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ABSTRACT

Since 1982, studies have shown statistical evidence that career and technical education (CTE) can play a role in reducing the number of high school dropouts, especially among students who are at high risk of dropping out. Case studies at several High Schools That Work sites showed improvements in retention and graduation at the same time that academic achievement and graduation requirements were increased. Strong evidence that CTE can help reduce dropout rates also comes from studies of career academies. In particular, statistical evidence seems strongest when CTE involves an emphasis on learning both academic and CTE knowledge and skills. (18 references) (AJ)

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Dropouts and Career and Technical Education

by Michael E. Wonacott
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It is widely held that career and technical education (CTE) can help enhance at-risk students' engagement in high school and reduce dropout. But what do the statistics show? Does CTE in fact reduce the secondary dropout rate? This *Myths and Realities* reviews the research on approaches with a CTE component, such as school-to-work (STW), High Schools that Work, and career academies, to compare popular expectations and actual outcomes of CTE for secondary students at risk of dropping out.

Dropouts and CTE

In October 2000, the overall picture of high school dropouts had changed little since the late 1980s (Kaufman et al. 2001): For every 100 young adults enrolled in high school in October 1999, 5 had left school without completing a program; of 34.6 million U.S. young adults aged 16-24, 3.8 million—almost 11 percent—had not completed high school and were not enrolled. Some studies have shown that students in schools with a concentration of multiple risk factors (e.g., large schools, large classes, high poverty, inner city location) have less than one chance in two of graduating from high school; furthermore, the economic costs of dropping out have increased as time goes on (Castellano et al. 2001). Adjusting for 50 years of inflation, young male college graduates at the end of the 1990s earned about one and half times as much as their peers in 1949, but the young male high school dropout earned less than half as much as his counterpart.

The conventional wisdom that CTE is one solution to the problem of dropouts is made clear in one statewide evaluation of STW (Schug and Western 1999). In telephone interviews, most randomly selected school district curriculum directors reported a belief that STW had beneficial effects on student outcomes like high school completion, but all 45 agreed that there was not reliable information on achievement, attendance, or completion rates. Another statewide study (Brown 2000) noted that state systems for collecting and reporting Tech Prep outcomes were poorly developed, perhaps because they were not required in the Tech Prep Education Act (Title III-E of Perkins II). So it would seem that the question remains: Is CTE one solution to the dropout problem or not?

Early Statistics on the Effectiveness of CTE

In fact, for some time there has been statistical evidence that CTE can play a role in reducing dropout. Mertens et al. (1982) analyzed data from the New Youth cohort of the National Longitudinal Surveys of Labor Force Behavior and found a very small (about 0.1 percent) but statistically significant effect of vocational education in reducing the likelihood of dropping out, particularly for at-risk students. Perlmutter (1982) compared secondary retention in a large urban school district among matched groups of students who applied to vocational high schools and were admitted (Vocational Controls), those who applied but were not admitted (Targets), and those who had not applied (Academic Controls). After 1 semester, 18 percent of the Targets had dropped out—but none of the Vocational Controls. After 5 semesters, Vocational Controls had the highest retention rate in district schools (73.7 percent), followed by Academic Controls (68.7 percent) and Targets (58.5 percent). Furthermore, when both Targets and Academic Controls received any occupational training in academic high schools, they showed better retention rates.

In a review of research, Boesel et al. (1994) noted that descriptive findings indicated that vocational students were less likely than general students to drop out (if more likely than academic students). However, students who defined themselves as vocational students in 12th rather than 9th grade in a follow-up survey or who were defined by having a vocational concentration were often much less likely to drop out than general students or nonvocational students (i.e., academic and general combined). Two matched group comparison studies, including Perlmutter (1982), also showed a vocational student dropout rate of only half (or less) the dropout rate of nonvocational students. Although regression analyses in seven different studies (including Mertens et al. 1982) showed a mix of methodology, detail reported, effect size, statistical significance, and conclusions, Boesel et al. concluded, with reservations, that CTE did appear to reduce the likelihood of dropping out.

A Trend in More Recent Statistics

A number of studies since Boesel et al.'s (1994) review have supported the conventional wisdom the CTE can reduce dropping out among high school students. For example, Hayward and Tallmadge (1995) evaluated 12 Perkins Cooperative Demonstration Program sites (total n = 1,430 students) using either random assignment (9 sites) or matched comparison group (3 sites) design; sites with a significant reduction in dropping out (4 of 12 sites) demonstrated coordinated, integrated vocational and academic education leading both to *good* entry-level employment and postsecondary education, among other critical components. Similarly, Stern et al. (1998) cited 10 studies with findings of higher graduation rates or lower dropout rates for career academy students than students in comparison groups—for example, 1-year career academy dropout rates of 2-6 percent as opposed to 10-21 percent in comparison groups in the mid-1980s or 92 percent graduation rate for academy students in one district compared to 82 percent districtwide in the late 1990s. Hughes et al. (2001) cited four studies showing reduced dropout rates for STW students, especially high-risk students.

Case studies of a number of High Schools That Work sites showed improvements in retention and graduation at the same time that academic achievement *and* graduation requirements were increased (*Publications and Materials: Case Studies* n.d.). For example, over 7 years, the dropout rate at Gilmer County High School (Glenville, West Virginia) decreased from 3.4 to 2.9; in the 4 years from 1995-96 to 1998-99, the graduation rate at Loganville High School in Georgia increased from 67 percent to 81 percent and the dropout rate decreased from 8 percent to 3.2 percent; and in the two years from 1992-93 to 1994-95, North Laurel High School's (London, Kentucky) dropout rate declined from 9 to 8 percent. Even more impressive, the dropout rate for grades 7-12 at Randolph County Vocational Technical Center, Elkins, West Virginia, was 20 percent in 1987; by 1996-97, it had fallen to less than 2 percent. Equally, the dropout rate at Swansea High School (South Carolina) was 8 percent in 1992; by 1997, it had fallen to 2 percent. Walhalla High School (South Carolina) reported a decline in the dropout rate from 3.7 percent in 1987-88 to 2.3 in 1997-98.

Two statewide studies have also compared Tech Prep and non-Tech Prep student outcomes. MacQueen (1996) found that 12th-grade Tech Prep Associate Degree (TPAD) and similar non-TPAD students graduated from 24 selected Rhode Island high school at essentially the same rates (84.5 percent TPAD, 86.1 percent non-TPAD). Brown (2000) compared 247,778 Texas Tech Prep students in five cohorts to non-Tech Prep CTE students and all other students. Tech Prep dropout rates were consistently lower (1.3 percent declining to 1.0 percent) than those of the other two groups (2.2 percent declining to 1.4 percent for non-Tech Prep CTE, 1.8 percent declining to 1.6 percent for all other); Tech Prep dropout rates remained superior when disaggregated for white, Hispanic, African-American, at-risk, and economically disadvantaged subpopulations.

In contrast, a random assignment study of graduation rates at 59 career magnet programs (Crain and Thaler 1999) compared outcomes for

9,176 applicants who were either granted or denied admission based on a lottery. Comparing schools, some career magnets had better graduation and dropout rates than comprehensive high schools—but some had worse. And comparing applicants after the fourth year of high school, 26 percent of lottery winners had graduated and 14 percent had dropped out, compared to 31 percent and 11 percent, respectively, of lottery losers.

Strong Evidence of CTE Effectiveness

Strong evidence that CTE can help reduce dropout rates comes from studies of career academies. Maxwell and Rubin (2000) studied three cohorts of students in a single large urban school district and found that career academy students dropped out at less than half the rate of nonacademy students (7.8 versus 18 percent); they concluded that career academies affect dropout and graduation rates *indirectly* by increasing knowledge and skills (as reflected in GPA), which in turn increases the likelihood of graduating. Likewise, Elliott et al. (2001) compared two graduating cohorts of Junior Reserve Officer Training Corps Career Academy (JROTCCA) students with matched, site-specific comparison groups of students enrolled in (1) other magnet school or non-JROTC career academies, (2) noncareer academy JROTC programs, or (3) general academic programs. In one cohort, 52 percent of JROTCCA students graduated, compared to 28 percent of noncareer academy JROTC and 29 percent of general academic students; in the other, 53 percent of JROTCCA students graduated, compared to 38 percent and 28 percent, respectively. Differences were even greater when comparing students who graduated from their original high school with a final GPA of 2.0 or higher: 34 percent JROTCCA compared to 13 percent noncareer academy JROTC and 14 percent general academic in one district; 35 percent compared to 15 percent and 13 percent in the other.

Last, in a multisite, multiyear evaluation of nine high schools and their career academies (Kemple and Snipes 2000), students (n=1,764) who applied to career academies were randomly accepted or denied admission using a lottery; findings on persistence aggregated across all students showed only slightly improved outcomes for career academy students. However, disaggregating findings revealed that for students at high risk of dropping out, dropout rates were substantially reduced (21 percent for academy students, 32 percent for nonacademy students) and on-time graduation rates substantially increased (40 and 26 percent, respectively). Discrepant findings in a subsequent report resulted from differences in the samples used; "Analyses conducted for the current report indicate that the Academies reduced dropout rates and increased on-time graduation rates for high-risk students in this portion of the School Records sample by a statistically significant amount" (Kemple 2001, p. 32).

Perhaps most convincingly, Plank (2001) analyzed National Education Longitudinal Study of 1988 (NELS:88) data on 11,352 students of whom 12.28 percent had dropped out of high school at some point between March 1989 and Spring 1992. Using regression analyses to control for prior achievement, grades, race/ethnicity, gender, and socioeconomic status, Plank found that the risk of dropping out was highest when students took *no* CTE courses and lowest when students completed 3 Carnegie units in CTE subjects for every 4 Carnegie units of academic subjects; when students took *more* than 3 Carnegie units in CTE subjects for every 4 Carnegie units of academic subjects, the risk of dropping out rose again slightly. In particular, a high-risk student with no CTE courses was about four times as likely to drop as a high-risk student with a 3:4 CTE/academic course-taking ratio.

So, there appears to be solid statistical evidence that actual CTE outcomes match popular expectations—CTE actually does play a role in reducing dropouts, especially among students who are at high risk of dropping out. In particular, statistical evidence seems strongest when CTE involves an emphasis on learning in *both* academic and CTE knowledge and skills.

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