

New Pathways to Careers and College

Examples, Evidence, and Prospects

Mary G. Visher
MDRC

David Stern
University of California, Berkeley

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Overview

The debate about high school reform is increasingly focused on the role of career-technical education (CTE) in helping to prepare *all* students for success in *both* postsecondary education and the workforce. The stand-alone vocational courses into which high school students with lower academic achievement were often channeled are becoming a thing of the past. Instead, programs that merge CTE, rigorous academic coursework, and career exploration opportunities, while creating clear pathways through high school, college, and beyond, are gaining momentum. This report describes some of the most prominent of these “pathway” models, identifies localities where the approach has gained the most traction, discusses the underlying principles that characterize the most promising programs, and briefly presents the evidence of their potential to make a difference. The report concludes with a set of recommendations for future investment to strengthen and scale such programs.

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Introduction

Career technical education must reposition itself not just as a vocational alternative to college prep but as a pathway into postsecondary programs that links degrees and credentials to occupations.¹

The national discourse on high school reform is increasingly focused on the role of career and technical education in preparing *all* students for success in both postsecondary education and the workforce. High schools are moving away from the stand-alone vocational courses of the past, into which students with lower academic achievement or perceived potential were often channeled. Many educators are now calling for approaches that link career-technical education, rigorous academic coursework, and experiences that show students the relevance of education to their future, while teaching them the academic and employability skills they need to be successful in both college and career. Across the nation, schools, districts, cities, and states are launching or scaling these new programs. Yet many initiatives are struggling to gain traction and expand, due in part to inadequate resources and in part to a shortage of rigorous evidence of their efficacy.

In this report the term “college and career pathways” — or “pathways” for short — is used to refer to a range of models or approaches that attempt to create a clear path for students to follow to attain an educational and occupational goal, while learning the skills — sometimes called twenty-first century skills or transferable skills — they need to succeed in both domains. This report focuses on pathway programs that begin in high schools and sometimes extend beyond, to postsecondary education or training.

The report begins with a short history of how pathways evolved from the relatively narrow occupational courses that dominated vocational education in high schools throughout most of the twentieth century to the more comprehensive models of today. Next, it describes the models and approaches identified in a recent scan of the field, noting the various principles, locations, and prevalence and any intermediaries that support them. The next section lists the core design principles of models and approaches that many believe to be the key ingredients of the most promising programs. Following this is a brief discussion of the efficacy of a subset of these programs for which rigorous evidence exists. The report concludes with a section addressing the factors or conditions that would enable the strengthening and expansion of pathways at the local level.

The goal of career and college preparation for *all* students has been widely accepted, and several promising models have provided good evidence that this goal is attainable. But

¹Independent Advisory Panel of the National Assessment of Career and Technical Education (2014), p. ES-2.

these models have not yet been implemented on a large enough scale to accomplish the systemic, sustainable change that would achieve the goal. Implementing these models requires resources, planning, and commitment. At present, the recent National Assessment of Career and Technical Education finds that students who take a sequence of related career-technical classes in high school are still more likely to come from families with lower income and less educated parents; these students are less likely to take advanced math courses in high school and are less likely to enter or complete a postsecondary educational program.² Disrupting this pattern, inherited from the twentieth century, is a challenge many educators and employers are now trying to meet.

Origins of College and Career Pathways

During most of the twentieth century, high schools were designed to prepare some students for college and other students for work. That has changed. Now the most commonly stated goal of high school is to prepare students for both college *and* careers — in fact, this is the tag line on the logo for the Common Core State Standards. Two related developments reflect this change. One is the progression from vocational education to career-technical education. The other is the recent attempt in some cities and states to build systems of college and career pathways, combining career-technical with college-prep curriculum.

In the 1980s, what was then called vocational education (VE) started evolving into what is now called career and technical (or career-technical) education (CTE). VE courses were explicitly intended to prepare high school students for direct entry into full-time work — *not* for college or university. In contrast, CTE courses are meant to fit together with classes in academic subjects so that high school students are prepared for *both* work and postsecondary education.

The change from VE to CTE is apparent in federal legislation. As recently as 1998, the federal law authorizing funds for VE continued to define it as preparation for careers “other than careers requiring a baccalaureate, master’s, or doctoral degree.” But the 2006 reauthorization, which replaced the term “vocational” with “career and technical,” finally eliminated the prohibition against using the federal funds to prepare students for careers that require a bachelor’s or advanced degree. And in 2014 the federal agency that oversees this funding changed its name from the Office of Vocational and Adult Education to the Office of Career, Technical, and Adult Education.

Patterns of course-taking by high school students show a dramatic shift away from VE as a separate, noncollege track. Among high school graduates who completed an occupational

²U.S. Department of Education (2014). A thorough description of trends in CTE participation was provided by a commissioned background paper (Dalton et al. 2013).

course sequence, the number who also completed the academic coursework expected for college jumped from 28 percent in 1982 to 88 percent in 2000.³ Thus almost all students who take an occupational course sequence are now also completing the academic core curriculum — although, as noted earlier, CTE concentrators are still less likely to take advanced math courses in high school, or to enter or complete college.

The change from VE to CTE was prompted by new demands from employers. Historically the main advocates of federal funding for VE, employers in the 1980s began to express concern that entry-level job training in high school was not sufficient to prepare employees for increasingly rapid change in technology, products, and the organization of work.⁴

Traditional VE, as a track for students who were not deemed college-bound, also had been consistently criticized for enrolling disproportionate numbers of low-income and minority students, and limiting their options.⁵

Several high school reform efforts promoted the movement from VE to CTE. One of the most important was High Schools That Work, launched in 1987 by the Southern Regional Education Board. Career academies, which began in Philadelphia in 1969 and were replicated during the 1980s in California and New York City, also embody the CTE approach by fitting an occupational course sequence together with the academic coursework expected for college. These and more recent examples of college and career pathway models are described in the next section.

As the idea of preparing students for both careers and college has become more popular, some cities and states have begun to develop systems of career-themed pathways that enroll large proportions of high school students. The 1994 School-to-Work Opportunities Act provided federal funding to build such systems, but this effort was strongly opposed in some places as unwarranted federal intrusion, and the legislation lapsed in 1999. More recent attempts to build college and career pathways on a larger scale have been initiated by states or localities. Prominent examples are the Linked Learning District Initiative in California, described in later sections of this report, and P-Tech in New York.

³National Center for Education Statistics (2008). Students are defined as vocational concentrators if they earned at least 3 credits in a single specific labor market preparation field but had fewer than 12 credits in the core academic course areas of English, social studies, mathematics, and science.

⁴See, for example, National Academy of Sciences (1984) and Kearns (1988). David T. Kearns was the CEO of Xerox Corporation from 1982 to 1990 and became deputy secretary of education from 1991 to 1993 under President George H. W. Bush.

⁵For example, see Oakes (1985).

A Scan of Pathway Approaches and Programs in the United States

Pathway approaches and programs have grown considerably across the country, especially in the last ten years, but to our knowledge no scan of these programs has been done for some time. We began the task of identifying college and career pathway programs by listing all those that we were personally aware of and expanded the list by reviewing recent literature and online information. We then asked ten experts for further suggestions. Appendix Table A.1 gives the programs, their main components, their locations, and their supporting organizations. Appendix B provides the list of experts we consulted.

Each of the programs and approaches shown in Appendix Table A.1 meets the following broadly defined criteria:

- Serves high school students
- Includes a career-technical education component (courses, occupational training)
- Pays attention to preparation of students for success in *both* college and career
- Targets all students regardless of their prior academic achievement
- Has existed for at least a few years

The scan resulted in identifying two general types of programs that meet most or all of the criteria outlined above. The first type are *systemic* approaches, which are often state driven, reaching relatively large numbers of students. They encompass multiple partners (such as employers and colleges) and are designed to achieve broad, fundamental, and sustainable changes in how students are prepared for college and career. These approaches tend to be less prescriptive and more flexible. States, districts, and schools are usually given significant autonomy in deciding on which programs and services to incorporate, as long as they adhere to the key principles in the approach. These systemic approaches often include a variety of specific models. Linked Learning districts, for example, are systems of pathways from ninth grade through community college; California Partnership Academies are one of the models found within these districts. The second type are *discrete* models or programs, typically school based. These include small learning communities within schools, such as career academies, or whole schools, such as High Schools That Work. We identified four initiatives in the first category (Linked Learning, Pathways to Prosperity, Youth CareerConnect, and dual enrollment with a CTE focus) and eight in the second (career academies, High Schools That Work, New York City small schools of choice with a career focus, early college high schools with a CTE focus,

apprenticeships, transformed vocational high schools, the New Tech Network, and International Baccalaureate programs with a career exploration component).

Core Principles of the Most Promising Pathway Programs

Several common principles characterize the most promising of the pathway programs described in the previous section and in Appendix Table A.1. Below, we describe these principles and discuss some of the challenges experienced by schools and communities when they try to implement programs incorporating them.

Pathways keep students' options open. High schools face a fundamental dilemma. The great majority of high school students want to attain a bachelor's or advanced degree — because many high school students and their parents know that such degrees provide access to managerial and professional jobs with higher salaries, attractive working conditions, and greater employment security — but in fact only about one in three will complete a bachelor's degree.⁶ If high schools try to prepare all students only for four-year colleges and universities, many young people will finish their schooling without any technical knowledge or skill to earn a living.⁷ But if high schools provide college preparation only for students who, around age 14, are deemed likely to succeed in postsecondary education, they will mistakenly shortchange many talented young people, including disproportionate numbers of those from low-income families, racial or linguistic minorities, or recent immigrants — an injustice to those students and a loss to the nation.

Preparing high school students for *both* employment and postsecondary education is an obvious logical response to this dilemma. Pathways make college-prep academic coursework available to all students, and some provide access to college courses while students are still in high school. Pathways also offer a rigorous sequence of career-technical coursework to prepare students for direct entry into the workforce after high school or after they finish a college degree. Some pathways provide access to industry-recognized credentials, which help young people earn higher wages whether they enter full-time employment immediately after high school or work part-time while in college. And if students decide to enter a field different from the pathway they started in high school, the transferable skills they have learned, such as critical thinking and teamwork, will benefit them no matter what career they end up in. Keeping

⁶Educational expectations of high school students were reported in U.S. Department of Education (2011). Degree completion rates by age group are reported in National Center for Education Statistics (2014).

⁷Part-time employment while in high school traditionally enabled some students to learn work skills, apart from any career-technical courses. However, the percentage of high school students with part-time jobs fell sharply in the past decade.

students' options open is a consistently expressed goal of the new CTE approach and of the more complex models that include CTE as one component.

The choice of which pathway is up to the student (and parents). Because college and career pathways are designed to keep students' options open, they may be appropriate and beneficial for any student who chooses to enroll. Pathways are not generally intended only for high-achieving students or only for low-achieving students. Ideally every pathway would enroll a fairly representative cross section of students from the school or district.

Allowing students — and teachers — to participate by choice is relatively easy when a large high school contains only one or two pathway programs. But when a school or district policy requires all or most students and teachers to enroll in pathways, allowing completely free choice becomes more difficult. Some high school students, families, and teachers simply do not want to participate in a career-themed program of study. Even if they are given a choice about which pathway to join, they will not have the same level of interest, commitment, or motivation as students or teachers who really want a career-themed pathway. This implies that the benefits of career and college pathways may be greatest when not all students and teachers are required to participate.

There also may be a trade-off between choice and open access. Some pathways may attract certain types of students. For instance, pathways focused on fashion design, child development, or health care tend to enroll more girls, while construction, engineering, and manufacturing enroll more boys. The undesired consequence is that some boys who could excel in health care, or girls with a talent for engineering, would not choose those pathways because they don't want to seem "weird."

Ethical, political, and legal issues can arise, especially when enrollment patterns are associated with race, language, family income, or prior achievement. If students who choose the engineering pathway are mainly Asian, and those who choose a construction pathway are mainly Latino — or vice versa — the school or district would be under some obligation to disrupt that pattern, by concerted outreach or perhaps using a lottery to assign some students to pathways.

Personal support for students. Some pathways are organized as small learning communities that are somewhat separate from the larger high school. For example, most career academies are small groupings of students within larger high schools, typically numbering 150 to 300 students in grades 9-12 or 10-12.

Students receive more personal academic and social support in this situation because a small team of teachers shares responsibility for the same cohort of students over a period of three or four years. Ideally, teachers are scheduled to have common planning time, to coordinate

their curriculum and also to exchange information about students. Academy teachers come to know their students well and are therefore more able to provide individual support. As one career academy teacher remarked, “When you have students for a year, they’re on your mind. When you have them for three years, they’re on your conscience.”⁸

In career academies and some other pathways, students are scheduled to take some classes together as a cohort, and ideally those classes enroll only academy students. Usually the academy classes each year include one career-technical class along with one to three classes in academic subjects. Cohorting is a strategy used in many school reform efforts. It is especially useful in the context of pathways because it facilitates implementation of other key components in the model, including integration of career-technical coursework with academic coursework and work-based learning. Cohort scheduling allows teachers to develop cross-disciplinary projects, lessons, and assignments that integrate academic and technical content, making the academic subjects more interesting for students and creating coherence in the curriculum. Students who take several classes together also can develop a positive group identity and give one another academic and social support. It can be surprisingly difficult to schedule a cohort of students to take all or even most of their classes together each year, and in the right sequence from one year to the next. Scheduling a common planning period for pathway teachers adds to the challenge. A typical example of this challenge is when a high school offers only one section of a particular course, such as Advanced Placement Physics. That course typically would not be part of the shared sequence for a pathway focusing on Business and Finance, for instance, but if one or more students in that pathway wanted to take AP Physics it would have to be offered at a time when none of the required pathway courses was being held. Since a high school could easily have 10 or 20 “singleton” course sections, including various advanced courses and other electives, avoiding conflicts can become impossible. Schools then have to set priorities. Ideally, this is managed through a year-round process that includes all stakeholders.⁹

Integrated curriculum. The standard high school curriculum consists of “units” of instructional time. To receive a diploma, a student must complete a minimum number of units in particular subjects, as specified by the state and local school authorities. To keep track of students’ units, the school day is divided into periods, each period identified with a particular subject. Students proceed through the school day taking one subject after another — first period biology, second period Spanish, third period math, or whatever — with no connection between subjects. Not surprisingly, this approach to learning often fails to engage students’ interest and also inhibits certain instructional strategies such as project-based learning.

⁸Reported to David Stern by Marilyn Raby, who was the teacher’s supervisor.

⁹For tools and procedures for scheduling high schools with pathways, see College & Career Academy Support Network (2015a).

Scheduling a cohort of students to take several classes together each year can help overcome the artificial separation of subjects. In a health pathway, for example, teachers who instruct the same group of students in health occupations, biology, and social studies classes can integrate those subjects in a project dealing with a topic such as communicable disease and public health policy. Math teachers who have a cohort of pathway students in one of their classes can easily find connections with CTE teachers in construction, engineering, agriculture, business and finance, and other fields. Interdisciplinary lessons or projects can bring academic subjects to life, and help students see the relevance of school subjects to the world beyond high school. Teachers in career academies have been using this kind of integrated curriculum for decades.¹⁰

Creating and delivering integrated curricula is not easy. Teachers rarely have the time or the skills to develop units and need training and ongoing support to do this successfully. While integrated curricula and professional development are becoming more available through organizations such as ConnectEd and the Buck Institute, there is still much work to be done to ensure that teachers have the skills and knowledge they need to teach interdisciplinary content.

Real applications. Pathways often engage students in projects that have real value and relevance outside the classroom. Students build houses for sale, run restaurants or retail stores, conduct health clinics, operate child care centers, design websites for nonprofit or government agencies, compile data and reports on local environmental conditions, fix cars, produce public service announcements, or cultivate crops and raise livestock, among many other productive activities. In contrast to most class assignments, which are read and evaluated only by the teacher, these projects have clients or customers outside the classroom and are evaluated by the standards of adult professional work. Learning through actual productive activity was one of the strengths of traditional vocational education. Contemporary CTE continues that tradition, and in integrated pathways connects these activities to academic subjects as well.

The integrated, applied teaching and learning in college and career pathways requires more planning and coordination than the standard curriculum, which mainly leaves individual teachers to organize their own work. If an integrated curriculum with real applications were easy to do, it would probably be standard practice. But there is reason to expect that these complex teaching and learning practices will become more widespread. The Common Core State Standards, which emphasize application of knowledge and synthesis of information, provide an incentive for high schools to overcome the inertia of the standard curriculum.

¹⁰For a searchable database with examples of integrated curricula, see College & Career Academy Support Network (2015b).

Employer partnerships and work-based learning. Collaboration with employers and other community partners further reinforces the connection for students between high school and the world beyond. Employers play an important part in pathway programs, as curriculum advisors, mentors for students, and sponsors for work-based learning. They often offer a sequence of work-based learning experience, from classroom presentations by employers that promote career awareness, to career exploration through workplace visits and job shadowing, and on to actual career preparation in school-based enterprises and outside internships. Pathways provide work-based learning related to a particular theme, further reinforcing for students the value of what they are studying in school.

Quality career exploration and work-based learning experiences in which all students can participate are difficult to implement at scale. Teachers typically lack the skills and experience to recruit and collaborate with local employers and the time to do the considerable legwork to make this happen. Intermediaries that work to connect schools with employers, create and monitor internships, and handle logistics and compensation are often the solution. Tools and teaching materials are becoming increasingly available as well, such as a curriculum developed by MDRC called Exploring College and Career Options, now used by ConnectEd in the Linked Learning initiative.

Collaboration between high schools and postsecondary education. To create clear paths from high school to and through college, and help students take some steps along that path, career and college pathway programs have developed closer collaborations with local postsecondary institutions. These include providing better information to students about college requirements and possible courses of study; regularly reviewing students' transcripts to make sure they are on track to complete college requirements; organizing campus visits where high school students can see programs related to the theme of their pathway; helping students fill out applications for college admission and financial aid; creating articulation agreements so that some courses in high school can count for college credit; and enabling dual enrollment so that students start building a college transcript while still in high school. Just as teachers need training and support to teach effectively in these settings, counselors need training in how to provide more effective advice and tools to students as they choose and then follow a pathway program, especially when the pathway leads to and through college. Some pathway models include dedicated counselors, who work solely with pathway students.

District support. As the number of college and career pathways has increased, districts have become more involved, and for some approaches drive the process. The district role

includes selecting pathways that are tied to growing sectors in the local economy;¹¹ communicating to parents and the community what college and career pathways are all about; coaching and other assistance to pathway lead teachers, counselors, and other school site leaders; updating the curriculum and aligning it with new standards; ensuring that the evaluation of principals includes how well they manage the complexity of pathway implementation; helping to recruit and organize employer partners; and handling logistical issues around work-based learning.

High standards, accountability systems, and data-driven decision-making. As pathway models are replicated, it is important to ensure that new sites provide all the key elements, so that a program that calls itself a career academy or Linked Learning pathway is really offering the experience intended by the National Career Academy Coalition (NCAC), National Academy Foundation (NAF), and Linked Learning. These organizations have to a great extent aligned their standards to guide implementation and ensure quality. The NAF standards also include measures of students' performance in NAF courses and internships. The existence of these standards demonstrates that it is possible to define and monitor quality. However, the fact that the number of certified pathway programs nationwide still is under a thousand demonstrates how far there is to go to achieve large-scale implementation.

So far, pathway certification has been entirely voluntary, with no governmental rewards or sanctions attached. As states continue to modify their accountability procedures to take into consideration high school graduates' readiness for college and careers, students' successful completion of a certified career and college pathway can be used as an accountability measure. This is a topic of active discussion in California. Along with standards, data systems that are both accessible and sophisticated are needed to continuously measure progress in achieving key milestones in pathway development and student outcomes.

Strong intermediaries to support programs. Some career and college pathway models are supported by intermediary organizations. Some of these are national, such as NAF and NCAC. Others are local, such as Philadelphia Academies Inc. and Academies of Nashville. ConnectEd California, the intermediary that has pioneered the development of Linked Learning, has worked mainly in California but is now becoming national. The role of such intermediaries includes establishing standards and certification procedures, providing professional development and technical assistance, creating curricula, and providing operational tools, including web-based platforms.

¹¹There is some debate in the field about the extent to which programs should be tied to growing sectors. Long-run trends are difficult to predict, suggesting that it is better to equip students to be flexible, enabling them to respond to changing market conditions, rather than prepare for specific fields.

The Evidence

Despite the array of programs now operating in many cities and states, surprisingly little is known about the effectiveness of most of these in making a real difference in the lives of students who participate in them. Most research on these programs lacks the rigor needed to attribute with confidence any improvement in outcomes to the program itself, rather than to the characteristics of students who choose to enroll. There are a few notable exceptions to this pattern.

MDRC's oft-cited study of **Career Academies**, launched in the mid-1990s, used a randomized controlled trial (RCT) to study the impacts of the program on outcomes for approximately 1,500 students beginning in ninth grade and extending for eight years after their scheduled high school graduation dates.¹² The career academies produced sustained earnings gains that averaged 11 percent (or \$2,088) more per year for academy group members compared with individuals in the non-academy group — a \$16,704 boost in total earnings over the eight years of post-high school follow-up (in 2006 dollars). The labor market impacts were concentrated among young men, a group that has experienced a severe decline in real earnings in recent years. Through a combination of higher wages, hours worked, and employment stability, real earnings for young men in the academy group were higher by \$3,731 (17 percent) per year — or nearly \$30,000 over eight years — compared with the control group.

There were no positive or negative impacts for the total sample on educational outcomes, such as graduation (although there was increased high school graduation by males of color, compared with their control group counterparts) or college enrollment. In other words, the earnings gains came about without adversely affecting educational attainment. More than 90 percent of both the academy group and the control group graduated from high school or received a GED certificate, and half completed a postsecondary credential. This was the earliest rigorous evaluation of a pathway program conducted and is still often referenced in discourse about pathways.

A more recent study conducted by the College & Career Academy Support Network (CCASN) at the University of California, Berkeley, compared outcomes for students enrolled in **California Partnership Academies** (CPAs) with statewide outcomes for all public high schools.¹³ They found that 95 percent of academy seniors in 2009-2010 graduated at the end of the school year, compared with 85 percent of all California public high school seniors. Among academy graduates, 57 percent reportedly completed the full set of courses required for admission to California State University or the University of California, compared with only 36

¹²Kemple (2008).

¹³Dayton, Hester, and Stern (2011).

percent of graduates statewide. This last result emphasizes that career-themed pathways can in fact give students the option of attending college. Moreover, the law governing CPAs requires that at least half the students entering an academy in tenth grade must meet specified “at risk” criteria, including having low family income, low grades and test scores, and a record of poor attendance — and a subsequent CCASN study confirmed that academy tenth and eleventh graders generally do come from families with lower income and lower parental education, compared with nonacademy students in the same high schools.¹⁴ Because it was not a random assignment study, however, the positive outcomes for CPA seniors are likely attributable at least in part to unmeasured characteristics of students such as motivation, persistence, or interest.¹⁵

SRI has recently released two reports with findings from a study of Linked Learning, from Year 4 and Year 5 respectively.¹⁶ This study found that students in certified Linked Learning pathways outperformed similar students in the same districts on credit accumulation and satisfying university admission requirements. Students in certified Linked Learning pathways were also more likely to report feeling engaged in and motivated by their school work. Effects on high school graduation or postsecondary enrollment rates will not be known until 2016.

A longitudinal study examined the impact of **Programs of Study** — a type of career pathway promoted by the Office of Vocational and Adult Education (now Career, Technical, and Adult Education) in the U.S. Department of Education — on high school academic and technical achievement in two districts that participated in experimental and quasi-experimental strands of the study.¹⁷ Few differences existed across groups in ninth grade, but by the end of tenth grade, students’ test scores, grade point averages, and progress to graduation tended to be better for the students in Programs of Study than for control/comparison students. Another evaluation of Programs of Study found mixed results. While engagement seemed to improve, impacts on educational outcomes such as graduation did not in this pre-post, five-year longitudinal study of two cohorts of high school students in South Carolina’s **Personal Pathways to Success Program**. Researchers attributed the mixed findings to uneven implementation of the program.¹⁸

¹⁴Stern, Saroyan, and Hester (2012).

¹⁵Another CCASN study of two longitudinal cohorts found that only 52 percent or 53 percent of the students entering a CPA in tenth grade eventually graduated from that same academy. Most of those who leave the academy remain in the same high school or another California public high school. See Stern, Saroyan, and Hester (2013).

¹⁶Guha, Adelman, et al. (2014); Guha, Caspary, et al. (2014).

¹⁷Castellano, Sundell, Overman, and Aliaga (2011).

¹⁸Hammond et al. (2013).

Early college high schools (ECHSs) have been studied relatively thoroughly, although findings have not been disaggregated to compare the outcomes of students in the academically oriented ECHSs with those of students in CTE-oriented ECHSs.¹⁹ One study examined 10 ECHS programs in five states, taking advantage of built-in lotteries in some cases to determine who would be admitted to the program. Three cohorts of students, totaling 2,458, entered the programs. The study found positive impacts on high school graduation (86 percent compared with 71 percent for the control group counterparts) and on postsecondary credentials (22 percent compared with 2 percent), although it is possible that the control group students would catch up over time.²⁰ Another study of ECHSs used an RCT and found positive impacts on ninth-grade outcomes, most notably on the proportion of students taking core college prep courses and succeeding in them.²¹

Dual enrollment, like ECHS, is another approach to easing the transition from high school to college. Several studies have found positive effects of **dual enrollment programs**, including one that included a CTE component.²²

Finally, a study of **Exploring College and Career Options** (ECCO), a curriculum designed specifically for use in career academies and similar programs to offer students high-quality career and college exploration activities, showed that students in ECCO academies were more likely than a comparison group to score high on scales measuring college and career awareness. However, this was a descriptive study that would not meet high standards of rigor for studies assessing effectiveness.²³

To sum up, rigorous evidence on pathway models and approaches is scant. On the other hand, much descriptive research suggests that many of these programs to improve outcomes hold *promise* for improving the experiences and academic outcomes of students who enroll in them.

States and Cities Where Pathway Programs Are Gaining Traction

As indicated in Appendix Table A.1, pathway approaches and models can be found in high schools and their communities all over the country. Although many states are heavily involved in this work, some have been doing it longer than others and have been able to scale their

¹⁹Edmunds (2010).

²⁰Berger et al. (2013).

²¹Edmunds et al. (2012).

²²Karp et al. (2009).

²³Visher, Safran, and Altuna (2013).

initiatives more widely than others. These include California, with its Partnership Academies and Linked Learning initiatives, and Florida, with its large network of career academies. Three states stand out in their commitment by working to transform their vocational area schools into comprehensive, full-time, academically rigorous high schools with strong career exploration and preparation components: Massachusetts, New Jersey, and most recently Tennessee.

Similarly, certain cities have become important hubs for innovative high school reform efforts that incorporate career technical education. These include Long Beach, California (a high-performing Linked Learning district); Nashville and Philadelphia (where career academies are flourishing); and New York City (home to P-Tech and small schools of choice). Other places such as Houston, Boston, and Oakland, California, are emerging as models for how cities can pull together and build strong pathways for their students to help prepare them for successful transitions to postsecondary education and careers.

California illustrates how one state has built a strong system of pathways in the past few decades. Positive results from a small-scale replication of the Philadelphia academy model near Silicon Valley prompted the state to begin funding California Partnership Academies (CPAs) in 1984. The number of state-funded CPAs reached 467 in 2009-2010. Some of these were funded by special-purpose programs, such as to create “green” energy academies, and this funding has subsequently expired. About 200 CPAs remain with state funding that does not have an expiration date. Meanwhile, in 2005, the James Irvine Foundation (JIF) began developing the approach it came to call Linked Learning.²⁴ A Linked Learning pathway embodies virtually the same combination of features as a career academy. To promote the practice of Linked Learning, JIF created an organization called ConnectEd California, which began by supporting some exemplary pilot programs. ConnectEd then conducted a multiyear Linked Learning District Initiative, involving nine large school districts in the development of systems to enroll most or all of their high school students in Linked Learning pathways.²⁵ JIF and ConnectEd are now working to sustain the commitment to Linked Learning through development of several regional hubs throughout the state. JIF also created another organization called the Linked Learning Alliance to promote public awareness and support for policies to expand Linked Learning.²⁶

In 2014, California awarded \$250 million in state funds through a competitive grant process to regional consortia that would develop “career pathways” from grade 9 through 14, bridging from high school to community college. An additional \$250 million will be awarded for a second round of grants in 2015. Each grant is paid out over three years. This large invest-

²⁴See James Irvine Foundation (2015).

²⁵See ConnectEd (2015).

²⁶See Linked Learning (2015).

ment could help build institutional infrastructure that will sustain career and college pathways, including district systems, employer partnerships, work-based learning intermediaries, and dual enrollment agreements between high schools and community colleges. Some districts receiving these grants are indeed using them to expand and strengthen Linked Learning. However, preparing students for four-year colleges or universities is not required or even encouraged by these career pathway grants, and in some localities the resulting pathways will not in fact leave all options open for students.

Conclusion

High schools that include one or more of the pathway models and approaches described in this report can be found in virtually every state and in most large cities in the country. The movement to build career and college pathways has accelerated, mainly in response to local demand, and in some places aided by federal, state, and philanthropic support. But despite increased interest, only a small percentage of high school students are currently enrolled in pathways that include the key elements we have described in this brief. (No data currently exist to tell us the exact percentage.) There is much work to be done to ensure that the best programs are scaled to reach more students and are anchored by an infrastructure that ensures high-quality implementation, sustainability, and continuous improvement. What does such an infrastructure look like? What are the conditions these approaches need to thrive and grow?

- Strong support among leaders, from elected and appointed officials (such as mayors and state legislators) to school-level leaders (superintendents, principals) to business leaders
- Passion for change that goes beyond a few outspoken individuals
- Strong partnerships among districts, employers, and postsecondary institutions with a funded, experienced organization holding it all together
- Strong intermediaries with a track record in launching and sustaining programs through technical assistance and other supports
- Alignment with growing sectors that have jobs that pay family-supporting wages and offer opportunities for advancement
- Strong state support, including an accountability system that rewards schools for making students ready for both college and careers

If these elements are in evidence in a community, the foundation for building out pathway options for high school students may have a higher probability of success. Many of these elements need resources to take root. Funding is most acutely needed to:

- Build an infrastructure to form and sustain strong partnerships
- Expand the capacity of intermediaries with a track record of success
- Support quality professional development and technical assistance to help teachers, counselors, employment specialists, and school leaders perform effectively in these settings
- Reach marginalized groups of students, such as those living in extreme poverty or in rural areas, and belonging to underrepresented racial and ethnic groups
- Support use of web-based technologies to provide access to specialized curricula and facilitate employer engagement with student projects and work-based learning

Preparing high school students for both careers and college has been widely expressed as a goal of public policy, and this commitment has been reinforced by successful examples in many schools, cities, and states. However, large numbers of high schools are still stuck in the twentieth century, grooming some students for college and other students for work. A definitive national review of the nation’s career-technical education found that “exemplary CTE programs are seen as exceptions to mainstream options. CTE is still perceived by many as an alternative to rigorous academics — a separate track for students who are not college bound.”²⁷ To open choices for many more high school students to find a viable path to long-term career success will require additional effort by employers and other community partners, in concert with states, high schools, and postsecondary institutions. This work should focus on not only the quantity of programs being offered but, even more important, the quality. Supporting this effort would help build critical mass, moving high-quality career and college pathways into the mainstream of American education.

²⁷Independent Advisory Panel of the National Assessment of Career and Technical Education (2014), p. 3.

Appendix A

Pathway Approaches and Models

Appendix Table A.1

Pathway Approaches and Models, Key Components, and Locations

Program	Type or Structure	Key Components	Sites and Locations	Intermediaries, Supporting Organizations, and Funders
Systemic approaches				
Linked Learning	Districtwide systems of pathways from ninth grade through community college	Rigorous academics integrated with CTE coursework, work-based learning, personalized learning environments, standards for high quality implementation	65 districts in California, Detroit, and Houston	ConnectEd, College & Career Academy Support Network (CCASN), Linked Learning Alliance, National Academy Foundation (NAF), Career Ladders Project, state and foundation funding
Pathways to Prosperity	State-based systems of pathways from ninth grade through college	Sectoral approach (advanced manufacturing, IT, health, construction and first responders)	10 states: MA, NY, OH, IL, MO, TN, GA, CA, plus 2 more soon	Jobs for the Future and the Harvard Graduate School of Education
Youth CareerConnect	Community-based systems based on partnerships between schools, districts, employers, workforce agencies, and postsecondary institutions	Rigorous academics with a CTE component, employer involvement, sector-based approach, work-based learning, pathways to college	Approximately 20 grantees in several states	Funded by the Department of Labor
Dual enrollment with a CTE focus	Formal arrangements between a state, school districts, and college systems	High school students enroll in CTE courses in local community colleges, earning college credit and/or certificates while completing high school programs; sometimes includes extra support	Found in many states; largest programs in Florida and California	State-level college and K-12 agencies

(continued)

Appendix Table A.1 (continued)

Program	Type or Structure	Key Components	Sites and Locations	Intermediaries, Supporting Organizations, and Funders
Models and programs				
Career academies	Small learning communities within larger high schools	Rigorous academics integrated with CTE coursework, work-based learning, personalized learning environments	Reportedly more than 6,000 nationwide (as defined by 2012 Schools and Staffing survey); more than 300 California Partnership Academies; almost 600 NAF academies; local networks in Philadelphia and Nashville	CCASN, NAF, National Coalition of Career Academies, Philadelphia Academies, state departments of education in CA and FL
High Schools That Work	Whole schools	Students take rigorous academic courses tied to their major; career exploration and preparation are emphasized	1,200 sites in 30 states and the District of Columbia	Southern Regional Education Board
New York City small schools of choice with a career focus	Large high schools broken into 200 small schools	Personalized learning environments; community partnerships, some with a career focus and work-based learning	200 schools; unknown how many have a career focus	NYC Department of Education

(continued)

Appendix Table A.1 (continued)

Program	Type or Structure	Key Components	Sites and Locations	Intermediaries, Supporting Organizations, and Funders
Models and programs (continued)				
P-Tech (a variant of the early college high school model)	Early college high school model	Prepares students for high-skill jobs in technology, manufacturing, health care, and finance. An integrated six-year program, combining high school, college, and career training. With a rigorous academic curriculum, targeted technical training, comprehensive workplace learning, and individualized support services and pathways.	Five high schools in NYC by 2014, 16 new programs starting statewide; Chicago	Funded by NYC Department of Education and New York State Education Department, overseen by a leadership council made up of the Executive Chamber, IBM, the State University of New York (SUNY), the State Education Department (SED), and The Business Council of New York State Inc.
Early college high schools with CTE focus	High schools where students earn credit toward a diploma and college degree concurrently, sometimes co-located on college campuses	Students take high school and college classes concurrently, including CTE classes leading to occupational credentials	Over 280 schools in 30 states; approximately 200 have a career focus, many of which prepare students for careers in STEM fields	Jobs for the Future, Bill and Melinda Gates Foundation
Apprenticeships	Stand-alone or linked with high school coursework	Students earn high school credit and occupational training with certificate; sometimes paid to attend classes	A few programs in North Carolina and possibly Wisconsin; still very rare	Department of Labor priority to increase apprenticeships; existing programs involve collaboration between employers and schools

(continued)

Appendix Table A.1 (continued)

Program	Type or Structure	Key Components	Sites and Locations	Intermediaries, Supporting Organizations, and Funders
Models and programs (continued)				
Transformed vocational high schools	Free-standing vocational high schools transformed into career-themed full-time high schools	Combines college prep curricula with career technical education	Massachusetts Tennessee New Jersey	State Departments of Education
New Tech Network	Project-based learning and technological infrastructure are embedded in curricula	Project-based learning, collaborative learning with integration of cutting-edge technology. Focus is on college and deeper learning. Includes specialized curriculum in STEM, global studies, and environmental education.	160 schools in 26 states and additional schools abroad	The William and Flora Hewlett Foundation, Carnegie Corporation of New York, Bill and Melinda Gates Foundation, Steelcase Education Solutions, Educate Texas, UTeach, Center of Excellence in Leadership of Learning (CELL), North Carolina New Schools Project, Bick Institute for Education, Asia Society
International Baccalaureate (IB) programs with career exploration component	Programs embedded in comprehensive high schools	Academic courses from the IB Diploma Programme, career awareness and exploration experiences, service learning, career-related studies	93 programs in 79 cities, in 28 states	International Baccalaureate Organization

Appendix B

National Experts Interviewed for This Report

Betsy Brand
Executive Director
American Youth Policy Forum

Kim Green
Executive Director
National Association of State Directors of Career Technical Education Consortium
(NASDCTE)

Gary Hoachlander
President
ConnectEd: The California Center for College and Career

Brad Stam
Vice President
ConnectEd: The California Center for College and Career

Jack Jennings
Dean for Administration
Graduate School of Education, Harvard University

Marcie Mack
Interim State Director
COO of Oklahoma Department of Career and Technology Education

Susan Sandler
Sandler Family Foundation

Bob Schwartz
Professor Emeritus of Practice in Educational Policy and Administration
Graduate School of Education, Harvard University

James R. Stone III
Director of the NRCCTE at SREB
Southern Regional Education Board, University of Louisville

Johan Uvin
Acting Assistant Secretary
Career, Technical, and Adult Education (OCTAE), with U.S. Department of Education

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About MDRC

MDRC is a nonprofit, nonpartisan social and education policy research organization dedicated to learning what works to improve the well-being of low-income people. Through its research and the active communication of its findings, MDRC seeks to enhance the effectiveness of social and education policies and programs.

Founded in 1974 and located in New York City and Oakland, California, MDRC is best known for mounting rigorous, large-scale, real-world tests of new and existing policies and programs. Its projects are a mix of demonstrations (field tests of promising new program approaches) and evaluations of ongoing government and community initiatives. MDRC's staff bring an unusual combination of research and organizational experience to their work, providing expertise on the latest in qualitative and quantitative methods and on program design, development, implementation, and management. MDRC seeks to learn not just whether a program is effective but also how and why the program's effects occur. In addition, it tries to place each project's findings in the broader context of related research — in order to build knowledge about what works across the social and education policy fields. MDRC's findings, lessons, and best practices are proactively shared with a broad audience in the policy and practitioner community as well as with the general public and the media.

Over the years, MDRC has brought its unique approach to an ever-growing range of policy areas and target populations. Once known primarily for evaluations of state welfare-to-work programs, today MDRC is also studying public school reforms, employment programs for ex-offenders and people with disabilities, and programs to help low-income students succeed in college. MDRC's projects are organized into five areas:

- Promoting Family Well-Being and Children's Development
- Improving Public Education
- Raising Academic Achievement and Persistence in College
- Supporting Low-Wage Workers and Communities
- Overcoming Barriers to Employment

Working in almost every state, all of the nation's largest cities, and Canada and the United Kingdom, MDRC conducts its projects in partnership with national, state, and local governments, public school systems, community organizations, and numerous private philanthropies.