Educational Outcomes of
Cabrillo College's Digital Bridge Academy:
Findings from a Multivariate Analysis

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Introduction and Background

This report presents findings of a study conducted through a partnership between the Community College Research Center (CCRC) at Teachers College, Columbia University, and Cabrillo College's institutional research (IR) office that analyzed the educational outcomes of the Digital Bridge Academy (DBA), an innovative program at Cabrillo College designed to prepare disadvantaged students to succeed in college. Cabrillo College is a community college within California's public system and is located in Santa Cruz County, about 80 miles south of San Francisco.

An earlier study (Badway, 2007) examined the persistence and attainment of DBA students over time, but that study compared DBA student outcomes using only aggregate statistics on California community college students generally. In the current study, the CCRC-Cabrillo IR team used data from Cabrillo's student information system and multivariate analysis to compare attainment of DBA students with other students at Cabrillo College who did not participate in the program.

About the Digital Bridge Academy

Program overview

The Digital Bridge Academy (DBA) is a semester-long, intensive educational program that seeks to promote success and accelerate progress in higher education among at-risk community college students.[1] The DBA curriculum, which is based on theories from research on education and neurological science, and which borrows practices from graduate and corporate management education, is designed to help students build confidence so that they can become well-organized and effective learners. DBA students proceed through the program as a full-time cohort. Cohorts typically include about 25 students.

Students begin with an intensive two-week, eight-hours-per-day "foundation course" that emphasizes team-building, exploration of learning and working styles, communication, self-efficacy, and motivation. Students then enter a 13-week, full-time "bridge semester" of six integrated college-level courses, with supplemental student supports built into the curriculum, including study groups, referral to counseling, and other services at the college and in the community. The following outlines the elements of the curriculum.

Foundation Course (2 weeks, 3 credits)
- Communication skills
- Experiential learning
- Immersion in academic culture
- Teaching and learning styles
- Cohort-based support system

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[1] The DBA website, which can be found at http://www.cabrillo.edu/academics/digitalbridge/, features a video with testimonials from students who have participated in the program.

Bridge Semester (13 weeks, 13 credits)
- Team self-management course
- Social justice project-based course
- Literacy skills course
- Career planning course
- Computer science course
- Movement (physical education) course

The bridge semester curriculum is designed around a project-based course in which students conduct primary research on a social justice issue relevant to their lives and communities.

The DBA program was launched in fall 2003. From that time through the fall semester of 2008 there were 13 cohorts of participating students, with a total enrollment of 320. In this study, we examined the first nine of these cohorts, who enrolled from fall 2003 through fall 2007.

After the first three cohorts completed the program, the program staff made a major change to the DBA curriculum. Until that point, the curriculum for the bridge semester included college-level English. Because most of the students in DBA require remediation, program staff referred to this approach as "acceleration," since it allowed remedial students to take college-level courses, in effect skipping the remedial sequence. When students completed the associate degree English course (called English 100) offered through the program, they could then proceed to the first transfer-level English composition course.

In late 2004, Cabrillo's vice president of instruction informed the DBA director about her concern regarding a regulation in the California Education Code stipulating that students who assess at a particular level of instruction cannot enter a course that is more advanced than that indicated by the assessment/placement process. Since most DBA students tested into remedial English, the DBA program dropped the associate degree English course in spring 2005. The revised program included a reading lab course that incorporated writing instruction, which allows the program to enroll students with varying levels of writing skills. In spring 2007, a literacy skills course was added. Throughout this report, the term "accelerated DBA" refers to the version of the program offered to the first three cohorts, which included the associate-degree-level English course. "Non-accelerated DBA" refers to the version offered to the subsequent six cohorts.

Recruitment of DBA students

The Digital Bridge Academy program targets educationally disadvantaged students. Most participants are low-income young adults. On average, about 90 percent of DBA students are Latino, African-American, or Asian/Pacific Islander. The program staff collects information on student demographics to identify "at-risk" indicators (such as being a first-generation college student) and "high-risk" indicators (such as having a criminal record). Nearly all (98 percent) of DBA students in this study exhibited at least one at-risk indicator, and 71 percent exhibited at least one high-risk indicator. Table 1 details risk factors for the first nine cohorts

of DBA students. In the table, at-risk indicators are marked with an (A) and high-risk indicators are marked with an (H).

Table 1. Risk Indicators for DBA Students

Risk indicator	Number of students	Percentage of students
Two levels below transfer-level English, math, or reading (A)	164	69%
First family member in college (A)	162	68%
ESL student (A)	150	63%
Migrant worker parent (A)	148	62%
Not a high school graduate or GED holder (H)	73	31%
Parent with dependent children (H)	63	26%
Attended alternative or continuation high school (A)	59	25%
Substance abuse (H)	53	22%
Gang experience (H)	48	20%
CalWorks (public assistance) (H)	36	15%
Criminal record (H)	30	13%

Note: A = At-risk indicator; H = High-risk indicator.

The program staff recruits for the program at local high schools (primarily through career fairs and guidance counselors), one-stop career centers, adult schools, and basic skills classes at Cabrillo College. Staff members also recruit at substance abuse treatment centers, centers delivering services to foster youth, and organizations that serve ex-offenders. However, the majority of participants learn about the program through word-of-mouth, primarily from former DBA students. DBA graduates also serve as student interns in the program's recruitment offices, which are on both the Aptos and Watsonville campuses.[2] Over half (51 percent) of DBA students examined in this study had earned college units (including non-credit developmental and ESL units) prior to enrolling in DBA.

The only formal requirements for admission to the program are (1) that students score (at minimum) at a 7th grade level on Cabrillo's reading placement assessment, and (2) that they commit to enrolling full-time. Interested students who are not at least 18 years old are encouraged (but not required) to obtain a high school diploma before entering the program or to wait until they have turned 18 years of age. Some students in the program do not have a high school credential. There is no further screening of students who meet these criteria. Students who commit to the program are served on a first-come, first-served basis.

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[2] Cabrillo's main campus is in Aptos. The College also offers classes at its Watsonville Center and at several locations in downtown Santa Cruz.

Contact information on all who inquire about the program is entered into a database. The DBA staff contacts all prospects to see if they are interested in attending an information session at the DBA offices. While students can commit to the program without coming to campus, they do need to be present on campus at the DBA offices to register for the program and fill out the computer-based intake application. Students who come in to register for the program are required to meet with a student intern who has previously participated in the program. According to DBA founder and program director Diego Navarro, "Contact with DBA student interns is important. Applicants see that people like themselves are in college and are being successful. The transformation of identity begins before the student starts DBA courses. Their interaction with DBA interns is important in helping them realize that they can be college-bound too—that they are college material. We do not engage in any screening except for the Reading 205 placement test. We also find that many of these students don't read marketing material or websites. They have questions that need to be addressed by staff."

On average, about 15 percent of students who initially express interest in DBA enroll in the program. For example, at the Watsonville campus in the fall of 2008, 546 students expressed interest in the program and 49 enrolled. These numbers indicate that attrition during the period between initial contact and commitment to the program is high. Once students commit to the DBA, they fill out a Cabrillo College application and a program intake application, which includes information on family history, ethnicity and language, educational background, employment, and physical and mental health. Also included in the enrollment packet is a consent form, a survey about public speaking, a self-efficacy assessment, a learning disability self-screening tool, and an academic persistence survey. The last step in the recruitment and enrollment process is registering for DBA classes.

Tuition for the program is $320 for both the foundation course and bridge semester. During the application process, DBA students are encouraged to apply for financial aid. Staff members are available to facilitate this process, and they direct students to the College's financial aid and scholarships office for further assistance. The staff recommends that students apply for both the Board of Governors fee waiver, which covers the cost of enrolling in the program, and for admission to Extended Opportunity Program and Services (EOPS), a state-funded program that provides financial aid as well as support services, including academic counseling, free tutoring, and required college success workshops. In the sample of DBA students examined in this study, over one quarter (28 percent) participated in EOPS. An analysis by the DBA program found that about 70 percent of DBA students applied for financial aid, and all who applied were eligible for it.

Expanding the reach of DBA

The DBA program is currently offered at two Cabrillo College campuses, Aptos and Watsonville. Program founder Diego Navarro is scaling up the DBA program at Cabrillo and at another community college, and he is consulting on the replication and expansion of the program at two other community colleges. In addition, he and his colleagues offer week-long workshops to train faculty from other California community colleges to teach using the DBA philosophy, curriculum, and methods. To date, they have held four of these workshops and have educated around 150 faculty, administrators, and staff from over 20 community colleges

in California. They have also developed "curriculum kits" with guidance materials to enable faculty to implement the DBA curriculum on their campuses, and they have conducted half-day workshops to train faculty in the use of these materials. The DBA program continues to adapt, integrating interactive, web-based learning methods to the core approach. With National Science Foundation support, a numeracy course featuring an "accelerated" pedagogy using visual statistics rather than basic arithmetic has been added,as of fall 2009. Also in fall 2009, a science acceleration course is being piloted, with the goal of getting students, in a single semester, to the level where they can undertake college-level biology

Research Questions Examined in This Study

This report examines the characteristics and educational outcomes of students who participated in the first nine cohorts of the DBA program. Using multivariate statistics, we compared the educational outcomes of these students with those of other students at Cabrillo with similar characteristics who did not participate in the program. As part of this analysis, we examined whether students in the first three "accelerated" DBA cohorts had different outcomes than did those in subsequent "non-accelerated" DBA cohorts.

Data and Methods

The data used in this study were drawn from Cabrillo College's student information system. We selected the 208 DBA students who enrolled in the first nine cohorts of the program, of which 66 were in the first three cohorts and therefore experienced the accelerated version of the program; the 142 students in the subsequent six cohorts experienced the non-accelerated version. We selected only the first nine cohorts because the outcomes we planned to measure required follow-up data for subsequent semesters.

As a comparison group, we selected non-DBA students who took an English placement test during one of the semesters under study (fall 2003 through fall 2007). The rationale for selecting this comparison group is based on the fact that all degree-seeking students must take placement tests to see if they meet the requirements to take college-level English or math courses or if they instead need to take developmental courses in either subject, or both. Thus, taking the English placement test can be viewed as an indicator that a student is serious about pursuing studies that lead to a degree and/or transfer. We refer to this group collectively as the "assessment cohorts." There were 10,942 students in this comparison group, of which most—6,803—assessed into a developmental English course. Students were not included in the assessment cohorts if they did not actually enroll at Cabrillo (some took the placement assessment, but never enrolled, although about 85 percent of those who take the English test do enroll in English within two years). Students who took the English placement test multiple times were assigned to cohorts based on the last semester that they took the test, since students who re-assess have not taken English earlier, and we want to capture students when they are most likely to enter a English course. The comparison group

members were sampled without replacement, so each student could only enter the comparison cohorts once.

As noted above, the comparison students were assigned to a cohort based on the most recent semester they took the placement exam. Assigning the comparison students to a cohort based on a particular semester is necessary because of the outcomes we measure. All of the outcomes are relative to the semester of cohort entry. For instance, we measure credits earned after the semester of DBA enrollment or after the semester at the beginning of which they took the placement test for comparison between the two groups.

Cabrillo's research data warehouse contains data on demographic characteristics of each student in the sample, as well as their transcripts, which we used to determine the number of credits completed. The transcript data enabled us to track students through the end of the study period and back to the earliest date each student enrolled at the college, allowing us to control for any credits earned prior to the cohort entry semester.

The change in the DBA program from the accelerated model to the non-accelerated model seemed significant enough to consider each version separately. Hence, we examined the effects of participation in each version of DBA on the following educational outcomes:

- Number of associate degree credits earned;
- Number of transfer credits earned;
- GPA in the semester following DBA enrollment;
- Persistence to the next semester;
- Persistence over the following two semesters;
- Whether the student enrolled full time or part time in the semester following DBA enrollment;
- Whether the student passed associate-level English (English 100) in the two years following cohort entry;
- Whether the student passed transfer-level English (English 1A) in the two years following cohort entry.

To study these outcomes, we used multivariate regression analysis. The first three outcome measures listed above are continuous, so we used ordinary least squares (OLS) regression models to evaluate those outcomes. The remaining five measures are dichotomous, so we used logistic regression models in those cases. Other than this difference in the type of regression model used and the difference in the outcome measured in each case, all of the analytic models were specified identically, with the same control variables.

The models included controls for the following student characteristics: age, gender, Latino status, whether or not the student had a high school diploma or GED, and whether he or she lived in a low-income ZIP code area. The Cabrillo student information system contains only 5-digit ZIP codes, not 9-digit ZIP + 4 codes—the latter would have allowed us to match students with Census tracts. However, the College's research staff indicated that the level of economic segregation in the College's service area is high, and that low-income students at the College generally come from one of two or three ZIP code areas. The models also

controlled for each student's assessed level of English, the number of credits taken prior to cohort entry, whether the student had previously taken an ESL course, and whether the student participated in EOPS, an academic support program described above.

Findings

For each of the control and outcome measures examined here, we present descriptive statistics comparing students in the following groups: the comparison group (those non-DBA students in the assessment cohorts), the DBA group overall, the accelerated DBA cohorts, and the non-accelerated DBA cohorts. The means for the controls are shown in Table 2; the unadjusted means for the outcomes are shown in Table 3.[3] We examined the distributions for each of the controls and found that there is overlap between the DBA group and the comparison group for each one.

Compared to students in the assessment cohorts, a higher proportion of DBA students resided in a low-income ZIP code area, were Latino, had taken at least one English-as-a-Second-Language (ESL) class, and lacked a high school diploma (see Table 2); they also had fewer prior college credits and were slightly older. Given the clear demographic differences between the groups, one would expect DBA students to have substantially lower rates of academic success than the assessment cohorts; only a strong intervention would be likely to raise DBA student outcomes to match or exceed those of the students in the comparison group.

Table 2. Demographics of DBA and Comparison Group Students

	Assessment Cohorts	DBA Cohorts		
	All	All	Accelerated	Non-accelerated
N	10,942	208	66	142
Low-income ZIP code	27%	87%	85%	87%
Latino	32%	83%	83%	82%
Female	50%	49%	53%	46%
No high school diploma	12%	21%	15%	23%
ESL student[4]	4%	7%	8%	6%
Mean prior college credits	18	6	11	3
Mean age	21	23	23	22

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[3] Note that the sample sizes for the outcomes vary. Depending on the outcome, we looked forward one, two, or three semesters to measure it; therefore the extent of right-censoring varies. We note the different sample sizes in our discussion of each outcome below. In Table 2, we show the sample sizes for the one-semester outcomes, which are the largest.

[4] These are students who took ESL courses at Cabrillo College. Students who were ESL students prior to entering Cabrillo College are not counted. Thus this figure understates the share of students who previously took ESL.

Table 3. Outcomes for DBA and Comparison Group Students

	Assessment Cohorts	DBA Cohorts		
	All	All	Accelerated	Non-accelerated
One-semester persistence	72%	77%	91%	71%
Two-semester persistence	57%	58%	70%	52%
Full-time in next semester	34%	47%	55%	44%
Passed associate-level English (English 100)	33%	54%	80%	34%
Passed transfer-level English (English 1A)	40%	22%	36%	11%
Mean GPA in next semester	2.7	2.7	2.9	2.6
Mean college credits earned	28	33	41	27
Mean transfer credits earned	21	13	15	12

College Credits Earned

At Cabrillo, college credits are credits that count toward an associate degree or certificate but do not necessarily transfer to a four-year school. Transfer credits are college credits that can be transferred toward a baccalaureate degree.[5] The unadjusted means in Table 3 show that, on average, accelerated DBA students earned 41 college credits and non-accelerated DBA students earned 27 credits, while students in the assessment cohorts earned 28 credits.

We conducted an OLS regression that compared the accelerated DBA and non-accelerated DBA cohorts with a baseline group consisting of students in the assessment cohorts. The results are shown in Table 4. Students in the accelerated DBA group earned an estimated 21 more credits than those in the assessment cohorts, and students in the non-accelerated DBA group earned 9 more. The confidence intervals of these estimates did not overlap, so the former estimate is significantly higher (in a statistical sense) than the latter.

When we used our regression model to estimate the mean college credits earned by each group, holding the control variables at their means, we found that the accelerated group earned 49 college credits and the non-accelerated group earned 37 college credits. Members of the assessment cohorts earned 28 credits. (These results are not shown in the table.) One can think of these estimates as the number of credits that a student who had average values on the controls would have earned if placed into each of three groups. The values for the two DBA groups are higher than the non-adjusted values given above because the DBA

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[5] Four of our outcomes are based on tracking cohorts three semesters into the future: college credits, transfer credits, passing transfer-level English, and passing associate-level English. Because some of the later cohorts cannot be tracked this far into the future, our sample sizes are somewhat reduced for these outcomes to 8,514 for the assessment cohorts, 66 for the accelerated DBA cohorts, and 88 for the non-accelerated DBA cohorts (for a total DBA sample of 154).

participants are a more disadvantaged group than members of the assessment cohorts, which is reflected in the values of the control variables.

Table 4. OLS Regression Estimates of Differences in Credit and GPA Outcomes for Accelerated and Non-Accelerated DBA Students, Relative to Students in the Assessment Cohorts

	Accelerated DBA	Non-accelerated DBA
Difference in degree credits earned	21.19*** (2.04)	9.39*** (1.75)
Difference in transfer credits earned	3.67** (1.83)	2.12 (1.56)
Difference in GPA in next semester	0.22 (0.15)	0.01 (0.13)

Note: * p<0.10, ** p<0.05, *** p<0.01; standard errors in parentheses.

Transfer Credits Earned

Unadjusted means in Table 3 show that accelerated DBA students earned an average of 15 transfer credits; non-accelerated DBA students earned an average of 12, and students in the assessment cohort earned 21. Table 4 shows that, after using multivariate models to control for other student characteristics, only the accelerated DBA students earned significantly more transfer credits than students in the assessment cohorts—approximately 4 more. There was no significant difference between students in the non-accelerated DBA cohorts and those in the assessment cohorts in the estimated number of transfer credits earned.

When we used our multivariate model to estimate the number of transfer credits earned by group, holding the values of the controls at their means, we found that accelerated DBA students earned 25 transfer credits, non-accelerated, 23, and students in the assessment cohorts, 21 (not shown in the tables). (These figures of 23 and 21 are not significantly different from one another, but the figures of 25 and 21 are.) Again, these results can be interpreted as the number of transfer credits a (globally) average student would earn if placed into each group.

GPA in the Following Semester

For neither DBA group did we find any significant difference from the comparison group in the next semester GPA outcome.

One-Semester Persistence

Descriptively, as shown in Table 3, almost all (91 percent) accelerated DBA students persisted to the next semester.[6] Nearly three quarters (71 percent) of non-accelerated DBA students persisted, a rate similar to that of students in the assessment cohorts (72 percent).

Table 5 shows the marginal effects of participation in the accelerated and non-accelerated DBA programs on one-semester persistence. These were computed based on the results of a logistic regression in which the accelerated and non-accelerated DBA cohorts were compared with the assessment cohorts. Each marginal effect can be interpreted as the difference in the probability of the outcome in question between program participants and non-participants when the control variables are held at their means.

With this assumption, the students in the accelerated DBA group had an estimated probability of persisting to the next term (one-semester persistence) that was 15 percentage points higher than the corresponding probability for those in the assessment cohorts. The non-accelerated DBA students had a probability that was 8 percentage points higher than those in the assessment cohorts. Each of these estimates has a standard error of two percentage points, and the confidence intervals do not overlap. We can therefore conclude that the estimate for the accelerated DBA cohorts is significantly higher than that for the non-accelerated DBA cohorts. Thus, including the controls adjusts for differences between the groups that are not fully revealed in the descriptive statistics; in other words, the non-accelerated DBA group now looks better than the comparison group, whereas descriptively it had looked about the same.

Using our logistic model, we estimated the chances of persisting to the next semester for each group, holding the values of the control variables at their means. We found that a typical student would have had an 80 percent chance of persisting if in the assessment cohorts, an 88 percent chance if in the non-accelerated DBA group, and a 95 percent chance if in the accelerated DBA group (results not shown in the tables).

Two-Semester Persistence

Table 3 shows that, descriptively, 70 percent of accelerated DBA students persisted two semesters out (to the term after the next term), as opposed to 52 percent of non-accelerated DBA students.[7] In comparison, 57 percent of students in the assessment cohorts persisted to the second semester.

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[6] We have three one-semester outcomes under study: one-semester persistence, full-time status in the next semester, and GPA in the next semester. For the first two, the sample sizes are 10,942 for the assessment cohorts, 66 for the accelerated DBA cohorts, and 142 for the non-accelerated DBA cohorts. For GPA in the next semester, some data is missing, giving us sample sizes of 6,733, 53, and 70 respectively for each of these groups.

[7] Two-semester persistence is our only two-semester outcome. For this outcome, the sample size for the assessment cohorts was 9,015, for the accelerated DBA group, 66, and for the non-accelerated DBA group, 114.

In Table 5 it is shown that, controlling for student characteristics and other factors, compared to students in the assessment cohorts, the accelerated DBA students had a probability of persisting to the semester after next that was 19 percentage points higher, while non-accelerated DBA students had a probability that was 11 percentage points higher. However, in the case of this measure we cannot be sure that the students in the accelerated cohorts did better than the non-accelerated DBA cohorts because both estimates have a standard error of 4 percentage points. Thus they have overlapping confidence intervals.

When we used our logistic regression model to estimate the probabilities of two-semester persistence at the means of the control variables, we found that a student with values at these means would have had a 63 percent chance of persisting for two semesters if in the assessment cohorts, a 74 percent chance if in the non-accelerated DBA group, and an 82 percent chance if in the accelerated DBA group (results not shown in the tables).

Table 5. Logistic Regression Estimates of Marginal Effects of Participating in the Accelerated and Non-Accelerated DBA Cohorts, Relative to Students in the Assessment Cohorts

	Accelerated DBA	Non-accelerated DBA
One-semester persistence	0.15*** (0.02)	0.08*** (0.02)
Two-semester persistence	0.19*** (0.04)	0.11*** (0.04)
Full-time in next semester	0.32*** (0.06)	0.27*** (0.04)
Passing associate-level English (Eng. 100)	0.42*** (0.07)	-0.03 (0.05)
Passing transfer-level English (Eng. 1A)	0.31*** (0.06)	-0.06 (0.07)

Note: * $p<0.10$, ** $p<0.05$, *** $p<0.01$; standard errors in parentheses.

Full-time Status in the Following Semester

Table 3 shows that that 55 percent of students in the accelerated DBA group enrolled full time in the next semester, as did 44 percent of the non-accelerated DBA group. For the assessment cohorts, the comparable figure is 34 percent.

Table 5 shows that accelerated DBA students had a probability of enrolling full time in the next semester that was 32 percentage points higher than that of students in the assessment cohorts. For students in the non-accelerated DBA group, the corresponding figure is 27 percentage points. However, these estimates are not significantly different from one another.

Logistic regression indicates that a typical student would have had a 33 percent chance of enrolling full time in the next semester if in the assessment cohorts, a 59 percent chance if in the non-accelerated DBA group, and a 65 percent chance if in the accelerated DBA group (results not shown in the tables.)

Passing Associate-Level English

Table 3 shows that 80 percent of accelerated DBA students passed associate-level English (English 100) within two years of entry into the DBA program. Only 34 percent of the non-accelerated DBA students passed the course in the same period. For students in the assessment cohorts, the corresponding figure is 33 percent. The difference in outcomes between the accelerated and non-accelerated DBA cohorts is not surprising, because associate-level English was built into the accelerated version of the program and was dropped from the non-accelerated version.

The regression results in Table 5 show that after controls were introduced, students in the accelerated DBA group had a probability of passing associate-level English that was 42 percentage points higher than those in the assessment cohorts. The non-accelerated DBA students had no significant difference on this outcome compared to students in the assessment cohorts.

A typical student with values of the control variable at their means would have had, according to our logistic regression model, a 29 percent chance of passing associate-level English if in the assessment cohorts, a 26 percent chance if in the non-accelerated DBA group, and a 71 percent chance if in the accelerated DBA group (results not shown in the tables). Note that these figures of 26 and 29 percent are not statistically different from one another.

Passing Transfer-Level English

In Table 3, it is shown that 36 percent of accelerated DBA students passed transfer-level English (English 1A) within two years of entering a DBA cohort, as opposed to only 11 percent of non-accelerated DBA students. For students in the assessment cohorts, the corresponding figure is 40 percent.

Table 5 shows that, controlling for student characteristics and other factors, accelerated DBA students had a probability of passing transfer-level English that was 31 percentage points higher than that of students in the assessment cohorts. Non-accelerated DBA students showed no significant difference from the assessment cohorts. Thus, in terms of English achievement, both with respect to associate-level and transfer-level courses, only students in the accelerated DBA cohorts did significantly better than the those in the comparison group after controlling for student characteristics and other factors.

If a student had background control characteristics at their means, they could expect, from our logistic regression model, to have had a 37 percent chance of passing transfer-level English if in the assessment cohorts, a 31 percent chance if in the non-accelerated DBA group, and a 68 percent chance if in the accelerated DBA group (results not shown in the tables). Note, however, that the figures of 31 and 37 percent are not significantly different from one another.

Limitations of this Analysis

While the results of this analysis show that participation in the DBA program is correlated with better outcomes on most measures for students in both the accelerated and non-accelerated models, it is important to note that they do not provide definitive evidence that the DBA program *caused* the superior outcomes. It could be that, because of the way students are selected into the program, those who participate have higher motivation or other characteristics not measured in this study that make them more likely to succeed in college. Research that avoids potential selection bias would require an experimental design in which subjects are randomly assigned to either the DBA program or a control group. Given the program's philosophy of inclusion and small cohort sizes, this has thus far not been feasible. Nevertheless, the generally positive nature of our findings suggests that an experimental test of the DBA program would be warranted.

One more point regarding the issue of selection bias merits consideration. We have noted that in terms of recruitment, the DBA program staff intentionally seeks out students who face major barriers to success in college. Indeed, based on risk indicator data that the program staff collects on participants, DBA students as a group are almost certainly more disadvantaged than is the general population of Cabrillo College students. For example, as indicated in Table 1, over 60 percent of DBA students in the first nine cohorts had a parent who was a migrant worker, one quarter attended an alternative or continuation high school, and around one in five had a history of substance abuse and of gang involvement. Thus, DBA students are very likely to be more at-risk than Cabrillo students with similar levels of academic preparation, although comparable risk statistics are not available for non-participating Cabrillo students. To the extent that the DBA students in the sample were substantially more disadvantaged than other students, it may be that the estimates produced through this analysis *understate* the effect of participating in DBA.

Conclusion and Implications

In this study, the CCRC-Cabrillo IR team found that, controlling for student characteristics and previous enrollment patterns, on two of the eight outcomes we considered—degree credits earned and one-semester persistence—the accelerated DBA cohorts did significantly better than the non-accelerated DBA cohorts. On these measures both of the DBA groups did significantly better than the assessment cohorts, which served as a comparison group in this analysis. On two additional outcomes—two-semester persistence and full-time status in the following semester—both DBA groups did significantly better than the assessment cohorts, but we are not able to say that one of the DBA groups did significantly better than the other. For three outcomes—transfer credits, passing associate-level English, and passing transfer-level English—the accelerated DBA cohorts did significantly better than the assessment cohorts, while the non-accelerated DBA cohorts showed no advantage. For one outcome—GPA in the next semester—neither version of the DBA program showed an advantage.

While participants in the *non-accelerated* version of the program generally had significantly better outcomes on most measures than did students who did not participate in DBA, the estimated effects for the *accelerated* version were in most cases higher. For example, while non-accelerated DBA students had a probability of persisting to the next semester of 88 percent, accelerated DBA students had a probability of 95 percent. Comparison students who did not participate in the program had a probability of 80 percent. And while students in the non-accelerated version of the program earned an estimated 37 college credits, on average, accelerated DBA students earned 49 college credits, on average. Non-participants earned 28 college credits. Likewise, we estimated that students in the non-accelerated DBA program had a probability of enrolling full time in the subsequent semester of 59 percent. For accelerated DBA students, the figure was 65 percent, and for students in the comparison group, the figure was 33 percent.

Students who participated in the accelerated version of the DBA program were also significantly more likely to pass associate-degree-level English than were non-participants during the two-year observation period—accelerated DBA students had a probability of passing that was 42 percentage points higher than control group students. A similar effect was not evident for students in the non-accelerated version of the program. This is not surprising since instruction in associate-level English was incorporated into the accelerated— but not the non-accelerated—DBA model. It is also notable that accelerated DBA students had a probability of passing *transfer*-level English that was 31 percentage points higher than that of non-participants. Non-accelerated DBA students had no significant difference from non-participants in their likelihood of completing transfer-level English.

To the extent that colleges are seeking strategies for increasing the rate at which academically underprepared students complete "gatekeeper" courses such as college-level English and earn college credits, the accelerated version of the DBA program seems to hold particular promise. The findings from this study suggest that the DBA staff should consider ways to resurrect the accelerated model and move ahead with plans to use a similar approach with college-level math and other college courses that often present stumbling blocks to students seeking a college degree.

Reference

Badway, N. (2007, September). *Watsonville Digital Bridge Academy. Report 2: Persistence and Attainment.* Higher Education Evaluation Research Group.