Positive Effects Associated with College Now Participation

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Description of Analysis and Results on the *College Now* Program Included in the Final Report Issued by the “University Working Group on Collaborative Programs” (November 1, 2006)

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During the summer and fall of 2006, the research and evaluation unit of CUNY Collaborative Programs prepared an analysis on the effects that *College Now* participation has on students’ postsecondary outcomes. The following is an overview of *College Now* and then a brief description of the quantitative analysis presented in the final report of the University Working Group on Collaborative Programs (CUNY Office of Academic Affairs: pp. 20-21).

CUNY *College Now* has grown in the last ten years to be the University’s major collaborative program with the New York City secondary public school system. In all, there are seventeen campus-based *College Now* programs which are overseen by a central office *College Now* staff. The defining goals of *College Now* are to help students meet high school graduation requirements and prepare for success in college. High school students who meet eligibility requirements (based on standardized test scores or GPA) have opportunities to take developmental or college credit courses. Most sections of *College Now* college credit courses offered by CUNY’s largest *College Now* programs (Queensborough, LaGuardia and Kingsborough Community Colleges, York College) are taught in high schools in partnerships with those programs by high school teachers appointed as adjunct faculty members. Other programs offer college credit and developmental sections of courses dedicated to *College Now* students on a CUNY campus, and a small number of students register each year for undergraduate courses on the campuses, where they are in the same classes as matriculated college students. *College Now* also offers a variety of workshops, special topics summer programs (e.g. urban health, marine biology, jazz performance) as well as courses for high school credit. In short, *College Now* affords opportunities in multiple pathways for nearly all qualified high school students in the largest urban school district/University dual enrollment program in the United States.

There are three distinct elements to the analysis in the November 1, 2006 report: the creation of a longitudinal dataset that combines students’ *College Now* experience with their CUNY performance records; identification of a well-defined control group (i.e. a similar group of students who did not participate in the program) with which to compare postsecondary outcomes; and use of statistical methods to hold constant other factors that may be associated with postsecondary academic progress. Each of these features of the analysis will be described prior to a description of the statistical results.

**Data**

To examine the effect of *College Now* participation on postsecondary outcomes, student-level records were merged from both CUNY Collaborative Program’s *College Now* database and enrollment and performance data of first-time freshmen provided by CUNY’s Office of Institutional
Research and Assessment. While the student record keys (i.e. unique identifiers)\(^1\) were common to both data sources, the amount of missing data or data error on many records required the use of a probabilistic matching procedure designed in MS Access. In these cases, student records from each data source were matched on a range of other data fields.\(^2\) Data were limited to the population of individuals who graduated New York City high schools and within 15 months\(^3\) of graduation enrolled in a CUNY associate or baccalaureate degree program as first-time freshmen in fall 2003. Only those records where a complete high school transcript was available were used. This “unit of analysis” is technically an entire population, not a sample because data for every individual that met these criteria were used. This point will be considered below as it relates to whether or not the statistical significance of the effects is germane to their interpretation.

Comparison Group

In order to ascertain whether or not students who participated in College Now benefited in terms of postsecondary outcomes, it was necessary to compare their outcomes to those of a similar group of students who did not participate. In any given year, a large percentage of CUNY first-time freshmen (approximately 60%) are graduates of New York City public high schools. Around 35% of these students had participated in one or more College Now activities while in high school. This provides the condition for a “natural” experiment: the opportunity to compare the postsecondary performance of New York City high school graduates who enter CUNY with and without College Now experience. While this is a rare and unique opportunity\(^4\) to examine the effects of pre-college learning opportunities on postsecondary outcomes, the results produced by this natural experiment fall short of those that would be produced in a controlled experiment, one in which students would be randomly assigned to treatment (i.e. College Now participation) and control (i.e. no College Now participation). Random assignment of individuals to treatment and control groups is the gold standard in basic scientific research and is increasingly advocated for education research in order to insure that differences in educational outcomes are a result of the programs being investigated, not individual level features which are also correlated both with program participation (known as the problem of “self-selection”) and postsecondary outcomes (e.g. individual motivation, academic skills). In the real-world of educational programs, particularly those like College Now which are voluntary and open to all who qualify at participating schools, conducting research using a random assignment methodology is fraught with logistical hurdles. After a discussion of the results, a description about how self-selection will be controlled for in Phase II of this analysis by using a quasi-experimental design will be discussed.

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\(^1\) College Now uses the New York City Department of Education OSIS number while CUNY uses students’ social security number as key identifiers.

\(^2\) Student name, birth date, gender and address were used.

\(^3\) We select those who enroll within 15 months because this is in keeping with the designation made by CUNY’s Office of Institutional Research and Assessment of “recent” high school graduate.

\(^4\) There are very few states which have developed “unit-record” longitudinal datasets on students’ progress through secondary and postsecondary educational systems. This has hampered efforts by educational researchers to examine the features of high schools or secondary curricula that matter to postsecondary progress. Further, while there are several national longitudinal studies which researchers can use to conduct analysis on representative samples of students, these do not collect adequate information on participation in dual enrollment programs. Recent criticisms have been levied on the representativeness and accuracy as well as applicability of research using national random samples on state and local educational policy making. CUNY’s longstanding relationship with the New York City Department of Education as well as the fact that many CUNY students are DoE graduates and many DoE graduates go to CUNY provides a rare quasi-unit record dataset with which to examine the longitudinal effects of College Now.
Method

In order to isolate the unique effect that College Now participation had on students’ postsecondary outcomes, it was necessary to control for (i.e. temporarily hold constant) differences between individual students which might also contribute to differences in postsecondary outcomes. Individual factors which have been shown to hold a significant relationship to postsecondary educational outcomes include demographic characteristics (i.e. race/ethnicity, gender, age, family income), as well as prior educational experiences and outcomes (i.e. high school attended, college attended, standardized test scores). The statistical procedure known as multiple regression is able to hold these factors (i.e. independent variables) constant by estimating the effect that each of them has on postsecondary outcomes of interest (i.e. dependent variables). In this instance, the effect of College Now participation was estimated simultaneously in the data using a statistical software package that allowed us to examine, all other things being equal, the effect that this program had on various postsecondary outcomes. The effect can be thought of as an average effect across all those who participated regardless of background.

For the multivariate analysis included in the Working Group Report, the effect of College Now participation on three postsecondary outcomes was estimated separately and by students’ degree program. These outcomes were credits earned in the first year, GPA earned in the first year, and persistence to a third semester. Only credits or GPA earned while at CUNY were considered. Other pre-college credits such as Advanced Placement (AP) and transfer credits and their associated GPA were not included. This was, in effect, a very conservative estimation of the independent effect that participation in the College Now program had on students’ postsecondary progress. We were basically examining whether or not the program prepared students to do better in college, not whether they accumulated college credits or earned a higher GPA more quickly as a result of having participated in the program. In each case, the following factors were held constant: students’ race/ethnicity, family income, gender, age, academic preparedness as measured by high school GPA and standardized test scores, high school and college attended as well as college-level factors such as whether a student took part in the College Discovery or SEEK programs, attended part-time or changed colleges anytime in their first year at CUNY.

Results

The statistical models estimated the effect of College Now participation on credits and GPA earned in terms of the real-life scale of these two outcomes. In determining persistence to a third semester, the results were converted to a 0-100% probability scale using an equation. Only those results that were statistically significant are discussed below. Statistical significance indicates to a particular degree of certainty that the effect observed in a sample is not the result of chance. We should point out that because our data can in some senses be considered an entire population (i.e. all possible individuals who meet these criteria) and not a sample (i.e. a selection thereof), the relevance of the statistical significance of the findings is somewhat at issue. Because we have data from each CUNY freshman who graduated from New York City high schools, we technically have a

5 SEEK and CD are college opportunity programs for low income students.

6 If the p-value for a regression coefficient is less than .01, one can say that the observed results would only occur naturally in 1 out of 100 samples of the population in question. That is the effect is explained by the statistical model 99 out of 100 times using the particular sample at hand.
population, not a sample. Therefore, statistical significance is not necessarily relevant to the interpretation of the findings. Only in the event that one wants to generalize these findings to other pre-college dual enrollment programs (i.e. the universe of students in dual enrollment programs) with similar relationships to a local college system (for the purpose of policy recommendations, for instance) does the issue of statistical significance apply. A discussion of non-significant findings is appropriate, therefore, if we are interested in evaluating the effects of College Now as one particular dual enrollment program, not dual enrollment programs writ large. The table of results presented in the Working Group Report is reproduced below as Table 1 with one slight alteration: the percentage of students who participated in College Now by degree is also included.

Table 1

Positive Effects Associated with College Now Participation for Students from New York City High Schools: Fall 2003 First-time Freshmen Cohort

<table>
<thead>
<tr>
<th>Degree Type</th>
<th>Total Cohort</th>
<th>Percent who Participated in College Now</th>
<th>Additional Credits Earned by College Now Students in Their 1st Year</th>
<th>Improvement in GPA Earned by College Now Students in Their 1st Year</th>
<th>Increase in the Probability that College Now Students Will Persist to a 3rd Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Associate</td>
<td>7,154</td>
<td>30.0</td>
<td>0.77</td>
<td>.04 ns</td>
<td>5.3%</td>
</tr>
<tr>
<td>Baccalaureate</td>
<td>6,094</td>
<td>42.1</td>
<td>0.5</td>
<td>0.07</td>
<td>3.0%</td>
</tr>
<tr>
<td>Total</td>
<td>13,248</td>
<td>35.5</td>
<td>0.6</td>
<td>0.06</td>
<td>4.6%</td>
</tr>
</tbody>
</table>

Effect of College Now Participation on Credits Earned in the First Year at CUNY

Those in associate degree programs who had participated in College Now earned additional three-quarters of a credit (.77) in their first year on average than their peers who had not participated in the program while in high school. Since the data only included credits earned at CUNY, the results suggest that College Now participation either prepares students to enroll in a slightly higher credit load, to fail fewer courses on average in their first two semesters at CUNY, or both. While three-quarters of a credit may seem marginal, this effect is the inferred average for each College Now student who enrolled as first-time freshmen in associate degree programs in 2003. In total, this finding may be interpreted as nearly 1,652 additional credits earned (the equivalent of 550 three credit classes passed) in the first year for those who participated in the College Now program when compared to a similarly sized comparison group. This is in addition to the actual college credits that these individuals earned in high school through the program that were added to their transcripts.

One explanation for this increase in earned credits for associate degree students with College Now participation is the possibility that College Now helped students be better prepared upon entry to associate degree programs by either being exempt from remedial coursework or less in need of remedial courses which they completed more quickly than their non-College Now counterparts. If this was the case, those with College Now experience would have been able to enroll in college credit bearing courses sooner and earn more credits. The contribution that College Now
participation may have on students’ ability to be exempt from remediation or exiting remediation more quickly will be taken up in the discussion of Phase II of this analysis.

The effect of College Now participation on credits earned in the first year for students enrolled in baccalaureate degree programs was found to be slightly weaker. These students earned on average half a credit (.50) more than their peers who had not participated in the program while in high school. The inferred total effect for all baccalaureate degree students with College Now experience can be interpreted as an additional 1,282 credits earned, or about 427 three credit classes University-wide when compared to a similarly sized comparison group.

For students enrolled in both associate and baccalaureate degree programs, College Now experience resulted in earning three-fifths (.60) of a credit on average. Controlling for the other factors included in the statistical model, the inferred total effect may be interpreted as over 2,822 credits earned, or 940 three credit classes passed when compared to a similarly sized comparison group. Again, each of these effects on credits earned were in addition to the college credits earned in high school through the program that were added to student transcripts.

Effect of College Now Participation on GPA Earned in the First Year at CUNY

While students in associate degree programs had no statistically significant improvement in their GPA earned in the first year, baccalaureate students had a .07 higher GPA than their counterparts without College Now experience. This effect was the equivalent of earning a 3.57 vs. a 3.50 GPA. The independent effect of participation in College Now on GPA for those enrolled in baccalaureate degree programs suggests that participation in this program helped students perform better in their coursework. This could be due to increased academic capabilities or confidence. Across both degree types, students with College Now experience earned a GPA in their first year that was .06 points higher than their colleagues from New York City high schools who did not participate.

Effect of College Now Participation on Persistence to a Third Semester

In our most encouraging finding, students with College Now experience in both associate and baccalaureate degree programs benefited in terms of persistence to a third semester. Those in associate degree programs with College Now experience were found to have a 5.3% increase in the probability\(^7\) of persisting to a third semester. For instance, if those without College Now experience had a 70% probability of persisting to a third semester on average, those who did participate in the program had a 75.3% probability of persisting.\(^8\) Those in baccalaureate degree programs who participated in the College Now program had a 3.0% increased probability of persisting to a third semester than their counterparts. Across both degree programs, College Now participants had a 4.6% higher probability of persisting to a third semester.

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\(^7\) Probability is calculated here using the Delta-p formula (\(\exp([L_{\text{sub.1}}])/[1+\exp([L_{\text{sub.1}}]) - [P_{\text{sub.0}}])\) put forth by Petersen (1985) and used by Cabrera (1994)

\(^8\) Change in probability in inferential statistics is different than the actual percentage of cases where an outcome did or did not happen. Actual percentages which do not account for or hold constant other factors are otherwise known as descriptive statistics.
Discussion/Implications

The analysis conducted for the working group report demonstrated that *College Now* participation had relatively small yet statistically significant effects on the three measures of student performance at CUNY. It bears repeating that the effects on cumulative credits and GPA earned in the first year were found on student performance while they were only at CUNY; no pre-college credits or associated GPA were included in these variables. Therefore, holding all other factors constant, *College Now* experience seems to have some small, yet significant, effect on participants’ raw academic abilities. It is perhaps as a result of this effect, as well as the college course credits and GPA points earned in high school, that *College Now* alumni were found to have a higher probability of persisting to a third semester. It is apropos this last point that directions for phase II of this research project will be described.

Directions for Phase II

In Phase II, and to the extent temporally possible, models will be used to estimate the effect of *College Now* participation for each of the incoming fall 2002 through 2005 cohorts. There are several limitations to the analysis conducted for the November 2006 report that will be dealt with in Phase II of our ongoing longitudinal analysis of the *College Now* program. The first of these is how to control for the potential influence that self-selection bias has on the observed effects of *College Now* participation on students’ postsecondary outcomes. The experimental basis on which this research rests, where results for a treatment group are compared to that of a control group, is somewhat compromised by the fact that *College Now* is a voluntary program (in the case of schools that have college program partners) with universally open access for students who meet certain eligibility criteria. Because more motivated and/or academically successful high school students are likely to qualify for and participate in this type of program, they are also more likely to be successful once they enroll in CUNY, thus compromising the independence of the results.

To control for self-selection bias, two samples will be matched—those with and without *College Now* experience—using a number of factors which can be used to predict *College Now* participation with a procedure known as propensity score matching. The result will be balanced treatment and control groups which are nearly identical in terms of all other pre-college characteristics except for whether or not they participated in the program. While this may greatly reduce the number of cases available for analysis, the results are more defensible in terms of controlling for self-selection. Ideally, pre-high school academic skills data would be used to control for self-selection, but we do not have access to these data at this time. It is also at this point that it will be necessary to consider the statistical significance of the results because the matched groups will truly be a sample of the universe.

Another feature of Phase II of this research involves conducting separate analysis for students from high schools who are partnered with the College of Staten Island (CSI) *College Now* program. The *College Now* program on Staten Island takes the form of a professional development program for high school teachers sponsored by CSI’s Discovery Institute (DI). Teachers who participate in the DI have an opportunity under professional guidance to redevelop their core subject area lessons. Students who take these redeveloped classes are counted as *College Now* students even if they themselves do not take a *College Now* course (though a small number do). In Phase II, separate
analyses will be conducted for students from high schools partnered with CSI and all others to review separately the effect of an indirect and direct College Now experience.

Aside from controlling for these limitations in the original research, the statistical method of path analysis will be used to estimate the cumulative direct and indirect effects of College Now participation longitudinally. Because College Now participation was demonstrated to have an effect on cumulative credits and GPA earned in the first year, but in turn these two outcomes are likely to be related to whether or not a student persists to a third semester, linear regression is unable to measure the cumulative effect of College Now participation if these two former variables are used to predict the latter.

Moreover, the influence of College Now participation on additional outcomes needs to be considered to better capture the complex nature of postsecondary engagement and performance. These include probability of enrolling in a baccalaureate program; for those enrolling in an associate degree program, the probability of being exempt from or testing out of remedial coursework and subsequently enrolling in a baccalaureate degree program; the probability of enrolling full-time both first and second semesters; and the probability of attaining a degree. Path analysis is more appropriate than linear regression because it estimates the indirect effect of College Now on an outcome (i.e. degree attainment) vis-à-vis its effect on factors also related to that outcome (e.g. credits earned, full-time status, persistence to a third semester). An analysis will be conducted for each of these outcomes separately for each cohort in addition to estimating additive models where dependent outcomes are entered into the model as independent predictors at the appropriate stage. Figure 1 presents a schematic of the path analysis to be conducted.

A final addition to Phase II of this research on the effect of College Now is an examination of how different types of College Now participation matter for students’ postsecondary outcomes. The analysis presented in the Collaborative Program’s Working Group Report used a basic measurement of College Now participation: whether or not a student had enrolled in at least one College Now activity, whether a workshop, a summer program, a non-credit developmental course, or a college credit course. In reality, students often participate in more than one College Now activity type and to varying degrees (i.e. one or more enrollments). Research in Phase II will account for the different types and intensity of student engagement in the program by delineating discreet and exclusive College Now activities types and levels of participation.
Handout 6

Proposed Path Model of the Effect of College Now Participation on CUNY Post-Secondary Outcomes

Enrollment  First-year Outcomes  Second-year Outcomes  Graduation Outcomes
List of Works Cited


