University of California at Berkeley

Career Academies:

A Proven Strategy to Prepare High School Students for College and Careers

CASN
CAREER ACADEMY SUPPORT NETWORK

Career Academies: A Proven Strategy to Prepare High School Students for College and Careers

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Updated February 25, 2010

We'll start with students' own words. Here are some typical statements, by students in the Education and Child Development Academy at Peter Johansen High School in Modesto, California (recorded December 2, 2009):

"It's more than just you go to class, you stay there and then you leave. Since we go out [into the community] a lot with teachers they help us on a more personal level and with education. They help us with college, they help us with jobs that we might want to shadow. So it's more than just going to class."

"The academy has taught me a lot of life skills. Before, it was about me coming home just to do homework and now it's about me working towards something."

"It really helps us figure out our future and what we want to do."

"The job shadow experience has really given me a better perspective on what I want to achieve in life. The academy helps you take that extra step to see if it's really something you might want to do."

"There were a couple of teachers that were definitely close to me. Mrs. ----- was very close to me. She brought her love and passion to all the teachers and in turn then all the teachers brought that to all the students. No matter what the problem was we always felt welcome. So, I know, gosh, in high school it seems like you have a problem every day. So knowing that someone was going to be there –– that is very important."

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[1] This is an updated version of a paper first produced in 2001. Marilyn Raby died in 2004, but many of the ideas in this paper were originally hers.

"Our academy is like a family."

These echo statements from students in other academies, more than a decade earlier (Poglinco 1998):

"If I hadn't gotten into the academy, my life would be so much different than it is now! It has helped me so much, because I didn't really talk to people that much, and I was very shy. I know it's hard to believe that but I was! I wouldn't be as active in school as I am now, so I just feel as though I'm glad I got into the academy because, you know, all the opportunity I have now, it would never have been possible." (p. 15.)

"When I talk about the academy, I would very much highlight the fact that it sounds like all you do is work, you're college prep and everything like that, but actually it's not. Our first year, when we thought it was going to be very boring, we were hardly ever in the building because we'd go on field trips every two weeks, to get us more involved in what the academy is about. Instead of us just sitting in class and learning about it, they took us out and hands-on and said, 'Well, this is what we do and this is what you will do.' And that's one thing I can point out to them, it's not boring. It may be harder but it's not boring. They give you a lot of things to deal with and a lot of things to accomplish." (p. 13.)

Summary

Career academies, after more than four decades of development and three decades of evaluation, have been found by a conclusive random-assignment study to be effective in improving outcomes for students during and after high school. Career academies have therefore become the most durable and best-tested component of a high school reform strategy to prepare students for both college and careers.

The number of career academies has been expanding rapidly, in part because academies have been found to be effective, and in part because they embody ideas promoted by several major high school reform movements. This paper describes the growth and evolution of career academies, reviews the evaluation evidence, explains how career academies reflect widely accepted principles of high school reform, and considers prospects for the future.

Growth And Evolution Of Career Academies

In the first two decades after their 1969 inception, the growth of career academies was steady but gradual. Growth in the number of academies has accelerated since 1990, and has now reached about 7,000 in 2010.

Before 2004, accurate counts of career academies are available only from three organized networks. In Philadelphia, the nonprofit Philadelphia Academies, Inc., has supported career academies since 1969. In California, after two nonprofit-sponsored academies were established in 1981, the state began funding academies in 1985. The nonprofit National Academy Foundation (NAF) has sponsored academies since 1982, and now supports academies in 40 different states. Table 1 shows that the number of academies in these three networks together grew to about a hundred in 1990, expanded to more than 700 in 2000, and exceeded 1,000 in 2010.

Table 1

Growth of Three Career Academy Networks

Year	Philadelphia	California*	National Academy Foundation
When founded	1969: 1 academy	1981: 2 academies	1982: 1 academy
1980	about 5	--	--
1985	about 10	12	8
1990	about 20	29	54
1995	28	45	167
1998	28	200	289
2000	29	290	400
2010	28	500	over 500

*Includes only state-funded academies. Approximately an equal number of academies operate in California in 2010 without state

funding.

A total of 1535 schools in 634 districts received federal SLC grants from 2000 through 2007 according to the US Department of Education's Smaller Learning Communities Awards Database.[2] Even though the federal SLC grants were not intended mainly to promote career academies, that is what they mainly did. The program's web site shows how many schools that received grants from 2000 to 2004 were using various structures.[3] About 60 percent of the schools showed career academies as one of the structures they were using! Freshman academies and advisories were also commonly used structures. But career academies were by far the most frequently named approach. In effect, many large high schools saw the federal SLC grants as an opportunity to introduce career academies.

The only attempt to count the number of career academies nationwide was a question in the 2004 Schools and Staffing Survey, conducted by the National Center for Education Statistics (NCES). The questionnaire defined a career academy as "a multi-year program in which the curriculum integrates academic and career/technical education courses, organized around one or more broad career themes."[4] This captures at least some of the main features of a career academy.[5]

The 2004 NCES survey found that 4,800 high schools nationwide reported having at least one career academy. However, it is safe to assume that many of these schools had more than one academy. Furthermore, federal SLC grants continued after 2004, and undoubtedly have added to the number of career academies. As of 2010, therefore, an educated and fairly conservative guess is that there are approximately 7,000 career academies in the country, enrolling about one million high school students, mainly in grades 10

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[2] http://slcprogram.ed.gov/cgi-bin/mysql/slcawards.cgi?l=summary-state

[3] http://slcprogram.ed.gov/cgi-bin/mysql/slcawards.cgi?l=summary_ss&show_ss_type=Structure&ss_sortby=ss_count

[4] nces.ed.gov/surveys/ctes/tables/h14.asp

[5] In contrast, the 2007-08 Schools and Staffing Survey asked schools whether they offer a "Specialized career academy (Curriculum organized around a specific career area, such as health, hospitality, IT.)" This definition omits the integration of academic and career-technical coursework, and the multi-year nature of an academy.

through 12. That means career academies are enrolling about 10 percent of all students in grades 10-12.

What is a career academy?

A career academy is a type of school-within-a-school or small learning community (SLC) that provides a college-preparatory curriculum with a career-related theme. We coined the term "career academy" in 1992 to encompass the Philadelphia academies, California Partnership Academies, and the NAF academies (Stern, Raby, and Dayton 1992). Only the California academies are defined in legislation. Nevertheless, these and other career academies generally share three basic features, as identified by researchers at MDRC (Kemple and Rock 1996, p. ES-3):

• First, academies are **small learning communities**. An academy comprises a cluster of students who have some of the same teachers for at least two years, and who share several classes each year. A group of teachers from academic and technical disciplines are scheduled to have only or mostly academy students in their classes, meet with each other on a regular basis, and share in decision-making related to administrative policies, curriculum content, and instruction. One of these faculty members assumes lead responsibility for administrative tasks and usually serves as a liaison to the school principal and other building administrators, school district officials, and employer partners.

• Second, academies combine a **college-preparatory curriculum with a career theme**. Examples of common themes are health care, business and finance, communications media, and transportation technology. Academic courses that meet high school graduation and college entrance requirements are linked with technical courses that focus on the academy's field of work. Teachers have shared planning time to coordinate course content and instructional strategies. Career exploration and employability skill development may take place in the career-technical courses and in one or more academic courses. Work-based learning opportunities for students tie classroom activities to internships with local employer partners. College and career counseling informs students about options and planning for employment and further education, which may or may not be related to the academy career theme.

• Third, academies embody **partnerships with employers and**

postsecondary education. An advisory group for the academy includes representatives from the local employer community and from local colleges or universities, as well as academy faculty and administrators from the school and district. Advisory group members give advice on curriculum, appear as guest speakers in classes, host field trips, supervise student internships, provide financial or in-kind support, and some serve as mentors for individual students.

Origins of career academies

The first academies began with a focus on dropout prevention and vocational preparation, but academies soon evolved to include preparation for four-year colleges and universities. Philadelphia established the first career academy in 1969: an "Electrical Academy" at Edison High School, sponsored in collaboration with the Philadelphia Electric Company. The idea was subsequently applied to other fields —— business, automotive, health, environmental technology, law, horticulture, tourism, aviation —— and other high schools, growing to a network of 29 academies in 12 different career areas. The separate nonprofit organizations that had mobilized employer support came together in 1982 as one organization named Philadelphia Academies, Inc. Supported by corporate contributions and foundation grants, this organization continues to coordinate and subsidize academies in Philadelphia, while the city school district retains jurisdiction and supplies teachers and classrooms. Although the Philadelphia academies began as vocational training programs, today they send most of their graduates to college.

In 1981 the Philadelphia academy idea was introduced in California, starting with a "Computer Academy" at Menlo-Atherton High School and an "Electronics Academy" at Sequoia High School, near Silicon Valley. Based on a series of evaluations that demonstrated improved student performance, California passed legislation in 1984 that supported ten replications of the model. Evaluations of these academies continued the pattern of encouraging results, and in 1987 a second state bill was passed, supporting approximately 40 additional replications. The legislation has been renewed again several times, resulting in continued expansion as shown in Table 1. Many other academies have begun without state funding, and in some districts there are now several non-funded academies for every one receiving a state grant (no one has a precise count). The state-funded California Partnership Academies require three academic courses each year in grades 10 and 11, and one to three academic classes in grade 12,

along with one career-related course each year.

Also in the 1980s, New York City created the first "Academies of Finance," sponsored by the American Express Company, which subsequently joined with other companies to create the National Academy Foundation (NAF) in 1982. NAF currently supports academies focusing on the four themes of Finance, Hospitality & Tourism, Information Technology, or Engineering. NAF provides curriculum, technical support, and professional development for teachers. The NAF academies usually include only grades 11-12, but some individual NAF academies are moving toward the Philadelphia and California models, adding both earlier years of high school and more coordination with academic classes. Local advisory boards and internships for students are key features of NAF academies. Preparing students for college has been a goal of NAF academies since their inception.

In the 1990s a number of states and cities began to sponsor career academies. For instance, the Illinois State Board of Education started 20 California-style academies in 1994-95, expanding to about 50 in 2000. Cities that have had substantial numbers of career academies include Atlanta, Chicago, Denver, Los Angeles, Oakland, Sacramento, Seattle, and Washington, D.C.

Effects Of Career Academies On Student Outcomes During and After High School

One good reason why growing numbers of states, districts, and high schools have decided to start career academies is that they have been found to be effective in improving students' performance. This section summarizes the evidence to date, focusing on quantitative studies of student performance. The studies and findings are summarized in Tables 2 through 5.

Several studies in California found that academy students performed better than similar students in the same high schools who were individually matched with academy students on demographic characteristics and ninth grade records of low grades, high absenteeism, and disciplinary problems. An evaluation of the first two academies in California in the early 1980s found that academy students in grades 10 through 12 had better attendance, earned more credits, obtained higher grades, and were more likely to graduate than the comparison groups (Reller 1984; additional citations in Stern,

Raby, and Dayton 1992; see also Raby 1995). From 1985 through 1988 a similar evaluation of the 10 initial state-funded academies in California showed substantial and statistically significant advantages for academy students in attendance, credits earned toward graduation, grade point averages, and retention through high school (Dayton et al. 1989; Stern et al. 1989).

Table 2

Published Quantitative Evidence on Performance of Students Who Participated in Career Academies

Author(s) and Date(s)	Data Source
Reller 1984, 1985, 1987	Data collected 1981-86 on students in 2 Peninsula Academies in California, and individually matched comparison groups in each school. Followup surveys 15 and 27 months after graduation.
Snyder & McMullan 1987a,b	1981 sophomores entering business academies in 3 Philadelphia high schools traced to graduation. Graduates surveyed 1986-1987, and compared to random sample of all graduates, and all business program graduates, from those 3 high schools.
Stern, Dayton, Paik, Weisberg, & Evans 1988, 1989	Data collected 1985-90 on students in 10 academies funded by state of California, and individually matched comparison groups in each school.
Academy for Educational Development 1990	Followup of academy of finance students who graduated 1984-89. No comparison group.
Stern, Raby, & Dayton 1992	Followup surveys 10 and 22 months after graduation, of graduates from 10 state-funded California academies and comparison groups.

Hayward & Talmadge 1995	1989-92 data from 10 different programs using vocational education to promote high school success. Two of the sites are career academies. Evaluation used random control groups in some sites, non-random comparison groups in others, including the academies.
McPartland, Legters, Jordan, & McDill 1996; McPartland, Balfanz, Jordan, & Legters 1998	Reorganization of Patterson H.S. in Baltimore in 1995 included creation of 4 career academies for grades 10-12. Data analyzed from 1993 to 1998.
Kemple and Snipes 2000; Kemple 2001, 2004, 2008	10 career academies included in an experimental evaluation since 1993. This is the only evaluation of career academies with students randomly assigned to academies and control groups.
Maxwell and Rubin 1997, 2000	1991-95 school records for 3 cohorts of students in grades 10-12 in an urban district, including 9 career academies. Also a followup survey in mid-late 1996.
Maxwell 2001	1990-1997 data on 1,402 high school graduates from an urban school district who applied to a local university, including 349 who graduated from career academies.
Elliott, Hanser, and Gilroy 2002	1994-96 data from 3 Junior ROTC career academies in large cities were compared with data from other career academies or magnets in the same or similar schools, JROTC students not in academies, and students not participating in any academy or magnet.

Annual reports collected from state-funded academies in California continue to show strong performance by academy students (Dayton 1997). High school dropout rates in academies average about 7 or 8 percent over three years — about half the rate in the general

population of California students, despite the fact that state-funded academies are required to recruit a majority of students who are economically or educationally disadvantaged. An analysis of the 2005 reports by Bradby and others (2007) compared performance by academy students with statewide totals. Academy 10th graders were more likely to have passed both sections of the California High School Exit Examination; academy 12th graders were more likely to graduate at the end of the year; and academy graduates were more likely to have completed the 15 "a-g" courses required for admission to the University of California or California State University. Although these findings from the annual reports do not use matched comparison groups, they are consistent with the comparison-group evaluations.

Table 3

Findings on Academic Performance and High School Completion:

Students in Career Academies Compared to Other Students

Author(s) and Date(s)	Main Findings
Reller 1984, 1985	Academy students earned more course credits than comparison group. One-year dropout rates 2 to 6% in academies, 10 to 21% in comparison group.
Snyder & McMullan 1987b	Graduation rate for 1981 sophomores in 3 business academies was 77%, compared to citywide average of 67% for freshmen.
Stern, Dayton, Paik, Weisberg, & Evans 1988, 1989	Academy students overall performed significantly better than comparison groups in attendance, credits earned, average grades, and likelihood of staying in school. 3-year dropout rate for cohort entering 1985 was 7.3% in academies, 14.6% in comparison group.
Hayward & Talmadge 1995	Academies showed generally better results, improving students' attendance, credits, grades, and likelihood of completing high school.

McPartland, Legters, Jordan, & McDill 1996; McPartland, Balfanz, Jordan, & Legters 1998	Attendance in first implementation year rose from 71 to 77% at Patterson, compared to districtwide decline from 73 to 70% in grades 9-12. Survey of teachers found big improvement in reported school climate.
Kemple and Snipes 2000; Kemple 2001	Academy students overall earned a larger number of course credits and were more likely to have positive developmental experiences. Among students at highest risk of school failure, academy students attended school more regularly, earned more course credits, were more likely to participate in extracurricular activities and volunteer projects, and were less likely to be arrested. As of spring of senior year, dropout rate for the high-risk subgroup was reduced from 32 percent in the control group to 21 percent among the career academy students. However, one year after scheduled graduation, there were no significant differences in high school graduation rates.
Maxwell and Rubin 1997, 2000	District records show academy students received higher grades. Followup survey found higher grades increased the likelihood of graduation; result was 92% graduation rate for academy students, 82% for non-academy.
Elliott, Hanser, and Gilroy 2002	Students in JROTC career academies, and in other career academies or magnets, generally received higher grades, had better attendance, completed more credits, and were less likely to drop out, compared to statistically similar students not in academies.

Table 4

Findings on Enrollment in Postsecondary Education:

Students in Career Academies Compared to Other Students

Author(s) and Date(s)	Main Findings
Reller 1987	15 months after graduation, postsecondary enrollment rate 62% for academy graduates, 47% for comparison group. 55% of academy graduates, 22% of comparison group expected to complete bachelor's degree or more.
Snyder & McMullan 1987b	18% of business academy graduates said school was main activity in 1986-87, compared to 35% of citywide sample. Of those enrolled, 14% of academy graduates, and 43% of citywide sample, intended to get bachelor's degrees.
Academy for Educational Development 1990	89% of finance academy graduates said they had attended 4-year college or university, 58% majored in business or finance, and 67% planned to complete a master's or doctorate.
Stern, Raby, and Dayton 1992	1989 and 1990 followup surveys found no consistent differences between academy and comparison graduates in postsecondary attendance or degree aspirations.
Maxwell and Rubin 1997, 2000	Analysis of followup survey found higher grades for academy students increased their probability of going to college, and 2 of 9 academies gave an extra added boost to college-going, resulting in 52% of former academy students going to 4-year colleges, compared to 36% of non-academy.
Maxwell 2001	Among graduates who attended a local university, former academy students were less likely to need remedial coursework, and more likely to complete

	bachelor's degrees.
Kemple 2004, 2008	Eight years after scheduled graduation from high school, more than 90 percent of both academy and control groups had graduated from high school or received a General Educational Development (GED) certificate. Half of both groups had completed a postsecondary credential, but differences between academy and control groups were not significant.

Table 5

Findings on Employment After High School:

Students in Career Academies Compared to Other Students

Author(s) and Date(s)	Main Findings
Reller 1987	No significant differences between academy and comparison students 27 months after graduation, in employment status, wages, or hours worked.
Snyder & McMullan 1987b	64% of business academy graduates said work was main activity in 1986-87, compared to 42% of citywide sample. Academy graduates employed a larger fraction of time since graduation.
Stern, Raby, & Dayton 1992	1989 and 1990 followup surveys of academy and comparison graduates found academy graduates working 3 more hours per week, but no consistent overall difference in hourly earnings.
Maxwell and Rubin 1997, 2000	Analysis of followup survey found no significant differences in wages or hours worked between former academy and non-academy students, but former academy students more often said their high school program had prepared them well for further education and work.
Kemple 2004,	For eight years after scheduled graduation from high school, academies produced sustained earnings

2008	gains that averaged 11 percent (or $2,088) more per year for Academy group members than for individuals in the non-Academy group — a $16,704 boost in total earnings over the eight years of follow-up (in 2006 dollars). These labor market impacts were concentrated among young men. Through a combination of increased wages, hours worked, and employment stability, real earnings for young men in the Academy group increased by $3,731 (17 percent) per year — or nearly $30,000 over eight years. Academies also produced an increase in the percentage of young people living independently with children and a spouse or partner. Young men also experienced positive impacts on marriage and being custodial parents.

The California evaluations using individually matched comparison groups also followed students after they graduated from high school. Academy graduates were at least as likely to be enrolled in postsecondary education as their non-academy schoolmates one or two years after high school. At the same time, they had more hours of paid employment. Additional details are given in Stern, Raby, and Dayton (1992).

Maxwell and Rubin (1997) surveyed former high school students from a large California school district one or two years after their graduating year. They found that students who had attended career academies were at least as likely to be enrolled in four-year colleges as students who identified themselves as having been in the academic track in high school. Both the career academy and academic track graduates had significantly greater likelihoods of enrolling in four-year college than graduates who classified themselves as having been in the high school general track. Yet academy students had lower average scores on sophomore reading tests in high school, and they were less likely to be native English speakers, compared to students in the general track.

Maxwell and Rubin (2000) also analyzed school district records on academy and non-academy students. They found that students in career academies obtained significantly better grades. This was not due to easier grading standards within the academies: Maxwell and Rubin found that courses within most of the academies actually

awarded lower grades than non-academy courses in the same subjects. Furthermore, when Maxwell and Rubin divided students into high, middle, and low groups according to tenth grade math and English test scores, they found in each group that academy students obtained higher grades than non-academy students. The higher grades of academy students appear to be the main reason for their higher rate of college attendance, compared to non-academy students.

Maxwell (2001) extended the Maxwell-Rubin study to follow graduates of career academies and other graduates from the same school district who enrolled at a nearby university. She found that the academy graduates were more likely to come from high schools with large proportions of low-income minority students. After taking this into account, the academy graduates were less likely to need remedial coursework at the university, and they were more likely to receive their bachelor's degrees, compared to the other graduates from the same district. These findings suggest that academies help low-income students finish not only high school, but also college. They imply that the improvement in high school graduation rates was not accomplished by lowering academic standards in the career academies.

Outside of California, an earlier evaluation of business academies in Philadelphia (Snyder and McMullan 1987b) found a higher graduation rate compared to the citywide average, but a lower rate of enrollment in postsecondary education for academy graduates than for the general student population, and no significant differences in employment after graduation compared to graduates of other business programs. On the other hand, an early study of a NAF academy in New York City found high rates of postsecondary enrollment (Academy for Educational Development 1990). The difference apparently reflects the origin of the Philadelphia academies in traditional vocational education, while the NAF academies were designed as college preparatory from the outset. A subsequent study by Linnehan (1996) found that graduates from Philadelphia business academies reported better attendance while in high school, and that this carried forward into less reported absenteeism in their post-high school jobs.

Elliott, Hanser, and Gilroy (2002) analyzed data from three career academies affiliated with the Junior Reserve Officers' Training Corps (JROTC). They found positive effects on attendance, credits earned, grades, and the likelihood of staying in high school.

Importance of the MDRC random-assignment study

An unresolved question in these evaluations –– even in studies using individually matched comparison groups –– was whether the positive results for academy students might be attributable to selection. Since students must take the initiative to apply to a career academy, it is possible that academy students have more motivation, ambition, get-up-and-go, parental support, or other unmeasured strengths than the comparison students. These unmeasured characteristics may have prompted some students to apply to a career academy and also made them more likely to succeed whether they enrolled in an academy or not.

The selection issue not only clouds previous research on career academies, but also bedevils evaluations of other high school reform efforts. For example, numerous studies have attempted to test the effects of reducing the size of high schools, either by creating separate small schools or by dividing large high schools into smaller units. These studies tend to find that students in small schools, or in smaller units within large schools, are relatively less alienated, more engaged, more likely to pass their courses and accumulate credits toward graduation, and less likely to drop out (Gladden 1998; Cotton 1996; Raywid 1995). However, it is possible that these patterns are largely attributable to pre-existing differences between students in large and small schools, or between students who are and are not enrolled in small units within larger high schools —— and these differences may not be measured by researchers. For example, students may differ with respect to individual characteristics such as motivation, or with respect to community characteristics such as homogeneity of values. Because of such differences, the students in small schools or schools-within-schools may have been more likely to succeed even if they had been in big schools.

Several studies in particular are frequently cited as demonstrating that students in smaller high schools are less likely to drop out (Pittman and Haughwout 1987; Franklin and Crone 1992; Fetler 1989; Howley and Bickel 1999). Each of these studies compares high schools in a state or national sample at one point in time. The smaller high schools therefore may include: schools in small, close-knit rural communities; magnet high schools or other schools of choice in big cities; and schools located in relatively homogeneous residential enclaves in small cities or various parts of metropolitan areas. The characteristics of those communities —— such as stronger personal connections and shared values between school staff and parents —— may account for the lower dropout rates, and these characteristics are not captured by

the simple socioeconomic measures used in the studies as statistical controls.

The available research, based on comparisons across communities, therefore does not demonstrate that replacing a large high school with smaller high schools would produce lower dropout rates or other desirable results in a given community.[6] Like the previous research on career academies, the research on small high schools and other kinds of schools-within-schools is suggestive but not entirely conclusive.

The only way to eliminate the uncertainty due to unmeasured differences among students or communities is the experimental procedure of random assignment. This is standard practice in medical research, and is sometimes used in classroom-level studies in education, but it has been very rare in studies of school structure (see Mosteller et al. 1996). That is why the MDRC study of career academies was so significant (and expensive). MDRC began its 10-site study in 1993 by creating a list of students who applied to the career academy at each site, and choosing at random those who would be admitted to the academy and those who would not. The latter constituted the control group. Unlike the matched comparison groups in earlier studies, all students in the MDRC control group had taken the initiative to apply to the career academy. They therefore shared the same unmeasured motivation, ambition, or other traits that might characterize the academy student.

The results of the MDRC evaluation strongly confirmed earlier findings from the matched-comparison studies of career academies. MDRC found that academy students overall earned a larger number of course credits needed for graduation, and were more likely to have positive developmental experiences such as working on a volunteer project. The strongest and most pervasive differences were found among students at highest risk of school failure. Among this subgroup, the academy students attended school more regularly, earned more course credits, were more likely to participate in extracurricular

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[6] A study by Kahne and others (2008) of new small high schools in Chicago did find a somewhat smaller dropout rate compared to other Chicago high schools. The dropout difference was on the borderline of statistical significance. The authors argued that selection bias would not be large in this study because students were still assigned to schools in their neighborhoods. The study found teachers and students in small schools felt they received significantly more personal support, but no differences in instructional practices or academic achievement.

activities and volunteer projects, and were less likely to be arrested. Most consequentially, as of spring of senior year, the dropout rate for the high-risk subgroup was reduced from 32 percent in the control group to 21 percent among the career academy students (Kemple and Snipes 2000).

The MDRC evaluation continued to collect data one year, four years, and eight years after students were scheduled to graduate from high school. These follow-ups revealed that students in both the academy and control groups had high rates of high school graduation and completion of postsecondary credentials, compared to a national sample of students from similar urban high schools. The high educational attainment of students in the control group –– who all had applied to academies at the start of the study –– gives credence to the idea that students who apply to academies tend to have stronger motivation or other characteristics that contribute to their success in school. The MDRC study ultimately found no significant differences between the academy and control groups in high school completion or postsecondary educational attainment.

On the other hand, the MDRC study found large, sustained, and statistically significant differences in labor market outcomes. For eight years after scheduled graduation, academy students had higher earnings –– about 11 percent higher, on average. Among males, academy students' earnings were 17 percent higher. Earlier the MDRC study had found that academies provided more opportunities for career exploration, career-technical coursework, and work-based learning –– and these features of academies may have been responsible for the higher earnings of academy students later on.

In sum, the MDRC evaluation has produced conclusive evidence that career academies improve students' performance in high school, especially for students at greatest risk. Eight years after high school, students who had been assigned to career academies had significantly higher earnings than the control group. Former academy students also had high levels of postsecondary educational attainment, though not significantly higher than the control group. Because the MDRC study controlled for selection effects by using random assignment, the evidence on the effectiveness of career academies is stronger and clearer than for other high school reform strategies. This provides an exceptionally solid basis for designing new policies and practices to improve high schools.

Two issues raised by the MDRC study: test scores and schoolwide effects

Despite positive results, the MDRC study raised a couple of troubling issues, one explicit and the other implicit. The explicit issue is about test scores. MDRC found that career academy seniors scored no higher than students in the control group on standardized tests in mathematics and language arts (Kemple and Snipes 2000). Evaluation of the first 10 California Partnership Academies also found no effects on standardized test scores (Dayton et al. 1989). The absence of evidence that career academies improve standardized test scores is serious because such tests are sometimes regarded as the best immediate measure of student learning.

It is important to recognize that the long-run benefit of career academies for participating students depends much more on reducing the dropout rate than on raising test scores. For instance, the additional earnings associated with completing one more year of high school are estimated to be four to ten times greater than the additional earnings associated with one grade-equivalent year of test score gain (Levin 2000) —— and few if any replicable programs have been found capable of producing test score gains of that magnitude. Therefore, even if academy students' test scores are no higher than the control group's, career academies still provide substantial benefits if they enable more students to finish high school.

That said, MDRC's null finding about test scores raises questions about what kind of instructional improvement, if any, occurs in career academies. Poglinco (1998) analyzed interviews with students, teachers, and administrators from three of the academies in the MDRC study, to see whether academies were supporting students' college goals. One of the themes running through students' comments is that the atmosphere of trust and encouragement created within the academy, and with workplace mentors, bolstered their general self-confidence. College aspirations were seldom mentioned as a reason for entering the academy in grade nine or ten, but they became more explicit by junior year. This qualitative evidence amplifies results from surveys in which academy students reported more academic support from teachers and peers than the control group (Kemple 1997). However, none of these findings indicate whether the level of instruction in academies was more rigorous than in non-academy classes, or whether academy students actually learned more than the control group.

A second set of issues arising from the MDRC study and previous

evaluations of career academies has to do with schoolwide effects. First, how does the presence of one or two academies in a larger high school affect the performance of students in the school as a whole? It is possible that an academy —— or any other program that serves only some of the students in a school —— attracts special resources, especially teachers who are highly committed, energetic, or talented. If so, students in the academy may gain at the expense of the rest of the school. The MDRC study did check on whether academy teachers were more experienced or better educated than their non-academy counterparts, and found no differences on average (Kemple and Rock 1996). However, because teachers were not randomly assigned to academies, there may well be unobserved differences in motivation, commitment, or other attributes related to good teaching. Furthermore, academy teachers had smaller classes (24 students on average) than non-academy teachers (26.7). It is possible, therefore, that the difference between the performance of academy and non-academy students is partly attributable to a shift of resources from the rest of the school to the academy.

Whether academy students' gains come at the expense of non-academy students can be determined only by comparing the level and variation in student performance before and after the academy is introduced into the school. The question could be answered by introducing career academies into a set of high schools, and comparing schoolwide student performance over time with another set of high schools that did not have career academies.

A similar evaluation design, comparing schools over time, would be needed to answer a second question not addressed by the MDRC study: namely, what is the impact of dividing a school into career academies or other kinds of small learning communities so that every student and every teacher belongs to one of these smaller units. As noted earlier, a number of high schools have in fact divided themselves into various kinds of sub-units, and a large proportion of these are using career academies for some or all of their small learning communities. McPartland et al. (1996, 1998) have produced the first reported results of subdividing a high school entirely into career academies in grades 10-12. Patterson High School in Baltimore was slated for reconstitution because "it was one of the two worst high schools in the state of Maryland in 1994." (1996, p. 1) For example,

> "Small groups of unruly students were constantly roaming the halls and stairways, and repeated faculty efforts to bring order to the building were unsuccessful. Teachers, unable to maintain peace in the halls, retreated to their classrooms where they tried

> to do their best with the students in their rooms. They kept the doors of their rooms closed, and many papered over their door windows to shut out the outside confusion." (1996, p. 2)

With help from CRESPAR, Patterson reorganized itself into a set of academies: one for ninth graders, and four career academies for students in grades ten through twelve. Results in the first year included better student attendance and a turnaround in teachers' ratings of the school climate. Subsequently, students' performance on math proficiency tests also improved (McPartland et al. 1998). These preliminary results suggest that career academies can improve student performance when combined with other elements in a schoolwide strategy.

The Role Of Career Academies

In Reconstructing American High Schools

Unfortunately, for many students high schools are not effective. The evidence is plain: only about three out of four high school freshmen graduate four years later –– no more than in the 1970s (Tyler and Lofstrom 2009). High school students' scores on the National Assessment of Educational Progress also have not improved over the past 30 years, and most graduates are not prepared to succeed in postsecondary education (Balfanz 2009; Roderick et al. 2009). Yet the great majority of high school students report that they are often bored in school (Stern 2009). These problems are well known, and have been well described many times before (Sizer 1984, 1992; Fine and Somerville 1998; Grubb 1995; Steinberg 1998; Stern et al. 1992).

So what is being done, and what is the possible role of career academies in reconstructing high schools? We describe two major ongoing efforts. One is the "college and career" movement, which focuses mainly on strengthening curriculum and combining conceptual learning with relevant practical experience. The other is the movement toward small schools and learning communities, which are intended to improve the relationships among students and teachers and create conditions for more effective teaching and learning. Career academies are contributing to both of these efforts.

Preparing students for both college and careers

Should all high school students be ready for college when they graduate? Or should some students focus on college preparation, while others prepare mainly for work after high school? These alternatives have been debated in the U.S. for more than a hundred years. Career academies steer a middle way through this debate, by offering to prepare students for both college and careers. The career academy approach is consistent with the goals of enabling more students to achieve high academic standards and go to college (see Kazis et al. 2004). It is also consistent with the goal of making high school more engaging and relevant to students' interests.

Career academies aim to provide the kind of academic preparation that will give as many students as possible the option of attending college. But the fact is that only about 30 percent of all 25-29 year-olds in the U.S. actually have completed bachelor's degrees (U.S. Digest of Education Statistics). So it makes sense that high schools should also give students some real preparation for the labor market, and career academies also do that. Career academies respect and encourage students' college aspirations and –– whether or not these aspirations are fulfilled –– the career academy also gives students some practical knowledge and skill to earn a living. This strategy is consistent with contemporary goals of career-technical education (CTE), as CTE has evolved from traditional vocational education.

Even students who are determined to go to the most selective four-year colleges can benefit from a career academy, because they can gain a better understanding of academic subjects when these subjects are applied to problems and situations in which the students are interested. Students who are interested in health and medicine can enroll in a health academy and gain additional insight into biology and chemistry by using them to perform actual lab tests. Students who like business and finance can gain more insight into mathematics by studying asset valuation models. Those with an affinity for engineering can find many applications for physics in the courses and internships they experience in an engineering academy.

It is important to emphasize that career academies do not require students to commit to a field of work for the rest of their lives. Students who graduate from a health academy, for example, might go on to college and major in English, engineering, or anything else. And these would all be considered successful outcomes.

Most high school students want to go to college. In fact, a large majority of high school students say they expect to earn at least a bachelor's degree. A national survey in 2002 found that 72 percent of high school sophomores expected to get at least a bachelor's degree, and 10 percent did not have definite expectations, so only 18 percent definitely did not expect to earn a bachelor's degree (Ingels et al. 2005). The percentage of high school students who expect to graduate from college has grown significantly since the 1980s. Between 1981-82 and 2003-04, the share of high school seniors who expected to attain at least a bachelor's degree nearly doubled, from 35 to 69 percent (Condition of Education, 2006).

Parents of high school students share these aspirations. Public Agenda asked in 1999, "When it comes to your own child, do you think a college education is something absolutely necessary to get, something helpful but not necessary, or not that important?" More than 6 out of 10 thought college was absolutely necessary, and only 3 percent said it was not that important.

Parents in minority communities want college for their children just as much as anyone else. In California, a 2006 poll by New American Media focused on racial/ethnic minority groups. Among those who had children in public schools, 80 percent of Latino parents, and 88 percent of African American parents, said they expected their children to earn a bachelor's or advanced degree.[7]

High school students and their parents have good reasons to think college is important. First, college is a great investment, financially. Many high-paying jobs require college degrees, so college graduates earn substantially more than high school graduates, on average. Of course, it takes time and money to get a college degree. But economists estimate that the yield on investment in a college education has generally been about 10 percent a year –– much better than putting money in a bank account! This payoff is very similar for males and females, and for all racial and ethnic groups (Barrow and Rouse 2005). The financial return to college degrees increased steadily since the 1980s, indicating strong and growing demand for college graduates in the labor market (Goldin and Katz 2008). So the college aspirations of high school students and their parents reflect basic economic facts.

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[7] http://media.newamericamedia.org/images/polls/edu_poll/nam_edu_poll.pdf

Money is not the only reason to go to college. A college education also produces other benefits. People who have been to college are generally healthier and live longer (Meara et al. 2008). College improves a person's ability to read, write, think, and understand the world. College graduates are more likely to vote, and to participate in the civic life of their communities (Kahne and Middaugh 2008).

College preparation was not the goal of traditional vocational education in U.S. high schools. The 1918 Smith-Hughes Act, which provided the first federal funds for vocational education, explicitly defined vocational education as preparation for occupations that did not require a bachelor's or advanced degree. That restriction remained in the federal definition for the rest of the 20th century, despite constant criticisms by social scientists from John Dewey in the 1920s and George Counts in the 1930s to Jeannie Oakes and others more recently –– that such "tracking" is inefficient and inequitable. During the 1980s, influential spokesmen for employers, traditionally strong advocates for vocational education, also began to question its efficacy in preparing students for a changing economy.

Congress responded to these criticisms in 1990 by redirecting federal support to "integrate academic and vocational education." In 2006, Congress finally eliminated the language that prevented CTE from preparing students for occupations requiring a bachelor's or advanced degree. Instead, federal law now defines CTE as providing "coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in current or emerging professions." (emphasis added)

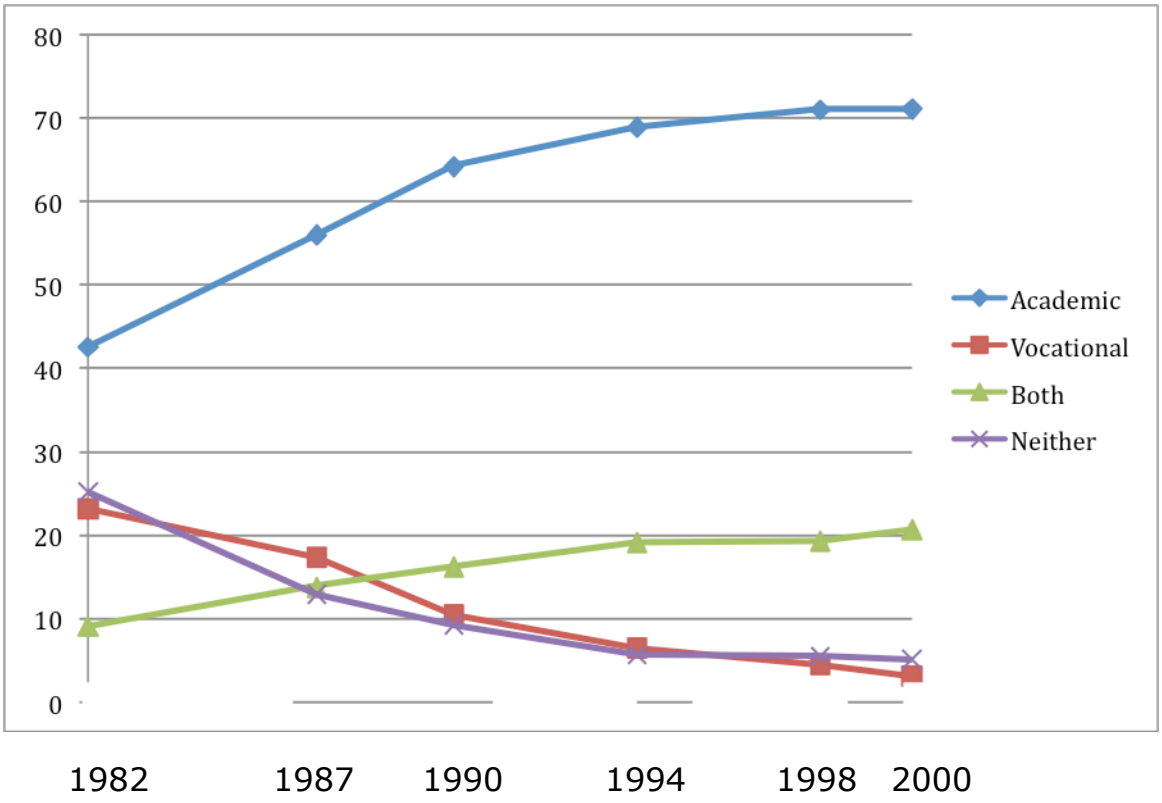
These changes in federal law mirror changes in practice. One of the most important efforts to promote a combined academic and career-technical curriculum is *High Schools That Work* (*HSTW*), led by Gene Bottoms (Bottoms and Presson 1995). The Southern Regional Education Board and a group of state partners launched this effort in 1987, "to prepare students for careers and further education by improving curriculum and instruction in high schools."[8] According to the website, "More than 1,200 *HSTW* sites in 32 states are using the framework of *HSTW* Goals and Key Practices to raise student achievement." One of those ten key practices is: "Teach more students the essential concepts of the college-preparatory curriculum by encouraging them to apply academic content and skills to real-world

[8] www.sreb.org/programs/hstw/hstwindex.asp

problems and projects." A second is: "Provide more students access to intellectually challenging career-technical studies in high-demand fields that emphasize the higher-level mathematics, science, literacy and problem-solving skills needed in the workplace and in further education."[9] Many of the high schools in the *HSTW* network use career academies to implement these principles.

Figure 1[10]

Trends in curricular concentrations during high school



[9] www.sreb.org/programs/hstw/background/keypractices.asp

[10] Source: National Center for Education Statistics, *National Assessment of Educational Progress, High School Transcript Study 2000,* table 2; published online only, at http://nces.ed.gov/nationsreportcard/hsts/tables/hsts002.asp (retrieved February 19, 2009). Students are defined as vocational concentrators if they earned at least three credits in a single specific labor market preparation field but had less than twelve credits in the core academic course areas of English, social studies, mathematics, and science.

The movement to combine career preparation with college preparation seems to be succeeding. Transcripts of the nation's high school graduates show a dramatic shift away from the traditional separation of academic and vocational education, toward combining CTE with a core academic curriculum. As seen in Figure 1, the share of high school graduates who completed both an academic and a CTE concentration jumped from 9 percent in 1982 to 21 percent in 2000. During that period, the share that completed a CTE concentration but did not take a full set of academic courses fell from 23 percent to 3 percent. Put differently, the percentage of CTE concentrators who also completed a full academic sequence rose from 28 to 88 percent! Almost all CTE concentrators now also complete the academic core curriculum.

The spread of career academies therefore can be seen as part of an expanding movement toward blending preparation for college and careers. As more high school students and their parents have recognized the value of postsecondary education, they have become more reluctant to pursue a traditional form of vocational education that did not lead to college, and have increasingly demanded a core academic curriculum along with CTE. Delivering that combination is what career academies are designed to do. Instead of directing some high school students toward college and others toward work, career academies and contemporary CTE aim to keep students' postsecondary options open.

Career academies offer college prep plus coursework and experience related to a field of work. This was a major focus of the federal School-to-Work Opportunities Act, which passed in 1994 and sunset five years later (Urquiola et al. 1997). Some of the central issues were succinctly stated by Olson (1997):

> "Today we teach students academic subjects out of context and then are perturbed when they ask, "Why do I have to learn this?" We hire young people without glancing at their high school transcripts and then wonder why they do not work harder in school. We sequester teens in high schools that are too big for them and then express dismay when they succumb to an adolescent peer culture. We tell young people to attend college to "get a job" but then offer little in the way of career guidance. We convince students that we are preparing them for the 'real world' but make their education as removed from the adult society as possible."

School-to-work programs attempted to make the high school curriculum more coherent and meaningful for students by creating various kinds of curricular pathways with career-related themes. Connections between the classroom and the work world were reinforced by providing opportunities for job shadowing, internships, and other kinds of work-based learning. Many school-to-work programs also sought to articulate high school courses with subsequent studies in two-year or four-year colleges.

Career academies predated the school-to-work movement and exemplified ideas that the school-to-work movement sought to generalize: using career-related themes to increase the coherence of the high school curriculum; providing internships and other forms of workplace experience to connect classroom learning to the world beyond school; and preparing students for careers that include postsecondary education. For these reasons, the 1994 School-to-Work Opportunities Act explicitly named career academies as one of the "promising practices" for preparing all students both for further education and for careers that require a solid academic foundation. This was the first mention of career academies in federal legislation, and it helped stimulate interest in them.

Small schools and small learning communities

The second major trend that has contributed to growth of career academies is the movement to create new small high schools and to divide large high schools into smaller learning communities (SLCs). From 2000 to 2008, the Bill & Melinda Gates Foundation and the U.S. Department of Education each invested about a billion dollars to promote small high schools and SLCs. In *High School for the New Millennium*, the foundation declared,

> "The Bill & Melinda Gates Foundation is committed to the concept that students should be able to choose from several small, innovative public high schools that offer a highly personalized, rigorous education and prepare every student for college, work, and citizenship. The foundation is partnering with communities across the country to promote the transition from large comprehensive high schools to smaller focused high schools. Grants fund both the startup of new small high schools as well as the conversion of large high schools into smaller, more personalized schools or learning communities. The foundation expects these new and revamped schools will offer families

> greater choice within the public school system and create models that can be replicated throughout the country." (p. 5)

The U.S. Department of Education summarizes its SLC grant program as follows:

> "The Smaller Learning Communities (SLC) program awards discretionary grants to local educational agencies (LEAs) to support the implementation of SLCs and activities to improve student academic achievement in large public high schools with enrollments of 1,000 or more students. SLCs include structures such as freshman academies, multi-grade academies organized around career interests or other themes, "houses" in which small groups of students remain together throughout high school, and autonomous schools-within-a-school, as well as personalization strategies, such as student advisories, family advocate systems, and mentoring programs." (http://www.ed.gov/programs/slcp/index.html)

As we reported above, career academies have been the most common approach used by schools receiving federal SLC grants. The movement for small schools and learning communities has clearly contributed to the spread of career academies.

The Coalition of Essential Schools (CES) has provided some of the original and continuing intellectual and organizational support for the small schools movement (Sizer 1984, 1992). The fundamental concerns of CES are to improve the intellectual, social, and ethical quality of life for students and teachers while they are in high school. Although a narrow vocationalism would be considered inimical to the goals of CES, career academies can in fact be found in a number of Coalition schools, and the kind of education offered by career academies has been endorsed in CES publications. For instance, Cushman et al. (1997) have written:

> "A career academy promises a meaningful context for students' academic work across disciplines, a culture of high expectations derived from real-world standards, and a structure and opportunity for exploring the world of adults. Ideally, in academic and real-world contexts, students explore and master equivalent sets of intellectual and practical skills. They may apply the analytic methods of different academic disciplines, for example, to the problems of the health care system, or they may study the physics of building an electric car. In the process, they also acquire a more real sense of the nature of different work

> roles than casual observation can provide. They come to appreciate the learning that happens in many work settings.” (p. 16)

In Boston, specifically, the authors observe that "school-to-career pathways or academies tend to attract ambitious students looking for a way to gain the academic background, mentoring, and real-world connections that will help them find a path into and through college to a career." (p. 18)

Because of their basic design, career academies are likely to fulfill several of the intellectual and ethical principles espoused by CES. Career-related themes give focus and coherence to the curriculum, encouraging the analytical depth denoted by the CES dictum "less is more." Giving students opportunities to test and deepen their understanding of academic concepts through practical applications and work-based learning in career academies promotes the CES principles of engaging students as active "workers" and using demonstrations of authentic mastery to assess student learning. The effectiveness of career academies in improving the academic performance of high-risk students demonstrates their compatibility with the CES principle of justice and equity.

Most obviously, the organization of career academies as small learning environments within larger high schools enables students and teachers to form the more personal and caring relationships that CES considers necessary for good teaching and learning (Sizer 1984, 1992; Meier 1996). The MDRC evaluation did find, in fact, that students in career academies receive more personal attention and support from teachers, compared to non-academy students (Kemple 1997). Conchas (1998) has found that the feelings of affinity created among students in an urban career academy were strong enough to overcome animosities among different racial and ethnic groups which caused problems in the rest of the school.

The enthusiasm for small schools or small learning communities within large schools is shared not only by members of CES. Prominent researchers and educational authorities also promoted this idea (Darling-Hammond 1996; Noddings 1992; Sergiovanni 1994; National Association of Secondary School Principals 1996). Advocates urged the creation of new small schools and the breaking up of large schools into self-contained subunits (Fine 1994; Fine and Somerville 1998; Raywid 1995; Oxley 1989). For example, Fine wrote:

> “Across the country there is a revolution happening within the

> field of schooling. In urban areas, as well as suburban and rural communities, educators and parents are demanding, creating, and struggling to sustain small, neighborhood-based schools as schools of choice. There is growing literature, both scholarly and popular, that substantiates the positive effects of such small schools. We know that big schools often have harmful effects on many students, teachers, and parents, and that given the right conditions ... small schools can create an academic climate in which a sense of belonging and rich teaching and learning can flourish." (Fine and Somerville 1998, p. 2)

The small schools movement has given additional impetus to the spread of career academies, as one type of smaller learning environment. Some new small schools located in their own buildings may choose to organize their curricula around career-related themes. And, as we have seen, in large high schools that have been subdivided into smaller units, many of the new SLCs have been designated career academies.

Future Prospects

Over the past 40 years, career academies have established themselves as a replicable model that can produce significant benefits for students during high school and for years afterward. Career academies have been found to provide effective preparation for college and careers. State and federal policies are increasingly geared to preparing all students for postsecondary education. But the fact is that, in the foreseeable future, most students still will not complete college degrees. In this context, career academies maximize students' options by providing college preparation plus career-related coursework and experience. "College prep plus" could be a good shorthand description of what career academies offer. It seems likely that the number of career academies will continue to grow, as a proven model for promoting "college and career readiness."[11] Cost-benefit analysis by Belfield and Levin (2007) indicates that investing in

[11] As of 2010, the Obama Administration's Race to the Top initiative gives top priority to developing college and career readiness standards and assessments. In California, the James Irvine Foundation is sponsoring a major initiative to provide "linked learning" pathways that combine college preparation with career-technical courses, work-based learning, and extra support for students (see Oakes and Saunders 2008).

career academies would yield a high payoff to taxpayers.

Looking ahead, some questions still remain open. One is whether dividing large high schools into smaller learning environments, including career academies, actually will produce substantial benefits for students. The evaluations of career academies have studied situations where there were only one or two career academies within a larger school. The evaluation of Talent Development High Schools so far has found positive impacts for the freshman success academies, but the impacts of the career academies in grades 10-12 have not yet been measured (Kemple and Herlihy 2004). An evaluation of the Gates Foundation's high school initiative found students' academic performance was lower in schools that had been divided into smaller learning communities than in small schools that were started from scratch, but that evaluation did not attempt to control for possible selection bias, and did not distinguish between career academies and other small learning environments (American Institutes for Research 2006).

There are several reasons why the benefits of career academies or other small learning communities may not generalize when applied schoolwide. As we have already mentioned, one or two academies or SLCs within a larger high school may recruit students with relatively high levels of motivation, but if all students are enrolled in SLCs this would not be possible. Similarly, a single academy or SLC in a larger high school may attract relatively innovative and enthusiastic teachers, but if such teachers are in limited supply the results of their work would not be generalizable to an all-SLC high school.

Even if an academy or SLC in a school with only one or two SLCs does not recruit students or teachers who possess any special qualities, the mere fact that students and teachers choose to join the academy or SLC tends to create an esprit de corps that helps boost student achievement. If all students and teachers are told they must join an academy or other small learning environment, the element of voluntarism may be lost. Naysayers within the SLCs may undermine their effectiveness. Rivalries among SLCs also may threaten morale (Muncey and McQuillan 1996).

For career academies or other SLCs that require the active collaboration of employers or other community members or organizations, expanding to the entire high school may overload local capacity to provide internships, service learning opportunities, or other experiences outside the classroom. This would dilute the effectiveness of the career academies or other such programs.

Another question is whether applying career academies or other SLCs schoolwide would produce a new form of tracking. For instance, students in the most advanced classes might gravitate to the same academy or SLC, creating a hierarchical ordering among the academies and SLCs in the high school. As in traditional forms of tracking, the potential danger is that students in the less prestigious academies or SLCs would be systematically short-changed as teachers expected less of them (Oakes 1985; Mosteller et al. 1996). On the other hand, schools could monitor enrollment trends and intervene to prevent such results. Moreover, the fact that career academies and other thematically defined SLCs recruit students and teachers who share some common interest may make it easier to ensure that each academy or SLC enrolls students who represent a cross-section of the entire school.

In sum, rigorous evaluations have found that individual career academies within larger high schools help improve students' academic performance, prepare them for postsecondary education, and boost earnings after high school. The number of career academies in high schools around the country has grown to about 7,000. Increasing numbers of high schools are now grouping all students and teachers into career academies or other kinds of small learning communities. Whether subdividing an entire high school into career academies or other small learning environments improves students' academic performance and reduces the number of dropouts is not yet known. This is one of the main questions on the frontier of knowledge about how best to redesign American high schools.

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