

CCRC BRIEF

NUMBER 37

FEBRUARY 2008

Dual Enrollment Students in Florida and New York City: Postsecondary Outcomes

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Dual enrollment programs enable students to take college courses and earn college credit while in high school. Once limited to high-achieving students, these programs are now seen as a means to support the postsecondary preparation of average-achieving students. Moreover, though dual enrollment programs typically have been reserved for academically-focused students, increasing numbers of career and technical education (CTE) programs are making them available to their students. Despite the popularity and growth of dual enrollment programs, there has been little research on their impact on students' preparation for, and success in, postsecondary education.

This Brief summarizes a study conducted by the Community College Research Center (CCRC) that was designed to fill that research gap. Our investigation sought to assess the effectiveness of dual enrollment programs in promoting high school graduation and postsecondary achievement. We examined the influence of dual enrollment program participation on students in the State of Florida and in New York City, compared to students who did not participate, with a specific focus in both locations on CTE students. In Florida, we also considered all student participants. Our study provides evidence suggesting that dual enrollment is an effective strategy for encouraging postsecondary success for all students, including those in CTE programs.

Dual Enrollment

Dual Enrollment and Its Presumed Benefits

Dual enrollment programs are collaborative efforts between high schools and colleges that allow high school students (usually juniors and seniors) to enroll in college courses. They provide a challenging academic experience and the opportunity to earn college credit prior to high school graduation. Dual enrollment students take actual college courses, often on a college campus, that are taught by college professors or high

school teachers certified as college adjuncts. The courses vary in their eligibility requirements and target populations. Sometimes these variations are regulated by state policies; other times, program structure is determined through cooperative agreements between the partnering institutions.

Dual enrollment is presumed to lead to many positive outcomes for participating youth, by increasing the academic rigor of the high school curriculum, helping students acclimate to college, and reducing the cost of college. Dual enrollment programs have existed for many years but have typically targeted only the most advanced students. Now it is argued that dual enrollment may also help middle and low achievers. Dual enrollment may reduce high school dropout rates and increase student aspirations, and decrease the amount of remediation needed by college entrants (American Association of State Colleges and Universities, 2002; Boswell, 2001; Martinez & Bray, 2002).

The broadened view of the benefits of dual enrollment has set the stage for expansion of the program to CTE students — who in previous eras may have been seen as not needing to be prepared for college — since it reflects the goals of a variety of CTE reforms. Dual enrollment helps upgrade the CTE curriculum with high-level academic and technical experiences, thereby preparing students for a postsecondary education, an increasingly necessary prerequisite for workplace success. It also enables high schools to offer students CTE opportunities without having to invest in costly technical equipment.

Still, because of the limited availability of comprehensive data and the lack of rigorous evidence, little is known about whether dual enrollment can increase students' postsecondary attainment (Bailey & Karp, 2003; Lerner & Brand, 2006).

Extent of Student Participation

Information on student participation in dual enrollment is only beginning to be collected, but program-level data indicate that participation is increasing: 71 percent of U.S. high schools and 57 percent of U.S. postsecondary institutions permitted high school students to take college courses in 2002-03 (Waits, Setzer, & Lewis, 2005). In total, 813,000 secondary school students took a college-credit course during the 12-month 2002-03 school year (Kleiner & Lewis, 2005). In 2006, 42 states had policies on dual enrollment (Western Interstate Commission for Higher Education, 2006), and some of them are considering

revisions that would make dual enrollment accessible to more students. At the federal level, the Secretary of Education's Commission on the Future of Higher Education has expressed support for the expansion of dual enrollment programs.

The Study

We used quantitative methods to examine the outcomes of dual enrollment participation for students in two large, well-established programs, one in Florida and one in New York City. Our research questions included the following:

- (1) What are the short-term effects of participation in a dual enrollment program, for all students and for CTE students, as measured by high school graduation and college enrollment rates?
- (2) What are the program participation effects for all students and for CTE students on initial entry into postsecondary education, such as enrollment intensity, first-semester grade point average (GPA), and persistence to the second semester?
- (3) What are the long-term effects of participation for all students and for CTE students, as measured by their persistence into the second year of postsecondary education, GPA, and credit accumulation?
- (4) Do program effects vary by high school achievement, gender, socioeconomic status, or number of dual enrollment courses taken?

To answer these questions, we analyzed Florida and New York City datasets using non-experimental methods, including ordinary least squares and logistic regressions. The New York City dataset included 2,303 records; the Florida dataset, 299,685 records. The New York dataset included only students who attended one of New York City's 19 vocational high schools and enrolled in the City University of New York (CUNY) after graduation. In contrast, the Florida dataset had records for all students enrolled in a Florida public high school, whether or not they were CTE students.

The longitudinal nature of the data enabled us to control for many preexisting student characteristics. Limiting analyses to only CTE students provided an additional level of control for preexisting characteristics, because both CTE dual enrollment students and their non-participating peers had technically-oriented goals while in high school. Although we assumed that these students were similar to one another in terms of motivation, career and academic aspirations, and high school experiences, it is important to note that the restriction of the sample to only CTE students does not necessarily eliminate all preexisting differences. Future research should seek additional control variables, as well as use experimental and quasi-experimental designs to establish a causal relationship between dual enrollment participation and educational outcomes.

Analysis: Florida

Florida has a longstanding statewide dual enrollment program that is supported by state legislation. All high school students in the state who meet eligibility criteria (a 3.0 GPA and passing the appropriate college placement exam for general education courses) must be offered the opportunity to participate in dual enrollment.

Methodology

The State of Florida maintains a comprehensive student unit-record system for all students enrolled in the public education system; it tracks students over time and across secondary and postsecondary public institutions in Florida. CCRC had access to student records for the 2000-01 and 2001-02 high school graduating cohorts.

The state does not identify students as CTE concentrators, so we relied on the National Center for Education Statistics' definition of occupational concentrators: those who had completed three or more credits in a Specific Labor Market Preparation (SLMP) area (such as Technology and Communications, Health Care, or Business).

We analyzed the correlation between participation in dual enrollment and subsequent matriculation into, and persistence in, Florida postsecondary institutions, using the following outcome variables: high school diploma, postsecondary enrollment, full-time enrollment, State University System (SUS) enrollment in first term (indicating enrollment in a four-year institution), first-year GPA, cumulative postsecondary GPA, persistence to second term, persistence to second year, and postsecondary credits earned three years after high school graduation. We conducted the analyses twice, once for all students in the state (to determine the effect of dual enrollment participation generally) and once for only students in CTE programs (to determine the effect of dual enrollment participation for this sub-group of students). Then, because some researchers suggest that dual enrollment programs spanning multiple semesters may better improve outcomes for middle-achieving students, we conducted a second set of analyses that accounted for participation intensity — the number of dual enrollment courses taken by a student.

Student Characteristics

Overall, dual enrollment students were more likely to be female and White than non-participants. They were less likely to be Black or Hispanic, to be labeled as Limited English Proficient, or to have been eligible for free or reduced lunch in middle school. Not surprisingly, given the state's eligibility requirements, dual enrollment students had higher grade point averages in high school than non-participants.

Dual enrollment CTE students were also more advantaged than their non-dual enrollment peers. It is possible that dual enrollment students participated in CTE programs that were focused on high-technology or high-skill occupations such as computer networking or

Table 1.
Regressions of Dual Enrollment Participation on Selected Outcomes in Florida

	Short-Term Outcomes			Long-Term Outcomes		
	Postsecondary Enrollment after HS	Persistence to the Second Term	First Year Grade Point Average	Persistence to the Second Year	Cumulative Grade Point Average	Postsecondary Credits Earned in Three Years
All students:						
Dual Enrollment Participation	0.168*** (0.009)	0.045*** (0.005)	0.215*** (0.014)	0.054*** (0.006)	0.203*** (0.012)	15.173*** (0.482)
Observations	217,466	127,623	128,295	127,623	128,295	127,623
Pseudo R-squared	0.137	0.069	0.245	0.077	0.286	0.288
CTE students:						
Dual Enrollment Participation	0.181*** (0.017)	0.042*** (0.010)	0.262*** (0.026)	0.052*** (0.011)	0.243*** (0.024)	15.227*** (0.875)
Observations	31,056	18,573	18,601	18,573	18,601	18,573
(Pseudo) R-squared	0.144	0.061	0.182	0.072	0.218	0.256

Notes: Robust standard errors are in parentheses. *** Significant at 1%.

Depending on the outcome, either a logit or ordinary least squares (OLS) regression was used to estimate the impact of dual enrollment participation. Control variables commonly include student demographics (e.g., gender, race/ethnicity, cohort year, disability, limited English proficiency, free/reduced lunch program eligibility), high school GPA, and high school characteristics (e.g., proportions of Black and Hispanic students, charter school, school grade, location, pupil-to-teacher ratio, median household income of residents, proportion of residents with college or higher education).

engineering, which have often encouraged college enrollment, while non-dual enrollment students participated in more traditional CTE fields with less well-developed college connections. These differences may also reflect state requirements for dual enrollment participation or student motivations and college aspirations. CTE dual enrollment students were more likely than their peers to be female or White, and they were less likely to be Black or Hispanic, to have a disability, to be labeled as Limited English Proficient, or to receive free or reduced lunch in middle school. Lastly, they had higher GPAs than their non-participating peers.

Findings

Our findings showed, generally, a positive relationship between dual enrollment participation and short- and long-term outcomes for both the full sample and the CTE sub-sample, after accounting for students' preexisting characteristics (see Table 1).

Short-Term Outcomes

- **Dual enrollment was positively related to students' likelihood of earning a high school diploma.** Dual enrollment students in the full sample were 4.3 percent more likely than their peers to earn a diploma; CTE students were 1 percent more likely (not shown).
- **Dual enrollment was positively related to college enrollment for both the full sample and the CTE sub-sample.** Participation was also associated with an increase in the likelihood of a student's initial enrollment in a four-year institution (by 7.7 percent for all students and 8.6 percent for CTE students, not shown). For students who enrolled in postsecondary education, dual enrollment participation was also positively related to their likelihood of enrolling full time.

- **Dual enrollment students in the full sample and in the CTE sub-sample were statistically significantly more likely to persist in college to a second semester:** 4.5 percent for the full sample and 4.2 percent for the CTE sub-sample.
- **Dual enrollment students also had statistically significantly higher postsecondary GPAs one year after high school graduation.** The difference ranged from as low as 0.21 points for all students to as high as 0.26 points for CTE students only.

Long-Term Outcomes

- **Of students who enrolled in postsecondary education, dual enrollment participation was positively associated with their likelihood of remaining enrolled two years after graduating from high school.** For the full sample, dual enrollment students were 5.4 percent more likely than non-participants to be enrolled. Dual enrollment CTE students were 5.2 percent more likely to be enrolled than CTE students who were not dual enrollment participants.
- **Dual enrollment students' cumulative college GPAs three years after high school graduation were statistically significantly higher than those of their non-participating peers,** demonstrating that the relationship between dual enrollment participation and grade point average continued throughout students' postsecondary careers.
- **Dual enrollment students earned more postsecondary credits three years after high school graduation than non-participants.** For the full sample, dual enrollment students earned 15.1 more credits than their non-dual enrollment peers. CTE dual enrollment students earned 15.2 more credits. Although some of these credits

Table 2.
Regressions of College Now Participation on Selected Outcomes at CUNY

	Short-Term Outcomes			Long-Term Outcomes		
	Pursuing a Bachelor's Degree	Persistence to the Second Term	First Term Grade Point Average	Persistence to the Second Year	Fourth Term Grade Point Average	Postsecondary Credits Earned in Three-and-a-Half Years
College Now Participation	0.097*** (0.029)	0.010 (0.020)	0.133* (0.066)	0.049 (0.039)	0.026 (0.044)	10.648*** (3.649)
Observations	1,960	1,994	1,703	1,994	1,818	1,994
(Pseudo) R-squared	0.226	0.025	0.127	0.043	0.153	0.222

Notes: Robust standard errors are in parentheses. * Significant at 10%; *** significant at 1%. Depending on the outcome, either a logit or ordinary least squares (OLS) regression was used to estimate the impact of College Now participation. Control variables commonly include student demographics (e.g., gender, race/ethnicity, cohort year, age), college admissions average, socioeconomic status (e.g. median household income of residents, proportion of residents with college or higher education), and high school characteristics (e.g., proportions of Black, Hispanic, and free/reduced lunch students; pupil to teacher ratio).

were likely earned through dual enrollment, it is probable that some were earned after matriculation into postsecondary education.

We found that participation intensity — the number of dual enrollment courses taken — had little impact on short- and long-term outcomes in Florida, however. The statistically significant effect of dual enrollment participation compared with non-participation generally remained the same, regardless of whether students took one, two, three or four, or five or more dual enrollment courses.

Analysis: New York City

New York City's public university system, the City University of New York (CUNY), has a long-standing dual enrollment program, College Now. Every two- and four-year college in the CUNY system and nearly 300 high schools are involved. Between 2001 and 2006, 113,796 students participated in College Now.

Methodology

The data collected from College Now came from two sources, the College Now office and the City University of New York's Office of Institutional Research, and comprised students who graduated from a vocational high school and enrolled in CUNY in 2001 and 2002. The dataset included demographic variables, College Now courses taken by students and grades earned, information on students' high school academic performance, and semester-by-semester information on credits attempted, credits earned, and grades in all courses taken throughout the CUNY system.

The analyses examined the correlation between participation in College Now and matriculation into and persistence in CUNY for CTE students. We ran each regression for the entire sample, comparing students with any participation in College Now with their nonparticipating peers. Then, as with Florida, we conducted a second set of analyses that accounted for students' participation intensity.

Student Characteristics

College Now students were more likely than non-participants to be female, Black, or Asian. They also had higher CUNY College Admissions Averages. They were less likely to be White or Hispanic. Both CTE and non-CTE students came from neighborhoods with similar household incomes and education levels.

Our sample, focused as it was on CTE students, differed demographically from the broader College Now population, although both groups came from neighborhoods with similar household incomes and education levels. According to internal CUNY Office of Academic Affairs analyses, 60 percent of associate degree and 65 percent of bachelor's degree College Now students who entered a CUNY institution in 2002 were female, higher than the percentage of female students in our sample. Likewise, our sample had a higher percentage of Black students and a lower percentage of White students. The College Admissions Average of the College Now CTE students (78.3) was higher than that of all College Now participants entering associate degree programs (74.5), but lower than that of College Now participants entering bachelor's degree programs (82.3). Thus, it is important not to generalize our findings to College Now overall, as they pertain only to students entering CUNY from the 19 vocational high schools, who may differ from other New York City students in a variety of ways.

Findings

We found positive short- and long-term outcomes of dual enrollment participation by CTE students in New York City (see Table 2), though not as consistently as in Florida.

Short-Term Outcomes for CTE Students

- **College Now participants were more likely than their peers to pursue a bachelor's degree.** Specifically, they were 9.7 percent more likely than their peers to pursue a bachelor's degree as opposed to an associate degree.

- **Program participation was positively related to students' first-semester GPAs.** Participants had first-term GPAs 0.133 points higher than those of non-participants. The positive relationship between College Now participation and first semester GPA seems to reflect the impact of taking two or more courses rather than of participation more generally.
- **Students who took two or more College Now courses were 3.5 percent more likely to enroll in college full time than non-participants,** whereas students who took only one course were no more likely to do so (not shown).

Long-Term Outcomes for CTE Students

Differentiating those students taking one, or two or more, dual enrollment course appears to be important for long-term outcomes, at least for the students in this sample. The long-term outcomes variables were positively related to College Now participation, once participation intensity was taken into account.

- **Participation was positively related to students' overall progress toward a degree.** Three-and-a-half years after their initial postsecondary enrollment, College Now participants had earned significantly more college credits than their non-participating peers. This effect is stronger for students who participated in two or more courses.
- **Participation in two or more College Now courses was associated with statistically significantly higher GPAs after four semesters,** whereas taking only one course did not have a statistically significant effect (whole sample result shown).
- **However, participating in only one course was positively associated with persisting to the second year of postsecondary education, whereas taking two or more courses did not have an effect.** This is contrary to our hypothesis that more intense participation will have a greater effect (whole sample result shown).

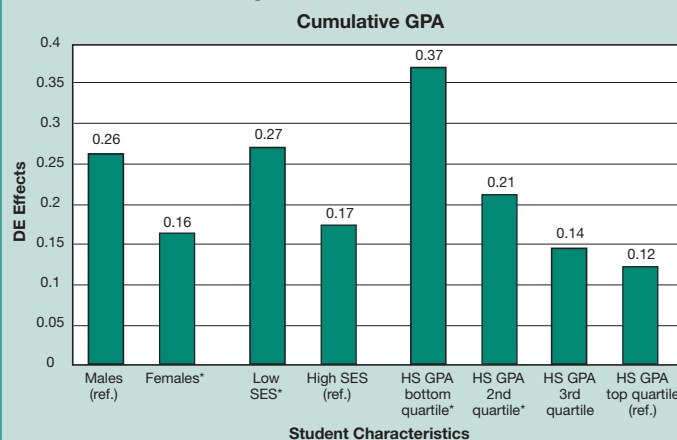
Outcomes for Sub-Groups

Part of the argument for expanding access to dual enrollment programs relies on an assumption that some types of students, particularly low-income or low-achieving students, may benefit from early exposure to the demands of college courses. This argument is based on evidence that these groups typically have less positive postsecondary outcomes than their more advantaged peers and on a desire to help eliminate gaps in college achievement.

Thus we ran separate regressions of the impact of dual enrollment for each of three sub-groups and then tested whether each group demonstrated similar marginal effects. Our analyses focused on differences in terms of gender (since males are increasingly underrepresented in higher education), high school achievement, and socioeconomic status.

Given the limited size of our New York City sample, we could examine outcome differences only in terms of gender. We found no significant differences between males and females. In Florida we were able to run analyses for all of the sub-groups and found that, in many cases, male and low-income students benefited more from dual enrollment participation than their peers. For example, three years after high school graduation, students from low-income backgrounds who participated in dual enrollment had GPAs that were 0.27 points higher than their low-income peers who did not participate. High-income dual enrollment students had college GPAs that were 0.17 points higher than high-income non-dual enrollment students. This difference (0.27 versus 0.17) is statistically significant, indicating that dual enrollment has a bigger influence on college GPA for low-income students (Figure 1 shows results for all sub-groups). On some measures, students with lower high school grades also benefited to a greater extent than students with higher grade point averages. Further, on some measures, these sub-group differences were true for both the full sample and the CTE sub-sample; on other measures, the differences were found only for the full sample.

Figure 1.
Varied Effects of Dual Enrollment Programs on Cumulative GPA Three Years after High School Graduation among All Students in Florida



Notes: * A difference in DE effects between one group and a reference group is significant at the 5 percent level.

DE effects are computed from separate OLS regressions by gender, socioeconomic status (SES), and high school GPA quartiles. Control variables commonly include cohort year, disability, Limited English Proficiency (LEP), proportions of Black, Hispanic, and free/reduced lunch students, charter school, school grade, median household income of residents, proportion of residents with college or higher education, and location.

These are encouraging findings. Males, low-income, and low-achieving high school students all appear to benefit from participation in dual enrollment to a greater extent than their dual enrollment peers who enter college courses with more social, economic, and educational advantages. These findings indicate that dual enrollment can benefit a range of students, and may have the greatest positive impact on those students who are often excluded from participation.

Conclusion and Recommendations

The findings provide an encouraging, though not definitive, picture of dual enrollment as a strategy for promoting student access to and persistence in postsecondary education. The positive association between dual enrollment participation and postsecondary outcomes is particularly strong for groups who are struggling in postsecondary education, especially males and low-income students. We would, however, urge that additional research be conducted to further establish the efficacy of dual enrollment as a promising high school and CTE reform strategy and to better understand which groups of students may benefit most from dual enrollment participation.

The study findings lead to recommendations pertaining to two separate arenas: dual enrollment and CTE reform. In both, policy and programming may be influenced by the positive relationship found between dual enrollment and student outcomes.

Dual Enrollment

- (1) **Expand currently restrictive eligibility requirements for dual enrollment**, since program participation can benefit a range of students.
- (2) **Consider creation of dual enrollment sequences**, since study findings suggest that students may benefit from taking more than one dual enrollment course.
- (3) **Expand outreach to underserved populations and provide dual enrollment courses tuition free for low-income students** (if not for all students), in order to ensure that they are able to take advantage of dual enrollment opportunities.

CTE Programs

- (1) **Expand dual enrollment options for CTE students**, particularly in places where these students are not currently offered dual enrollment opportunities.
- (2) **Continue to integrate dual enrollment into CTE pathways and programs.**

References

- American Association of State Colleges and Universities. (2002). The open door: Assessing the promise and problems of dual enrollment. *AASCU State Policy Briefing*, 1(1), 1–10.
- Bailey, T., & Karp, M. M. (2003). *Promoting college access and success: A review of dual credit and*

other high school/college transition programs. Washington, DC: U.S. Department of Education.

- Boswell, K. (2001). Dual enrollment programs: Accessing the American dream. *Education Commission of the States, Office of Community College Research and Leadership, Update on Research and Leadership Newsletter*, 13(1), 1–3.
- Kleiner, B., & Lewis, L. (2005). *Dual enrollment of high school students at postsecondary institutions, 2002–03*. Washington, DC: U.S. Department of Education, National Center for Education Statistics. Retrieved October 5, 2007, from <http://nces.ed.gov/pubs2005/2005008.pdf>
- Martinez, M., & Bray, J. (2002). *All over the map: State policies to improve the high school*. Washington, DC: Institute of Educational Leadership.
- Office of Vocational and Adult Education. (2003). *The Secondary and Technical Education Excellence Act of 2003: Summary of major provisions*. Washington, DC: U.S. Department of Education.
- Waits, T., Setzer, J. C., & Lewis, L. (2005). *Dual credit and exam-based courses in U.S. public high schools, 2002–03*. Washington, DC: U.S. Department of Education, National Center for Education Statistics. Retrieved October 5, 2007, from <http://nces.ed.gov/pubs2005/2005009.pdf>
- Western Interstate Commission on Higher Education. (2006). *Moving the needle on access and success: A study of state and institutional policies and practices*. Boulder, CO: Author.

The authors gratefully acknowledge the staff of the Florida Department of Education, the Florida K-20 Education Data Warehouse, the City University of New York (CUNY) College Now office, and the CUNY Office of Institutional Research for providing the data used in this report. Use of these data should not be considered an endorsement of the findings by either Florida or CUNY. The authors are also grateful for the financial support of the National Research Center for Career and Technical Education, which was supported by the Office of Vocational and Adult Education (OVAE), U.S. Department of Education (ED). The contents do not necessarily represent the positions or policies of OVAE or ED.

This Brief is based on the report titled *The Postsecondary Achievement of Participants in Dual Enrollment*, which is available for download free of charge at <http://ccrc.tc.columbia.edu>.

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