

CCRC BRIEF

NUMBER 24

FEBRUARY 2005

The Effects of Institutional Factors on the Success of Community College Students

Thomas Bailey, Juan Carlos Calcagno, Davis Jenkins, Gregory Kienzl, and Timothy Leinbach

Community colleges are the gateway to higher education for many students who would otherwise have limited access to college, particularly those who are from low-income households or are ethnic minorities, first-generation college students, or immigrants. Yet only about one-third of all community college students receives any degree or certificate even eight years after initial college enrollment. And credit accumulation and completion rates are even lower for minority and low-income students. Meanwhile, community college student outcomes, as measures of college effectiveness, are of increasing concern for institutional accountability. The Bush administration and many legislators in Congress would like to hold postsecondary institutions to higher standards of accountability, just as they have done with elementary and secondary schools. Institutional reporting requirements to the Department of Education now include data for graduation rates overall and broken out by gender and race/ethnicity. More than half of all states take into account the performance of public colleges when determining higher education appropriations.

The use of completion rates as the primary yardstick for accountability puts pressure on community colleges to improve student outcomes. Yet, community college advocates have resisted the use of completion rates either as an accountability measure or as a normative goal. They argue that many community college students only want to learn new skills or enroll for personal enrichment – goals for which such students may obtain tangible benefits. Further, many factors that may create barriers to student completion are beyond the control of colleges, such as a student's poor academic preparation. Because community colleges must accept all eligible students seeking to enroll, they often have student populations comprised of individuals who would not be admitted to more selective institutions or who may have many challenges to graduation. For such reasons, standard completion measures such as graduation rates may judge community colleges unfairly.

Still, measuring institutional graduation rates can provide useful information about differences among colleges, such as leading researchers to identify policies and practices that might promote student success at

those colleges with higher relative rates. For an individual college, analysis of its completion rates can be an important way to measure the effectiveness of its policies and practices relative to other similar institutions.

This Brief summarizes a research project, conducted by the Community College Research Center (CCRC) and one component of a Ford Foundation-funded study on minority degree attainment at community colleges, which used institution-level data to analyze the effect of community college characteristics on student performance. The study provides an important first step in identifying the institutional factors – characteristics, policies, and programs – that contribute to improved educational outcomes for community college students.

Methodology

Background

Most of the research on institutional factors affecting student outcomes has been carried out at baccalaureate institutions. The models used in those studies are largely inappropriate for an analysis of community colleges because community colleges generally have substantially different structures, missions, and funding mechanisms than most baccalaureate institutions. Therefore, to more accurately identify community college characteristics associated with higher graduation rates, CCRC researchers developed a theoretical framework based on the nature of these colleges and models that consider their particular characteristics. Both student and institutional characteristics were incorporated into each model in order to control for student characteristics and to identify institutional characteristics that promote or detract from student completion. We used grouped logistic regression to estimate the models.

Models and Data Sources

The first model, an *institutional level* analysis, uses institutional graduation rates as the outcome variable to be explained, with institutional characteristics as the explanatory variables. The data are for all community colleges from the Graduation Rate Survey of 2002-03 from the Integrated Postsecondary Education Data System (IPEDS) of the National Center for Education Statistics (NCES). In this model, the interpretation of the variables represents the effect of institutional factors on the likelihood of the average first-time, full-time (FTFT) degree-seeking community college student to earn a credential (associate degree or certificate).

We tested a variety of institutional characteristics and institutional student demographics: location (urban,

suburban, or rural); whether a college awards more certificates than associate degrees; institution size (measured by full-time equivalent (FTE) undergraduates); the proportion of part-time faculty; the proportions of FTE minority students (black, Hispanic, or Native American), female students and part-time students; federal student aid per FTE (serving as a proxy for the relative income level of the student body); undergraduate in-state tuition; and expenditures per FTE undergraduate on instruction, academic support, student services, and administration.

The study of the impact of institutional characteristics on institutional graduation rates is informative, but it only tells us about the increased or decreased likelihood of the average student at an institution completing a degree, where the average student is determined by that institution's characteristics. To ascertain the likelihood of a *particular type of student* at the institution completing a credential or transferring to a baccalaureate institution we applied our second model, the *individual level* analysis. This model uses the institutional characteristics from IPEDS together with individual student background and enrollment characteristics from the National Education Longitudinal Study of 1988 (NELS:88) dataset as the explanatory variables, and student outcomes by 2000

(eight years after high school class graduation) from NELS:88 as the dependent variable. We selected the sample of all students from NELS:88 whose initial postsecondary enrollment is at a community college. An additional analysis of this model included the subset of community college students enrolled in associate degree programs.

The explanatory individual characteristics include gender, race/ethnicity, socioeconomic status (measured by household income, highest level of parents' education, and parents' occupation), ability (measured by 12th grade reading and math composite test scores), type of major, financial aid received, enrollment in remediation, delayed enrollment, full-time enrollment, and interruptions in enrollment for more than four months.

Table 1 lists the institutional and individual explanatory variables and their mean values in each sample for the models.

Results

Institutional Level

Effects of Community College Characteristics on Overall Student Outcomes.

In general, we found that colleges located in urban areas are predicted to have 3.5 percent lower graduation rates, while rural colleges can expect nearly 4 percent higher graduation rates. Larger community colleges, no matter whether they are urban or rural, and especially those with more than 2,500 FTE undergraduates, have 9 to 14 percent lower graduation rates than do smaller colleges. Not surprisingly, colleges that emphasize certificates have higher completion rates. A student is more likely to complete a certificate program than an associate degree program in three years.

With respect to the positive effect of a college's deployment of financial resources, only a greater expenditure on instruction is statistically significant. However, the magnitude of the effect is not very large: an additional \$1,000 spent on instruction per FTE undergraduate improves graduation rates by 1.3 percent.

Effects of Community College Student Demographics on Overall Student Outcomes. In terms of the demographic characteristics of the student body, having a large proportion of minority students enrolled at a college lowers the probability of completion by first-time full-time students, even after controlling for other characteristics of the college.

Colleges with a relatively larger part-time student population have

Table 1: Mean Values of Community College Institutional and Individual Characteristics

Variable	Institutional Level		Individual Level	
	All Community Colleges	All Community College Students	Associate Degree Students	
<i>Observations</i>	<i>915 colleges</i>	<i>1,464 students</i>	<i>892 students</i>	
FTFT degree-seeking undergraduates	505	-	-	
FTFT degree-seeking undergraduates who earned a degree or certificate within three years	113	-	-	
Earned a degree or certificate or transferred to a baccalaureate institution by the end of NELS:88 survey	-	52.1%	48.9%	
<i>Individual Student Characteristics (NELS:88)</i>				
Female	-	48.4%	48.2%	
White	-	71.2%	70.9%	
Black	-	8.5%	9.2%	
Hispanic	-	15.8%	17.9%	
Asian	-	3.8%	2.0%	
SES: lowest quartile	-	17.0%	19.0%	
SES: second quartile	-	29.4%	31.7%	
SES: third quartile	-	30.3%	25.9%	
SES: highest quartile	-	23.3%	23.3%	
Test scores: lowest quartile	-	19.1%	19.1%	
Test scores: second quartile	-	29.5%	30.4%	
Test scores: third quartile	-	34.1%	35.8%	
Test scores: highest quartile	-	17.3%	14.7%	
Received any type of financial aid	-	42.3%	43.1%	
Academic major	-	39.2%	41.6%	
Occupational major	-	47.3%	51.5%	
No major	-	9.6%	6.7%	
Took remedial courses	-	56.5%	56.9%	
Delayed enrollment	-	20.0%	21.1%	
Interrupted enrollment	-	38.6%	36.6%	
Full-time enrollment	-	17.2%	17.8%	
<i>Institutional Characteristics (IPEDS 2002-03)</i>				
Located in urban area	38.7%	50.1%	48.3%	
Located in suburban area	52.4%	46.8%	48.7%	
Located in rural area	9.0%	3.1%	3.0%	
Historically black college or university	0.9%	0.3%	0.4%	
Tribal college	1.9%	0	0	
Awards more certificates than associates	17.1%	8.9%	8.0%	
Proportion part-time faculty	52.6%	52.6%	54.0%	
In-state tuition	\$1,659	\$1,356	\$1,433	
Instructional expenditures ^a	\$4,157	\$2,773	\$2,733	
Academic support ^a	\$817	\$463	\$458	
Student services ^a	\$981	\$574	\$568	
Administrative expenditures ^a	\$1,461	\$1,293	\$878	
Federal aid (Pell Grants) ^a	\$824	\$539	\$560	
<i>Institutional Student Demographics (IPEDS 2002-03)</i>				
1000 or fewer FTE undergraduates	20.7%	4.2%	4.6%	
1001-2500 FTE undergraduates	37.0%	27.6%	27.4%	
2501-5000 FTE undergraduates	25.0%	24.2%	25.9%	
More than 5000 FTE undergraduates	17.3%	44.0%	42.1%	
Percent FTE female undergraduates	57.5%	56.1%	56.0%	
Percent FTE minority	23.3%	19.0%	18.8%	
Percent FTE part-time undergraduates	33.9%	36.6%	35.8%	

Notes: Authors' calculations. Sources in parentheses. ^aper FTE undergraduate.

lower completion rates, even for full-time students at such colleges. Similarly, a high proportion of female students is negatively associated with completion rates. The relationship between graduation rates and the share of women is surprising, since almost all research on retention and graduation shows that women graduate at higher rates than men, after controlling for other variables. To further test this finding, we disaggregated the institutional completion rates by gender, and found that the proportion of part-time students is negatively associated with completion rates only if the institution has more than 50 percent women. Our conclusion, therefore, is that a high proportion of female students lowers the institutional completion rate primarily when the college also serves a large number of part-time students.

Implications for Benchmarking Performance. In addition to identifying institutional characteristics that are related to higher graduation rates, our analysis can be used to benchmark the performance of individual community colleges. This is done by calculating the expected graduation rate of each college, based on its characteristics and student demographics, and comparing it to the actual graduation rate. An actual rate that exceeds an expected rate suggests that the college is over performing relative to its characteristics. While such a finding does not reveal the factors that cause this achievement, it suggests that case studies of over- and under-performing institutions would be useful to identify unmeasured characteristics or practices that could explain the higher than expected student completion rates.

To illustrate this analysis, we examined the graduation rates of 27 colleges participating in the *Achieving the Dream: Community Colleges Count* initiative funded by the Lumina Foundation for Education.¹ Their actual graduation rates ranged from 1 percent to 34 percent. While several colleges with high graduation rates are performing above their expected rate (based on their characteristics), for others the ranking shifts down when controlling for college characteristics. For example, one college with a 25 percent graduation rate has a predicted rate of 34 percent. Therefore, while it ranks fourth (out of 27 colleges) in actual graduation rate, it ranks eighteenth when the difference between the expected and actual graduation rates is used. Similarly, a college ranked eighteenth based on its actual graduation rate rises to tenth based on its performance relative to its expected rate.

Individual Level

Effects of Individual Student Characteristics on Individual Student Outcomes for All Community College Students. The results for the student characteristic effects are consistent with previous studies (see Bailey, Alfonso, Scott, & Leinbach, in press). We found that black race/ethnicity, enrollment in an occupational major or in no major, enrollment in remedial courses, delaying enrollment by more than one year after high school graduation, and interrupting enrollment by more than four months all have consistently significant negative impacts on the completion rates of community college students. We also found that students from high SES households, recipients

of financial aid, and full-time enrollees are all more likely to graduate or transfer.

Effects of Community College Characteristics on Individual Student Outcomes for All Community College Students. Students at community colleges with 2,501 to 5,000 FTE undergraduates are 20 percent less likely to achieve a successful outcome than students at colleges with 1,000 or fewer FTE undergraduates. A \$1,000 increase in in-state tuition decreases the probability of graduation by 4 percent, although the result is statistically weak. Further, large expenditures for academic support services are negatively associated with the probability to complete, possibly because institutions are spending more funds on these services in order to overcome student deficiencies (which we were unable to measure with our control variables). Conversely, funds spent on administration are associated with a higher probability of student success: a \$1,000 per FTE increase in administrative expenditures improves individual success by 7 percent; such expenditures may be associated with policies or practices that promote retention.

Effects of Community College Student Demographics on Individual Student Outcomes for All Community College Students. The only demographic characteristic of the student body that had a statistically significant effect on individual student outcomes is percent minority, which negatively impacted students' likelihood of earning a credential or transferring.

Effects of Individual Student Characteristics on Individual Student Outcomes for Associate Degree Program Students. The results for the student characteristic effects on associate degree students have only small differences with that for all community college students. Enrollment in an occupational or no major, delaying enrollment, and interrupting enrollment are still significant and negative for student completions. However, while black race/ethnicity is still negative, it is no longer significant. High SES students, high ability students, recipients of financial aid, and full-time enrollees all continue to be significantly more likely to graduate, but we also found that female associate degree students have a statistically significant 15 percent higher probability of graduating than their male peers.

Effects of Community College Characteristics on Individual Student Outcomes for Associate Degree Program Students. Associate degree students at larger institutions are less likely to graduate than those at smaller institutions. However, students attending rural institutions are more likely to have a successful outcome than those in urban and suburban areas. Students enrolled in certificate degree-oriented institutions have roughly a 14 percent lower chance of graduating. A largely part-time faculty is also a negative factor affecting the probability of success of associate degree students. Finally, student service expenditures per FTE have a positive impact on this population.

Effects of Community College Student Demographics on Individual Student Outcomes for Associate Degree Program Students. The outcomes of associate students are affected negatively by increases in the proportion of FTE undergraduates who are enrolled

¹CCRC is one of the research partners collaborating in the *Achieving the Dream* initiative

part-time, regardless of whether an individual student attends part-time. Similarly, a larger percentage of minority students at an institution is associated with a lower likelihood of graduation. A large number of Pell Grants (which provide financial aid to low-income students) per FTE undergraduate is a negative and significant factor in educational attainment for associate degree program students, regardless of whether they themselves are from lower income households.

Conclusions

As open access institutions, community colleges are available to all students, regardless of ability, academic background, or enrollment intentions. In order to raise student outcomes colleges must strive to identify and engage in institutional practices that will promote success for all of their students. This study, which used national institutional and individual student data to measure the institutional characteristics that affect community college student outcomes, is a first step toward that goal.

In summary, the most consistent finding is that students complete at higher rates in smaller colleges. Perhaps such institutions can provide a more personalized environment or have a more limited and focused set of programs, which may attract students who know what they want or help guide undecided students toward a clearer set of outcomes. One disturbing finding that needs further investigation is that students in colleges with more minority students tend to graduate at lower rates, even after controlling for the race of individual students. The effects of more funds spent on either instructional or student services expenditures is mixed, depending on other factors considered. Nevertheless, results suggest that cuts in either expenditure will lower college performance and thwart retention and completion.

The important contrasts between the institutional factors influencing success for community college students overall and for those in an associate degree program suggest that certificate and associate programs have different dynamics, and policies that promote success in one might not work for the other. Adult community college students are more likely than younger

students to enroll in certificate programs and they probably also respond differently to particular types of policies and practices.

Overall, the individual characteristics of students appear to be more important determinants of graduation and retention than the institutional variables. There may be several explanations for this. Well-prepared students with economic resources may succeed in a variety of institutions, whereas students with many barriers may have trouble even in more effective colleges. It is possible that even larger expenditures on instruction and services are not enough to counteract the student characteristics that compromise their ability to succeed. It is also possible that there are simply inadequate data on the most effective institutional policies.

No NCES national datasets contain all the information on institutional factors together with student characteristics that would enable a comprehensive analysis of the role a community college plays in the outcomes of its students. Still, this quantitative analysis of national data provides a foundation for investigations of individual institutions' policies and practices that promote student success. The study discussed here is only the beginning of a set of projects designed to refine both our knowledge of the institutional factors that can promote community college student completions and the methods used to analyze and study those effects.

References

- Bailey, T., Alfonso, M., Scott, M., & Leinbach, T. (in press). Educational outcomes of occupational postsecondary students. New York: Community College Research Center, Teachers College, Columbia University.

This Brief was prepared by the Community College Research Center (CCRC), Teachers College, Columbia University. The research was funded by the Ford Foundation. The work reported here has also benefited from research funded by the Lumina Foundation for Education (as part of the *Achieving the Dream: Community Colleges Count* initiative). The full report on which this Brief is based is available on the CCRC website, <http://www.tc.edu/ccrc>.

Thomas Bailey is the Director of both the Community College Research Center and the Institute on Education and the Economy. He is also the George and Abby O'Neill Professor of Economics and Education at Teachers College, Columbia University.

Juan Carlos Calcagno is a Research Fellow at the Community College Research Center, Teachers College, Columbia University.

Davis Jenkins is a Senior Research Associate at the Community College Research Center, Teachers College, Columbia University and a Senior Fellow at the Great Cities Institute, University of Illinois at Chicago.

Gregory Kienzl is a Research Analyst at the Education Statistics Services Institute of the American Institutes for Research and formerly a Research Associate at the Community College Research Center, Teachers College, Columbia University.

Timothy Leinbach is a Research Associate at the Community College Research Center, Teachers College, Columbia University.