, Berkeley. They were respectively the U.C. Berkeley site director and the national director of the National Center for Research in Vocational Education during the 1990s. Grubb is also the Faculty Coordinator of the Principal Leadership Institute, and Stern heads the Career Academy Support Network.

The American high school is perpetually in crisis. A new burst of reports since 2004 has complained about high dropout rates, the boredom and irrelevance of the curriculum, dreary teaching and invidious tracking. In California, both business and policy leaders assert that high schools are preparing students poorly for future employment and for postsecondary education. A fundamental reform of the high school is necessary if California is to have the skilled workforce and the competent citizenry it needs to prosper.

“Career-technical education (or CTE) is once again being seriously considered as an option for California high schools, after a decade in which academic programs and college preparation have been the focus.”

Partly in response, career-technical education (or CTE) is once again being seriously considered as an option for California high schools, after a decade in which academic programs and college preparation have been the focus.¹ Career academies in California have expanded, and some districts (like Oakland and San Jose)

Summary

Career-technical education (CTE) is back in the policy spotlight, as Governor Schwarzenegger and key legislators seek strategies to strengthen California’s much-criticized high schools. Some forms of CTE that integrate academic with occupational content could usefully be expanded to provide high school students with multiple pathways to college and careers. This strategy, which we call “CTE/multiple pathways,” is more feasible and desirable for California high schools than other approaches to CTE—including the traditional vocational education of the past century, the “dual” systems developed in Austria and Germany, or the sophisticated technical training provided in community colleges.

Three kinds of evidence show that CTE/multiple pathways are more effective for students. The best evidence about outcomes, based on random-assignment and other studies, shows that career academies enhance students’ motivation in school and their employment and earnings after high school, without decreasing academic course-taking, high school completion, or college enrollment.

continued on page 2

Summary (continued)

Second, CTE/multiple pathways are more consistent with evidence about what motivates and engages students than are conventional practices. Finally, CTE/multiple pathways provide novel responses to criticisms about high schools, including the charges that high schools are boring, irrelevant, impersonal, and rigid.

California can expand CTE/multiple pathways by building on existing practices in career academies, restructured high schools, Regional Occupation Centers and Programs (ROC/Ps), and community colleges. More funding will certainly be necessary. This might initially be allocated in project grants to high schools with the interest and capacity to reform, followed by categorical grants and then incorporation into general revenues. Additional funds should be provided over 5 to 10 years, since restructuring high schools requires careful planning and implementation.

Additional funding, though surely necessary, is surely not sufficient. It will also be necessary to provide the following:

- technical assistance, to help high schools with restructuring;
- pre-service and in-service professional development, for both teachers and principals, to prepare them for new ways of teaching;
- curriculum development, to combine academic with occupational content;
- more work-based learning opportunities, to complement school learning;
- the data necessary to monitor the effectiveness of new forms of CTE.

With these elements, CTE/multiple pathways could lead the way toward a thorough reform of high schools, providing a broader set of opportunities for students and enhancing both their academic and their occupational competencies.

and careers”, to create career-themed high schools, and to build stronger partnerships with employers. The positive responses to the Governor’s proposals reflect a growing recognition that the conventional academic or college prep track is not the only pathway, and for many students not the best pathway, through high school.

“The conventional academic or college prep track is not the only pathway, and for many students not the best pathway, through high school.”

It isn’t yet clear how the state of California should respond to this renewed interest in CTE. In this Policy Brief we first outline several forms CTE might take, to clarify that some options are unrealistic and others are undesirable. We then summarize the evidence that broadly occupational approaches or pathways benefit students. Finally, we turn to the alternatives for putting career-technical education back into high schools. This will require state financial support, but also technical assistance to establish the most desirable forms of CTE.

Alternative Approaches to Career-Technical Education

People often have very different approaches in mind when they talk about incorporating occupational content within the high school. There

have put academies in many of their high schools. The number of individual high schools that have restructured into different career-oriented majors or pathways has increased.² After extensive analysis of the options, the Irvine Foundation has funded ConnectEd to help high schools establish alternatives to the conventional academic track, and UCLA’s Institute for Democracy, Education, and Access has

compiled substantial research on the benefits of multiple pathways through high schools — some of which can be occupationally-oriented, and others of which may not.³ Governor Arnold Schwarzenegger has proposed a revitalization of CTE, calling for additional state funding to increase CTE opportunities, to integrate core academics with occupational courses to “give students pathways to postsecondary education



are at least four distinct approaches to the problem, but only one of these is likely to work in California.

Conventional or traditional vocational education: The vocational education that emerged in California and other states after 1900 established a series of curriculum tracks, in theory chosen voluntarily by students but in practice often recommended by counselors. These tracks typically prepared students for entry-level positions in the jobs of the early 20th century: retail and wholesale trade, clerical occupations, industrial production, automotive repair, and agriculture.

Since vocational tracks usually led to lower-status and lower-paid jobs than the college track, they often ended up as “dumping grounds” for students perceived to have lower academic abilities. Most vocational programs prepared students for employment only, and were considered terminal programs not leading to post-secondary education. Support for traditional vocational education has weakened in California because of its perceived inequities and because serious employment opportunities for 18-year-olds have dwindled. Little traditional voc ed remains, except in Regional Occupational Centers

and Programs (ROC/Ps), which now depend on adult students for much of their enrollment.

“Dual” systems of vocational education: Governor Schwarzenegger grew up in Austria, where the approach to CTE is very different. Austria and Germany have developed CTE systems that take place in two settings: the workplace, in apprenticeship systems lasting roughly three years; and in schools, where students learn related academic content. Americans have periodically looked at the German/Austrian systems with envy, since they are widely thought to prepare workers of high quality and flexibility.

In fact, however, it has proven impossible to sustain large amounts of work-based learning in the U.S.⁴ Most Americans are skeptical about the degree of employment regulation required by dual systems, the coordination among employers and unions necessary for governing dual systems, or the vast bureaucracy required to implement the necessary standards and exams. Americans also dislike tracking, and the dual system steers students into vocational programs at about age 15, closing off postsecondary education options for many young people. To be sure, it may be appropriate to incorporate more work-based learning (the foundation of the German model) into American forms of CTE, but otherwise the German/Austrian system is not an appropriate or feasible model for California.

Postsecondary occupational education: A great deal of CTE now takes place after students graduate from high school, especially in community colleges and in some private institutions. These are typically two-year programs, with at least one year of occupational content in courses of increasing sophistication; supportive academic coursework in math, reading/writing, and sometimes science; and general education. Many postsecondary occupational enrollments are in “modern” professions like nursing, other medical occupations, information technology, business, various engineering technologies, and other occupations requiring substantial academic content, usually with obvious

routes to similar majors in four-year colleges. There are certainly ways to strengthen cooperation and reduce program overlap between high schools and community colleges, but it would be extremely costly to offer in high schools the sophisticated programs provided in community colleges. In addition, forcing students to choose occupational directions at about age 14 could close off rather than open up alternatives for young people.

“It has proven impossible to sustain large amounts of work-based learning in the U.S.”

“Integrated” programs, “college and careers”, and multiple pathways: Updated forms of CTE emerged in the late 1980s and the 1990s. These are quite different from the other three in their effort to integrate academic and occupational learning, and to keep options for college open. One of us has labeled this approach “college and careers”, since it is intended to prepare every student for both options. Such programs usually focus on a broad range of occupations—medical occupations, not nurse practitioners; industrial production, not welding—including many “modern” professions like information technology and biotechnology that are part of the Knowledge Revolution. We refer to this option as “CTE/multiple pathways” to emphasize the variety of possible focus areas.

High schools offering multiple pathways take many specific forms. Career Academies such as the California Partnership Academies (CPAs), funded by state grants, are small learning communities in which a team of teachers shares responsibility for a group of students in grades 10-12 or 9-12. The curriculum is intended to fulfill course requirements for admission to a four-year college, while providing career-technical courses and work-based learning related to the academy’s theme. Students at each grade level are scheduled to take several classes together, increasing the cohesion among students and teachers and creating opportunities for teachers to coordinate lessons across different subjects.

A second form of CTE/multiple pathways includes majors or clusters, in which students take most of their courses from conventional subject-matter teachers but also take one or two periods a day in their “major.” A third is the development of entire schools with particular themes or emphases, a practice that has become more common with magnet schools and the creation of small themed high schools. Every teacher and student in a health-professions high school or technology-oriented high school like High-Tech High, for example, is engaged in some area of the larger focus, and all teachers can modify their curriculum to fit the theme.

All these approaches create curricula or pathways through the high school that differ from the straight academic track. Pathways need not be occupational; academies or schools-within-schools might also focus on environmental issues, urban problems, communications, social justice, or other non-vocational subjects.

Of the four main approaches to CTE, the only one that seems both desirable and feasible in California is CTE/multiple pathways. This model is much more consistent with efforts to improve academic as well as occupational learning than traditional vocational education. It is also consistent with Governor Schwarzenegger's proposals that CTE should open the way to both postsecondary education and careers for California's young people.

The Effectiveness of CTE/ Multiple Pathways

Before plunging into yet another reform, it's crucial to examine the evidence that CTE/multiple pathways might benefit students.⁵ A number of non-experimental evaluations have found that students in career academies have better attendance, better grades, fewer failed courses, lower dropout rates, higher completion of high school, and better college-going rates (especially to four-year colleges) than their peers in traditional high schools. One study asked students about their perceptions of schooling; those in career academies reported much higher ratings on several dimensions related to motivation and engagement, including study habits, maintaining positive attitudes toward schooling, being prepared for their current edu-

cation, and being self-motivated. In addition, academy students were more likely to say that their program was related to their current job or future education, had prepared them for their current or last job, encouraged them to meet work deadlines, and helped them to understand the relationship between schooling and work.

"Of the four main approaches to CTE, the only one that seems both desirable and feasible in California is CTE/multiple pathways."

Random-assignment evaluations of programs that reorganize high schools are costly and rare, but one study of career academies randomly assigned students to program and control groups. Among students at highest



risk of not finishing high school, those assigned to career academies were more likely to be enrolled in school at the end of senior year. They also had better attendance records and earned more course credits. Among the high-risk group, academy students were more future-oriented in several ways: they were more likely to have researched college options, to have taken SAT or ACT tests, and to have submitted college applications. For all academy students, and especially for males, the effects on employment and earnings four years after high school were positive. Academy students did not have better math and reading scores than non-academy students, and overall high school completion rates for academy and non-academy students were virtually the same, as were their enrollment rates in postsecondary programs.

"The best available evidence indicates that career academies enhance students' motivation, engagement, future orientation, and their employment and earnings without decreasing academic course-taking, high school completion, or college enrollment"

In sum, the best available evidence indicates that career academies enhance students' motivation, engagement, future orientation, and their employment and earnings without decreasing academic course-taking, high school completion, or college enrollment, as

one might fear. Unlike traditional vocational, this form of CTE/multiple pathways does not substitute career preparation for college preparation, but has instead managed to combine the two.

Additional evidence suggests that CTE/multiple pathways can be more successful in motivating and engaging high school students. A National Research Council (2004) review of students' motivation concluded that young people are more likely to be engaged in programs that allow for adult-student contact; where students have some autonomy in choosing their work; where they play active roles in learning and in constructing meaning on their own; where they are in well-structured environments with clear purposes; where students have multiple routes to competence; and where students can develop education and career pathways that help them understand the roles of schooling. All these conditions are much better met in high schools with CTE/multiple pathways. Smaller schools-within-schools create more adult-student contact, a clear pathway with the dual goals of college and careers, and the potential for students to choose among pathways as well as among projects and other learning experiences within pathways. CTE/multiple pathways must be carefully implemented to realize these benefits, of course, but they are more likely than traditional high schools to conform to well-known precepts about motivation.

Finally, CTE/ pathways provide some novel responses to the barrage of criticism about high schools.⁶ To counter the charges that high schools are boring and irrelevant, CTE/multiple pathways offers novel curricula linked to students' futures and specific interests. In place of the single lockstep curriculum, CTE/multiple pathways provides students with choices. Most schools that feature CTE/multiple pathways create smaller learning environments and schools within schools, enhancing personal relationships. Instead of the tracking of conventional vocational, or the neo-tracking of honors and AP courses, CTE/multiple pathways would—if implemented carefully—create options of equivalent stature, all leading to both college and careers.

To be sure, CTE/multiple pathways must be accompanied by other reforms, as Governor Schwarzenegger's proposals recognize. Enhancing student learning requires greater attention to improving the quality and breadth of instruction, particularly through staff development (Little, 2006). Correcting deficiencies in the basic academic competencies of some freshmen requires a 9th grade Success Academy or other similar intervention early in the high school years. Strengthening the ability of students to understand the consequences of high school decisions or to prepare for future goals requires that greatly improved guidance and counseling services be suffused throughout CTE/multiple pathways. CTE/multiple pathways provides the foundation for these reforms too.

Enhancing the Capacity for CTE/multiple Pathways Through Legislation⁷

Creating CTE/multiple pathways that prepare high school students for both college and careers will require fundamental changes in California high schools. The incorporation of CTE/multiple pathways would not be a simple add-on to existing high schools, but would transform them in substantial ways. Some of the elements for such transformation are already in place, but a number would have to be created anew. Additional funding may be necessary, but the capacity of high schools to incorporate CTE/multiple pathways must also be strengthened.

California already has some programs on which the state can build, including the Community Colleges (CCCs), the Regional Occupational Centers and Programs (ROC/Ps), and the state-funded California Partnership Academies. Community colleges, the primary providers of advanced CTE, could play valuable roles in broadening access for high school students to CTE programs; and through “tech prep” initiatives, which have created pathways combining the last two years of high school with two years of community college. Some Tech Prep consortia are still active, and might participate in new efforts to combine academics with CTE in high school.

The ROC/Ps now provide most of the CTE available to high school students, and many of their courses have

recently been approved by the University of California as satisfying “a-g” requirements. The ROC/Ps could, if aligned with academic offerings in partner high schools, form the basis of CTE/multiple pathways in many California high schools. Finally, the 290 California Partnership Academies in more than 200 comprehensive high schools represent the best examples of state-funded programs that combine academic coursework with CTE. They provide sources of expertise and examples of how to create CTE/multiple pathways, including methods of linking with employers.

“CTE/multiple pathways would not be a simple add-on to existing high schools, but would transform them in substantial ways.”

The real challenge will be to use new resources and existing programs to create *new* capacity to provide multiple pathways in traditional high schools. This is a long-run goal. For instance, it takes at least five years to get a career academy up and running to serve grades 9-12. The process requires a year of planning, followed by startup with grade 9 students, with an additional cohort enrolled each year. This could be started with funding for project grants supporting the introduction of CTE/multiple pathways, where the initial grantees are carefully selected for their commitment, readiness, and institutional capacity to develop CTE/multiple pathways. The grantees

might include high schools, ROC/Ps, and community colleges *as long as* they incorporate the broad roster of academic coursework necessary for college *and* careers, and adhere to the principles underlying CTE/multiple pathways. If the purpose of revitalizing CTE is first and foremost to reshape high schools, then initial grants should focus on high school reforms, with linkages to postsecondary education, middle schools, and employers coming later; legislation incorporating a hodge-podge of grants to different levels will never create coordinated pathways. Such initial grants would build some capacity and develop a base of information about the possibilities and pitfalls.

Project grants could be succeeded after several years by categorical grants to further expand capacity, with recipients again constrained by regulations to ensure fidelity to the CTE/multiple pathways model. If capacity were relatively widespread, these funds could then be incorporated into general state funding, perhaps with differentiated weights to reflect the higher costs of certain CTE approaches.

Additional state funding may be necessary to create additional CTE capacity, but it is surely not sufficient.⁸ The following forms of support will also be necessary:

Technical assistance related to CTE/multiple pathways is currently lacking in the state. Some can be provided by ConnectEd or the Career Academy

Support Network, and in many areas community colleges can provide expertise about CTE courses. But we anticipate that a great deal more technical assistance will be necessary. The state's ways of providing technical assistance, through lists of "approved" providers, has not worked well in the past. An alternative approach—for example, a more centralized non-governmental office providing technical assistance, or perhaps state-level capacity linked to county offices of education—should be developed.

"Teachers will have to learn how to work in teams, teach curriculum that integrates academic content with CTE, and oversee students' work-based learning."

Pre-service and in-service professional development for teachers, and also for counselors and administrators, will be necessary to make integrated pathways work. Teachers will have to learn how to work in teams, teach curriculum that integrates academic content with CTE, and oversee students' work-based learning. Counselors will need to work in new ways, perhaps focusing less on traditional one-on-one interactions with students and working more to incorporate information and decision-making into CTE/multiple pathways through career modules and future-oriented activities. Principals will need to learn more about ways of making these approaches effective, and about reaching out to employers and colleges outside the high school. High schools would also benefit from leadership preparation that explicitly

considers the special issues in high schools, including the implementation of CTE/multiple pathways.

Curriculum for integrated pathways is lacking. Some resources are available,⁹ but working these into the existing curriculum requires much initiative and ingenuity on the part of teachers. Many of these resources are not aligned specifically with the California curriculum standards, or with the a-g course requirements for admission to UC and CSU. A serious effort to develop new curricula might concentrate on a few themes that have been used most often in the CPAs, like health careers, business and finance, or arts and communication. The new curricula would link instruction in English, math, science, and social studies to particular career and non-career themes, and would



include projects that connect different classes and that are related to students' workplace experiences.

Work-based learning has sometimes been part of CTE, and well-structured cooperative education ("co-op") is still offered as part of some ROC/P classes. The best programs include learning plans with clear objectives, and cooperation between the classroom teacher and the workplace supervisor to guide and evaluate the student's performance. Ideally, they also include a range of workplace experiences, including school-year placements and more intensive paid internships in the summer following junior year.¹⁰ The methods for relating work-based and classroom learning should be developed in conjunction with the school-based part of the curriculum.

Monitoring the results is also necessary to know how well students perform in these new pathways. To do this, districts' data systems must identify which students are in which CTE pathways each year. Surprisingly, this is not standard practice in high schools that currently have academies or other kinds of small learning communities. Implementation of the California Student Identification System does not now require that students participating in such programs be identified. In addition, there is now no accurate way to measure students' progress toward meeting a-g course requirements. The University of California has created and piloted a Transcript Evaluation Service for this purpose, and the state

should make such a service universally available in high schools, adapted to include the information necessary to evaluate CTE/multiple pathways. Then school-level administrators, district officials, and state policy-makers will be able to monitor the effectiveness of pathways in enhancing learning, improving progress through the high school, and helping students attain the twin goals of college and careers.

"The status quo condemns a large fraction of California's students to bleak futures, without either careers or access to postsecondary options."

Incorporating CTE/multiple pathways into California high schools will not be a simple process. It cannot be accomplished by providing short term grants and hoping that money by itself will reshape high schools. It will require a longer period of time, significant investment in technical assistance and capacity-building to ensure that state funds are spent well, and an unwavering vision of what CTE/multiple pathways can accomplish. But the status quo condemns a large fraction of California's students to bleak futures, without either careers or access to postsecondary options. Incorporating CTE/multiple pathways would result in a thorough reform of the high school, greater attention to a range of both academic and occupational competencies, better opportunities for California's students, and a stronger workforce and citizenry for the future.



Endnotes

¹ As recently as 1992, the High School Task Force published a report that made many of the same points as this Brief. See *Second to None: A Vision of the New California High School*, California Department of Education.

² See, for example, D. Hull, “Vocational ed rebounding as an answer to dropout crisis”, *San Jose Mercury News*, Jan 15, 2007; and L. Rosenhall, “School offers new path to success”, *Sacramento Bee*, Feb. 24, 2007.

³ The IDEA papers are available at www.idea.gseis.ucla.edu/projects/multiplepathways/index.html, including papers by the two authors of this Brief.

⁴ The most recent period of enthusiasm for the dual system occurred in the early 1990s, and culminated in the School-to-Work Opportunities Act of 1994. That Act largely supported conventional practices like guidance and counseling. It also stimulated some expansion of work-based learning, but this did not become an integral part of the educational system, and most of the local school-to-work partnerships that supported work-based learning folded after the Act expired in 1999.

⁵ For the outcome evidence see NRC (2004), Ch. 7, and Stern and Stearns (2007).

⁶ At least 12 reports came out in 2004, and more have appeared since then; see Grubb (2007) for a fuller analysis.

⁷ See also the Legislative Analyst’s Office, *Analysis of the 2007-08 Budget Bill*, pp. E-53 - E-65. Our recommendations differ in some important respects.

⁸ The state of California has funded a series of high-cost reform efforts that have, on the average, had very few lasting effects, including AB1724, Class Size Reduction, the II/USP program, and the HPSGP program. The reasons why these substantial efforts have made so little difference, except perhaps to schools that were already undertaking reforms, need to be better understood before further legislation is created.

⁹ See, for example, http://casn.berkeley.edu/resources/tl_resources.html.

¹⁰ The development of such work-based experiences provides an obvious role for the business and labor communities, including those advocating more CTE. For a summary of research on work-based learning, see Bailey, Hughes, and Moore (2004).

Additional Reading

Bailey, T.R., Hughes, K.L., and Moore, D.T. (2004). *Working knowledge: Work-based learning and education reform*. New York: Routledge-Falmer.

Grubb, W.N. (2007). Reforming the 19th century high school: “Weak” and “strong” approaches to multiple pathways. www.idea.gseis.ucla.edu/projects/multiplepathways/index.html.

Little, J.W. (2006). Professional development and professional community in the learning-centered school. Washington D.C.: National Education Association.

National Research Council. (2004). *Engaging schools: Fostering high school students’ motivation to learn*. Washington, DC: National Academies Press.

Stern, D., and Stearns, R. (2007). Combining academic and career-technical courses to make college an option for more students. www.idea.gseis.ucla.edu/projects/multiplepathways/index.html.





POLICY BRIEF

Policy Analysis for California Education
University of California
3653 Tolman Hall
Berkeley, CA 94720
<http://pace.berkeley.edu>

Stanford University
520 Galvez Mall, 5th Floor
Stanford, CA 94305

RELATED PACE PUBLICATIONS

- Haleh Hatami, Project Coordinator. *Crucial Issues in California Education, 2006: Rekindling Reform*. 2006
- Michael W. Kirst, Anthony Lising Antonio, Samuel H. Bersola, Andrea Conklin Bueschel. *Improving the Transition from High School to Post secondary Education*. Working Paper, 04-1, April, 2004