



MAPPING SUCCESS

Performance-Based Scholarships,
Student Services, and Developmental
Math at Hillsborough Community College

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October 2014

THE PERFORMANCE-BASED SCHOLARSHIP DEMONSTRATION

EXECUTIVE SUMMARY

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Funders of the Performance-Based Scholarship Demonstration

Bill & Melinda Gates Foundation
College Access Foundation of California
Helios Education Foundation
Institute of Education Sciences, U.S. Department of Education
The Joyce Foundation
The Kresge Foundation
NYC Center for Economic Opportunity
The Ohio Department of Job and Family Services through the Ohio Board of Regents
Open Society Foundations
Robin Hood Foundation

Dissemination of MDRC publications is supported by the following funders that help finance MDRC's public policy outreach and expanding efforts to communicate the results and implications of our work to policymakers, practitioners, and others: The Annie E. Casey Foundation, The Harry and Jeanette Weinberg Foundation, Inc., The Kresge Foundation, Laura and John Arnold Foundation, Sandler Foundation, and The Starr Foundation.

In addition, earnings from the MDRC Endowment help sustain our dissemination efforts. Contributors to the MDRC Endowment include Alcoa Foundation, The Ambrose Monell Foundation, Anheuser-Busch Foundation, Bristol-Myers Squibb Foundation, Charles Stewart Mott Foundation, Ford Foundation, The George Gund Foundation, The Grable Foundation, The Lizabeth and Frank Newman Charitable Foundation, The New York Times Company Foundation, Jan Nicholson, Paul H. O'Neill Charitable Foundation, John S. Reed, Sandler Foundation, and The Stupski Family Fund, as well as other individual contributors.

The findings and conclusions in this report do not necessarily represent the official positions or policies of the funders.

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Overview

In 2010, Hillsborough Community College (HCC), a large multicampus institution in Tampa, Florida, worked with MDRC to create the Mathematics Access Performance Scholarship (MAPS) program to help academically underprepared community college students succeed in developmental math. MAPS provides an incentive for low-income students referred to developmental math to take their math courses early and consecutively, get help with math in an on-campus Math Lab, and strive for passing grades or better, in exchange for a modest scholarship contingent on performance. MAPS is part of the national Performance-Based Scholarship (PBS) Demonstration, which is testing performance-based scholarships with varying student populations and program requirements.

MAPS offered eligible students the opportunity to earn a performance-based scholarship of up to \$1,800 (\$600 per semester for three semesters) for successfully completing a three-course sequence — comprising Beginning Algebra, Intermediate Algebra, and a first-level college math course — within a period of three consecutive semesters plus a summer term. MAPS is the only program in the PBS Demonstration that provides an incentive for a specified course sequence. MDRC used a random assignment design to study the effects of MAPS compared with HCC’s standard services. Academic outcomes were tracked for all sample members for two years.

Key Findings

The findings at HCC, like those across the PBS Demonstration, are modest but positive.

- **More than 90 percent of program group students earned a MAPS award in the first semester, but scholarship receipt rates declined in the second and third semesters.** Scholarship receipt rates decreased partly because fewer students reenrolled each semester, although rates declined even after accounting for decreased enrollment.
- **MAPS students were much more likely to visit a Math Lab than control group students.** MAPS students were 38 percentage points more likely than control group students to visit a Math Lab in the first semester; a similar difference occurred in the second semester. MAPS students also spent more time in the Math Labs on average than did control group students.
- **MAPS helped move students further along in the math course sequence, and MAPS students also accumulated more credits overall — in part because of their greater progress in math.** By the end of two years, MAPS students were 11 percentage points more likely than control group students to complete a college-level math course or Intermediate Algebra as their highest-level math course (48.7 percent versus 37.8 percent). The program’s estimated effect on total credit accumulation is statistically significant after one semester, after one year, and after one year and one semester. After two years, MAPS students had earned 1.6 more total credits than their control group counterparts, although the increase of 7 percent is no longer statistically significant.
- **The program had no discernible impact on students’ retention.** Program group students were no more likely to reenroll in subsequent semesters than were control group students.

A future report will present a synthesis of the final results from sites across the PBS Demonstration.

Preface

Community colleges, which serve the postsecondary needs of more than one-third of college students in the United States today, are the primary providers of remediation for students who enter college academically underprepared. Developmental (or “remedial”) math is a particular challenge for community college students. In one study of more than 250,000 community college students, only 20 percent of students who were referred to developmental math passed a college-level math course — a course that is almost always required for graduation.

The Mathematics Access Performance Scholarship (MAPS) program, part of MDRC’s Performance-Based Scholarship (PBS) Demonstration, serves low-income students who are referred to developmental math. The program provides an incentive for students to take their math courses early and consecutively, get help with math in an on-campus Math Lab, and strive for passing grades or better, in exchange for a modest grant contingent on performance. The findings presented in this report, from MDRC’s evaluation of the MAPS program, indicate that MAPS led more students to visit a Math Lab and propelled them further in the math sequence, with a positive impact on students’ registration for and completion of a college-level math course. MAPS students also accumulated more credits overall. However, some academic outcomes remain unaffected, such as student retention from semester to semester. These modest but positive findings at HCC align with those found at other colleges in the PBS Demonstration, indicating that performance-based scholarships can give students a small push in the right direction.

In general, impacts for performance-based scholarship programs are slightly more positive than for other scholarship programs found in the literature. This result may reflect the targeting of programs; on average, students in the PBS Demonstration have one or more risk factors for not completing college, such as low-income status, parenthood, or being older than traditional college age, which may contribute to the larger effect of the contingent grant on academic outcomes. Financial incentives may be especially relevant to these students. Scholarship providers may find that targeting their scholarships in purposeful ways, for instance by creating incentives for academic success or participation in student services, generates a greater return on investment than merit-based scholarship programs.

A cross-site report on the PBS Demonstration will be published in 2015. This report will include longer-term follow-up for all colleges, including HCC, and will look at patterns and impacts across colleges to draw lessons from the larger demonstration. These findings will add to the growing body of knowledge about performance-based scholarship models and the efficacy of incentives for improving academic success among low-income students.

Gordon L. Berlin
President, MDRC

Acknowledgments

The Performance-Based Scholarship (PBS) Demonstration is made possible by anchor support from the Bill & Melinda Gates Foundation. The Mathematics Access Performance Scholarship (MAPS) program and its evaluation at Hillsborough Community College (HCC) specifically were supported by the Helios Education Foundation and the Open Society Foundations. We thank our program officers at these foundations who participated enthusiastically throughout the operation of MAPS.

We would like to thank the administrators and staff members at HCC who developed and implemented MAPS. While it is impossible to name everyone who supported this project over the last few years, we want to acknowledge a few individuals. We owe special thanks to Craig Johnson, Robert Wynegar, Shannon Grinstead, Elizabeth Stewart, and Nicole Jagusztyn. Judy Alicea, the MAPS Program Coordinator, earned our gratitude repeatedly throughout the project and we want to thank her for her role in supporting the students and supporting the research. We also want to thank all the employees of HCC's Math Labs, who played an especially hands-on role in supporting the students in this study.

Many MDRC staff members have contributed to the PBS Demonstration and to this report. On the project team, we would like to recognize Lashawn Richburg-Hayes and Robert Ivry for their leadership and guidance throughout this project, and Amanda Grossman for resource management. We must also thank Joel Gordon, Galina Farberova, Shirley James, and her staff in the data room for making random assignment and baseline data collection possible. Caitlin Anzelone supported the operations effort of the program. Nikki Gurley, Melvin Gutierrez, Jonathan Rodriguez, and Camielle Headlam conducted the data checks, ensured quality control, fact-checked this report, and provided support in preparing it for publication. Gordon Berlin, Dan Bloom, Alexander Mayer, Rashida Welbeck, and Joshua Malbin reviewed drafts of this report and provided valuable feedback. Sonia Kane edited the report and Carolyn Thomas prepared it for publication. Former MDRC staff members Reshma Patel, Bethany Miller, Jed Teres, Jasmine Soltani, and Hannah Fresques also provided valuable contributions over the course of the project.

Finally, but most important, we would like to thank the hundreds of HCC math students who participated in this study. We hope that the findings from this study, and from the PBS Demonstration overall, can be used to improve college programs and services to them and others in the future.

The Authors

Executive Summary

Community colleges, which serve the postsecondary needs of more than one-third of college students in the United States today,¹ are also the primary providers of remediation for students who enter college academically underprepared.² According to the National Center for Education Statistics, more than two-thirds of entering community college students take at least one remedial course within six years of first enrollment.³ Unfortunately, many students who enter a course of remediation struggle to complete that course, and only a third of students who take a remedial course in any subject earn a postsecondary degree.⁴ Developmental math is a particular challenge: in one study of more than 250,000 community college students, only 20 percent of students who were referred to developmental math passed a college-level math course — a course that is almost always required for graduation.⁵

To tackle the issue of developmental math success, Hillsborough Community College (HCC), a large multicampus institution in Tampa, Florida, worked with MDRC to create the Mathematics Access Performance Scholarship (MAPS) program in 2010. MAPS is a performance-based scholarship program that provides an incentive for low-income students in developmental math to take their math courses early and consecutively, get help with math in an on-campus Math Lab, and to strive for passing grades or better, in exchange for a modest grant contingent on performance. MAPS is part of the Performance-Based Scholarship (PBS) Demonstration, a national demonstration project that is testing performance-based scholarships in a variety of settings, with different populations and varying program requirements. MAPS is

¹U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, “Total Fall Enrollment in Degree-Granting Institutions, by Control and Level of Institution: 1963 Through 2010,” *Digest of Education Statistics* (2011): Table 199.

²This report uses the terms “developmental education” and “remediation” interchangeably. Although the terms may be interpreted somewhat differently, both refer to courses provided to students who are judged to be underprepared for college-level coursework.

³These data are based on U.S. Department of Education, National Center for Education Statistics (NCES), Beginning Postsecondary Students data from a computation using the NCES QuickStats website; see <http://nces.ed.gov/datalab/quickstats>.

⁴Clifford Adelman, *Principal Indicators of Student Academic Histories in Postsecondary Education, 1972-2000* (Washington, DC: U.S. Department of Education, Institute of Education Sciences, 2004); U.S. Department of Education, National Center for Education Statistics, “Percentage of Students Graduating with an Associate’s Degree Within 3 Years of Entry from the 2-Year Degree-Granting Institutions Where the Students Started as Full-Time, First-Time Students,” *United States Education Dashboard* (Spring 2010). Website: <http://dashboard.ed.gov>.

⁵Thomas Bailey, Dong Wook Jeong, and Sung-Woo Cho, “Referral, Enrollment, and Completion in Developmental Education Sequences in Community Colleges,” *Economics of Education Review* 29 (2010): 255-270.

an important part of the PBS Demonstration as it is the only program that provides an incentive for a specified course sequence.

After two years, the MAPS program has modestly helped students move further along the required math course sequence.

MAPS Program Model

MAPS offered students the opportunity to earn a performance-based scholarship of up to \$1,800 for successfully completing a three-course sequence within a period of three consecutive semesters plus a summer term:

1. **Beginning Algebra:** a developmental math course
2. **Intermediate Algebra:** a transitional course bridging developmental and college-level math classes
3. **First level of college math:** College Algebra, Elementary Statistics, or Math for Liberal Arts, depending on student's major

The MAPS scholarship was awarded at two payment points each semester:

1. **Initial payment:** \$100 was paid for remaining enrolled in the specified math course as of the end of the add/drop period (typically two weeks into the semester).
2. **Final payment:** \$500 was paid for successfully completing the specified math course with a "C" or better (with the payment made after final grades had come in for the semester, typically one to two weeks after the last day of classes) and meeting Math Lab requirements as follows:
 - **Beginning Algebra:** minimum of five visits and five total hours over the course of the semester
 - **Intermediate Algebra:** minimum of three visits and three total hours over the course of the semester
 - **College-level math course:** no Math Lab requirement

In addition, students who received a grade of “B” or better in the specified math course received a **bonus award** at the end of the semester, in the form of a math textbook for the next course or a book voucher.⁶

Students who did not succeed in one of the three courses by earning a passing grade were still eligible to earn the final payment of the scholarship for that course if they reattempted and passed it within the program period.⁷ Additionally, students received occasional reminders via e-mail from program staff about program requirements.

Evaluation and Research Sample

MDRC used a random assignment research design to estimate the effects of MAPS on academic outcomes. The evaluation includes an implementation study, an impact study, and a cost-effectiveness analysis.

HCC targeted its MAPS program to students who met the following criteria:

1. 18 years of age or older
2. Low-income, defined as having an Expected Family Contribution (EFC) of up to 5,273⁸
3. In need of Beginning Algebra (the highest level of developmental math)

Students who met all of the eligibility criteria and were interested in participating in the research study were randomly assigned either to a program group that was eligible to participate in MAPS or to a control group that received standard college services.

⁶Eligible students typically received a math textbook as their bonus award for the first two courses, and a voucher for the third course.

⁷Students who attempted a course, received the initial payment of \$100, and did not pass at the end of the term were able to retake the course. During the retake, students would not be eligible to receive the initial payment for enrolling, but would be eligible to receive the final payment of \$500 for meeting the Math Lab and grade requirement in the course.

⁸The Expected Family Contribution is a measure of a student’s and/or family’s ability to contribute toward the cost of college and is calculated according to a formula established by federal law. Elements of the formula may include the family’s taxed and untaxed income, assets, and benefits, such as unemployment and Social Security; the size of the family; and the number of family members enrolled in postsecondary education in the given year.

At the time of this study, students with an EFC of 5,273 or less were eligible to receive a Pell Grant.

Implementation Findings

The MAPS program was implemented at Hillsborough Community College, a two-year college with five campus locations, three satellite locations, and an active distance-learning community in Florida. The MAPS evaluation was conducted at two of HCC's largest campuses, Dale Mabry and Brandon. Both campuses had significant course offerings and established support resources (such as Math Labs) in place at the time of the study's inception to support the program, as well as the support of campus leadership necessary to implement the program.

The key findings on the implementation of MAPS follow.

- **MAPS operated largely as designed.**

Program staff fulfilled their duties as expected, and scholarship payments and book bonuses were distributed with few errors.

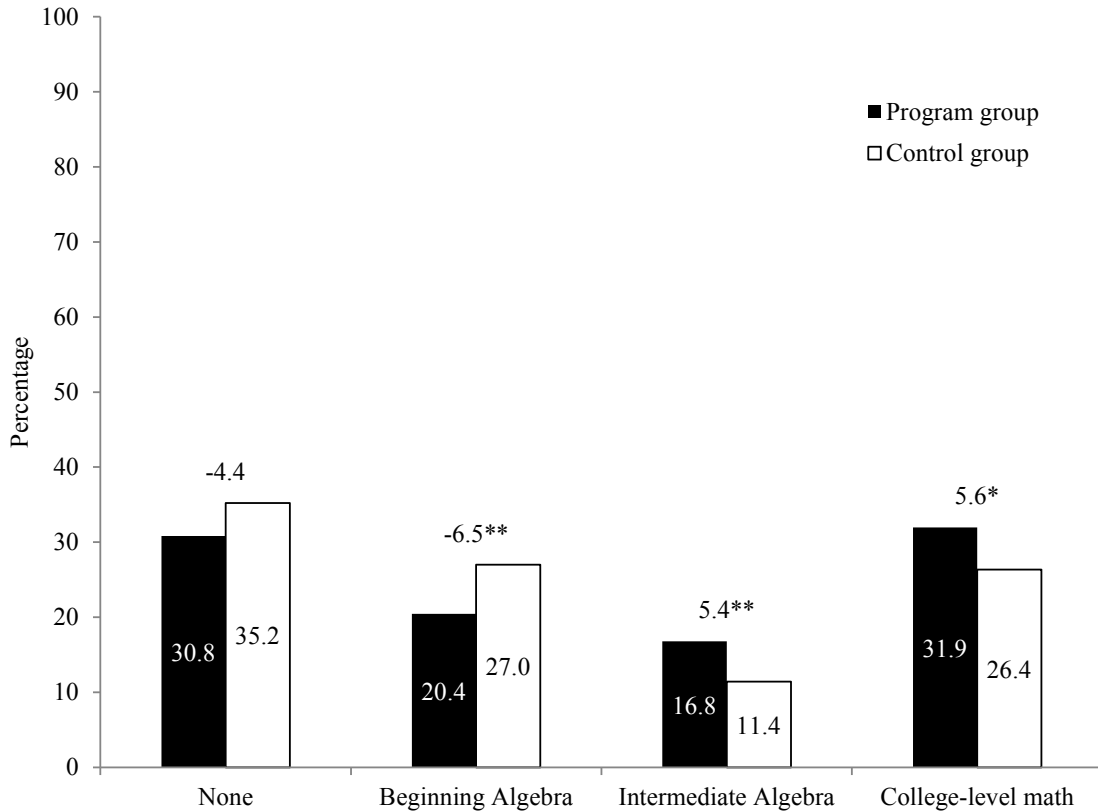
- **More than 90 percent of students in the program group earned a MAPS award in the first semester, but rates of scholarship receipt declined to slightly less than 60 percent in the second semester and around 30 percent in the third semester.**

Scholarship receipt rates decreased partly as a result of fewer students reenrolling each semester: only around 80 percent and 60 percent of program group students reenrolled in the second and third semesters, respectively. However, even after accounting for students who did not reenroll at HCC, rates of scholarship receipt declined: more than 95 percent of program group students who were enrolled in the first semester received a MAPS payment, while only slightly more than 50 percent of students who were enrolled in the third semester did.

- **MAPS students were much more likely to visit the Brandon and Dale Mabry Math Labs than control group students.**

MAPS students were 38 percentage points more likely than control group students to visit the Math Labs in the first semester — 87 percent of program group students visited the Math Labs, compared with 49 percent of control group students. A similar difference occurred in the second semester. In both the first and second semesters, MAPS students also spent more time and made more visits to the Math Labs on average than control group students — more than doubling the average number of visits and average number of hours spent there by control group students.

The Performance-Based Scholarship Demonstration
Figure ES.1
Highest Level of Math Completed After Two Years
Hillsborough Community College



SOURCE: MDRC calculations from Hillsborough Community College transcript data.

NOTES: Rounding may cause slight discrepancies in sums and differences. Estimates are adjusted by cohort-campus interaction, National Center for Education Statistics risk factors, and selected pre-random assignment placement test scores.

A two-tailed t-test was applied to differences between research groups. Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent.

Academic Findings

Academic outcomes were tracked for all sample members for two years. The key findings are:

- **MAPS helped move students further along in the math course sequence.**

As shown in Figure ES.1, compared with their control group counterparts, MAPS students were 11 percentage points more likely at the end of two years to complete a

college-level math course or Intermediate Algebra as their highest-level math course. This translates to an estimated average effect of 0.7 math credit, or a 15 percent increase in math credit accumulation (not shown in the figure).

- **There is evidence that MAPS improved students' overall academic progress as measured by total credit accumulation. This occurred, in part, because students made greater progress in mathematics as a result of MAPS.**

As shown in Figure ES.2, the program's estimated effect on total credit accumulation, including both math credits and credits for courses other than math, is statistically significant after one semester, after one year, and after one year and one semester. After two years, students who were offered MAPS earned 1.6 more total credits than their control group counterparts, a 7 percent increase, although this is no longer statistically significant. Taken together, this evidence suggests that MAPS improved students' overall academic progress.

Additionally, exploratory analyses suggest that MAPS may be more effective for financially independent students and for students who entered the study more than a year after graduating from high school or receiving a General Educational Development (GED) certificate. (The former group may be more likely to take responsibility for their own fiscal situation, while the latter may have been out of the math classroom for a while.) This finding will be strengthened if it is replicated at other colleges that implement performance-based scholarship programs.

- **The program had no discernible impact on students' retention.**

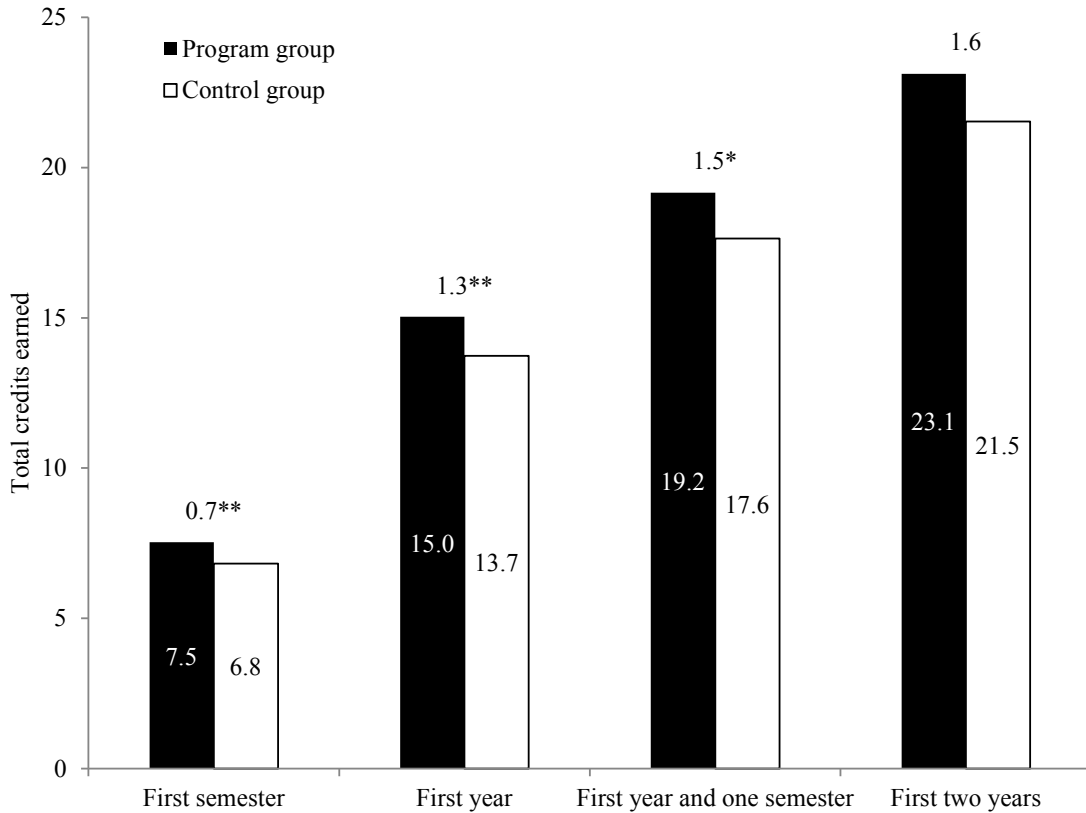
Over the first four semesters, MAPS had no statistically significant impact on students' semester-to-semester retention. That is, program group students were no more likely to reenroll in subsequent semesters than control group students.

- **The cost-effectiveness findings on MAPS are mixed and vary by outcome. MAPS was able to lower the cost per college-level math course completion when compared with the usual college experience but did not lower the cost of math credits and total credits earned.**

The analysis shows that the \$1,394 to \$1,863 of additional investment in each program group member resulted in an increase of 5.6 percentage points in the likelihood of completing a college-level math course. This impact is large enough that when costs (direct program costs plus the cost of credits attempted by students over two years) are tied to the number of college-level math course completions, the program lowers the cost per outcome achieved in comparison with the cost per outcome of the usual college services without the

The Performance-Based Scholarship Demonstration

**Figure ES.2
Total Credits Earned After Two Years
Hillsborough Community College**



SOURCE: MDRC calculations from Hillsborough Community College transcript data.

NOTES: Rounding may cause slight discrepancies in sums and differences. Estimates are adjusted by cohort-campus interaction, National Center for Education Statistics risk factors, and selected pre-random assignment placement test scores.

A two-tailed t-test was applied to differences between research groups. Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent.

program. Specifically, the cost per completion of a college-level math course for the program group is up to 5 percent less than the cost per college-level math course completion for the control group. The program also resulted in students' earning 0.7 more math credit and 1.6 more credits overall; these impacts were not large enough, however, to lower the cost per math or total credits earned.

Conclusions and Next Steps

The MAPS program at HCC was designed to promote progress through a sequence of three math courses by creating incentives for enrollment, use of support services, and math performance. The findings that are reported here indicate that the program increased students' use of Math Labs and moved students further along in the math sequence — demonstrating that a program like this one can have an impact on developmental math progress. There is also evidence of modest improvement on overall academic progress. At the end of two years, the MAPS group was ahead of the control group by 1.6 credits.

The findings at HCC align with those at other colleges in MDRC's Performance-Based Scholarship Demonstration. By and large, the colleges in the demonstration have found that performance-based scholarships are able to improve some key academic outcomes, such as students' meeting the targeted academic benchmarks and earning more credits. However, some academic outcomes remain mostly unaffected, such as students' remaining in school for the next semester. The findings at HCC, and across the demonstration, are modest but positive, indicating that performance-based scholarships can give students a small push in the right direction.

A cross-college report on the PBS Demonstration will be published in 2015. That report will include longer-term follow-up for all colleges, including HCC, and will look at patterns and impacts across colleges to draw lessons from the larger demonstration. These findings will add to the growing body of knowledge about performance-based scholarship models and the efficacy of incentives for improving academic success among low-income students.

Earlier MDRC Publications on the Performance-Based Scholarship Demonstration

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2014. Rashida Welbeck, Michelle Ware, Oscar Cerna, Ileri Valenzuela, with Alyssa Ratledge, Melissa Boynton

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2013. Reshma Patel, Ileri Valenzuela with Drew McDermott

Performance-Based Scholarships: What Have We Learned?

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2013. Reshma Patel, Lashawn Richburg-Hayes, Elijah de la Campa, Timothy Rudd

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2011. Cynthia Miller, Melissa Binder, Vanessa Harris, Kate Krause

Promoting Full-Time Attendance Among Adults in Community College

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2011. Lashawn Richburg-Hayes, Colleen Sommo, Rashida Welbeck

Rewarding Progress, Reducing Debt

Early Results from Ohio's Performance-Based Scholarship Demonstration for Low-Income Parents

2010. Paulette Cha, Reshma Patel

Paying for College Success

An Introduction to the Performance-Based Scholarship Demonstration

2009. Lashawn Richburg-Hayes, Paulette Cha, Monica Cuevas, Amanda Grossman, Reshma Patel, Colleen Sommo

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About MDRC

MDRC is a nonprofit, nonpartisan social and education policy research organization dedicated to learning what works to improve the well-being of low-income people. Through its research and the active communication of its findings, MDRC seeks to enhance the effectiveness of social and education policies and programs.

Founded in 1974 and located in New York City and Oakland, California, MDRC is best known for mounting rigorous, large-scale, real-world tests of new and existing policies and programs. Its projects are a mix of demonstrations (field tests of promising new program approaches) and evaluations of ongoing government and community initiatives. MDRC's staff bring an unusual combination of research and organizational experience to their work, providing expertise on the latest in qualitative and quantitative methods and on program design, development, implementation, and management. MDRC seeks to learn not just whether a program is effective but also how and why the program's effects occur. In addition, it tries to place each project's findings in the broader context of related research — in order to build knowledge about what works across the social and education policy fields. MDRC's findings, lessons, and best practices are proactively shared with a broad audience in the policy and practitioner community as well as with the general public and the media.

Over the years, MDRC has brought its unique approach to an ever-growing range of policy areas and target populations. Once known primarily for evaluations of state welfare-to-work programs, today MDRC is also studying public school reforms, employment programs for ex-offenders and people with disabilities, and programs to help low-income students succeed in college. MDRC's projects are organized into five areas:

- Promoting Family Well-Being and Children's Development
- Improving Public Education
- Raising Academic Achievement and Persistence in College
- Supporting Low-Wage Workers and Communities
- Overcoming Barriers to Employment

Working in almost every state, all of the nation's largest cities, and Canada and the United Kingdom, MDRC conducts its projects in partnership with national, state, and local governments, public school systems, community organizations, and numerous private philanthropies.