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Achieving Equity: An Evaluation of a Multicomponent, Lower-Division Student Success Program

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Abstract

The purpose of this study was to evaluate an academic support program that aims to improve persistence and graduation for lower-division students who are low income, first generation, and/or underrepresented. Students were organized in 10 academies that serve as a "school within a school" and have three main elements: a pathway of two linked general education courses that students follow, cohort-style, over four

semesters; wraparound student services integrated into the classroom; and a 45-hour faculty development process. Program participants (n = 2,281) were compared to a matched comparison group (n = 2,276). Multimodal logistic regression analyses showed that program participants statistically significantly outperformed the comparison group on every outcome measure: GPA, completion of developmental coursework, persistence toward graduation, and graduation rates.

Introduction

Many colleges and universities are experiencing sharp increases in the number of undergraduate students who are low income, underrepresented, and/or first generation (Hussar & Bailey, 2013) because of a number of factors, including demographic shifts and migration patterns (Chee & Neo, 2018). At the same time, there is a worsening gap in college completion rates between disadvantaged students and their more advantaged peers (AACU, 2015; Cahalan et al., 2018). For students enrolled in any postsecondary institution, just 21% of low-income, first-generation students earned bachelor's degrees within 5–6 years, compared with 57% of their peers who were not low income and not first generation (Cahalan et al., 2018). Comparing the top and the bottom of the income distribution, the contrast in graduation rates is even more stark: in the U.S., 77% of children born into the top income quartile will earn a degree by age 24, but for the bottom quartile, that number is a mere 9% (Westover, 2019).

Completing a bachelor's degree is a multiyear endeavor that places demands on students at many levels—academic, social, and financial. Disadvantaged students, in particular, must overcome interlocking barriers to college success that require coherent, long-duration, multicomponent solutions. Evidence suggests that these are more effective than short-term or one-shot add-ons to current institutional practices, which tend to have modest, short-term effects (Mayer, 2018; Tinto, 2010). Mayer (2018, p. 1) says that "combining and integrating multiple evidence-based strategies to address multiple factors can be highly effective." However, there are few evaluations of such comprehensive interventions in the literature (Kruglaya, 2020; Museus, 2011). Student support programs typically do not intervene to improve the quality of student experience in the classroom, the main location for students' connection to the institution. Instead, retention programs are typically student services add-ons (Hunn, 2014).

The purpose of this study is to evaluate the outcomes of the Metro College Success Program at one of 23 institutions in the California State University system that accepts the top third of high school graduates. The program has three main elements: first, it places students in a cohort-style, long-duration learning community of general education (GE) courses, making up an academy of up to 140 students who take two classes together each semester throughout the lower division; second, it provides student services that are tied to the classroom (e.g., tutoring, academic advising, early intervention); and third, it requires faculty to participate in a structured 45-hour faculty development process, focused on mastering engaging pedagogy and social-justice-oriented curricula. These program elements are all supported by a strong data collection system that is critical to both the program's management and the assessment of its impact.

Barriers to College Success

Following a review of the literature and discussions of their experiences, Metro's founders initially identified four barriers to college success for disadvantaged students, focusing on the ones amenable to change in institutional practices and the classroom.

The first barrier is that many students from poorly resourced K–12 schools arrive at college with weak academic preparation. The larger context is a reality of segregated and unequal learning conditions and inadequate school funding. Funding inequities manifest in radically unequal K–12 learning conditions, so that schools in disadvantaged communities often experience an unstable, less-experienced teaching workforce with high teacher turnover, crumbling facilities,critically overcrowded classrooms (Carter & Welner, 2013), and fewer advanced classes (Journey for Justice Alliance, 2018).

To understand the scale of such unequal learning conditions, we reviewed a national data set, focusing on the state where this intervention is being carried out. A 2012 study showed that, in San Francisco, school districts along with state and local governments spent $4,380 less per student per year at schools that have 90% or more students of color compared with schools that have a population that is at least 90% white. These highly segregated learning conditions impact 40% of all Black and Latinx students. In San Francisco, if funding were not so skewed, an average-sized school with high numbers of students of color would have had a total improved revenue of an extra $3.3 million per year (Spatig-Amerikaner, 2012). More recently, an updated state school funding formula has partially addressed inequities in school financing, yet problems persist: San Francisco ranks 41st among the 50 states in per-pupil K–12 spending, and it ranks last on other measures, with the nation's worst ratios of teachers, guidance counselors, and librarians per student (Kaplan, 2017).

A second barrier is that student services may be fragmented from the students' main point of contact with the institution—classes (Lehan et al., 2020). Tinto (2012) notes:

> Too often, institutions invest in a laundry list of actions, one disconnected from another. The result is an uncoordinated patchwork of actions whose sum impact on student retention is less than it could or should be. Moreover, and just as important, most institutional efforts have been situated at the margins of students' educational life. They have neglected the classroom, the one place on campus, perhaps the only place, where the great majority of students meet the faculty and one another and engage in formal learning activities (p. 5).

Students most in need of support may not seek out services such as academic counseling, tutoring, and financial aid advising. They may not be aware that they need help, they may not know how to find services, or they may feel that using support would brand them as "not being college material" (Bailey et al., 2011, 2015a). Centralized campus services often lack both personal knowledge of the student and continuity over time. For many first-generation students, who often have less family-based guidance than more advantaged students, the user-friendliness of services is very important (McCallen, 2016).

A third barrier is that instructors may have little background on how to use engaging pedagogy and relevant, robust curricula to help students strengthen foundation skills. Postsecondary education is the only segment of U.S. education in which instructors are subject matter experts yet may never have studied engaging pedagogy or curriculum development. Faculty members who use traditional lecture-based pedagogy have often only experienced traditional lecture-based pedagogy themselves (Struyven et al., 2010). Too often, GE courses are seen as being dry, a barrier to students getting to classes whose content is more compelling ("I need to get those GEs out of the way"). Moreover, deficits in complex skills, such as writing, require a more intensive and long-duration approach than is possible in a single, stand-alone university class.

Finally, Pascarella and Terenzini's (2005) meta-analysis of nearly 2,600 college success studies over three decades concluded that interaction with peers is one of the most powerful forces in student persistence and graduation. Yet diverse, low-income, and first-generation students are less likely to be engaged in academic and social interactions that foster success in college, such as studying in groups and faculty interactions (Engle & Tinto, 2008). Many disadvantaged students juggle school and work, time-consuming commutes, as well as childcare and family responsibilities, so that many come to campus only for classes. These conditions create barriers to forming strong personal connections with peers, advisors, or faculty (Fox, 2017; Newbold, 2015).

These four factors, along with others, combine to create a high risk of students dropping out in the first 2 years, the time of most severe student attrition (StateUniversity.com, 2018). Nationally, more than a quarter of low-income, first-generation students leave after the first year, four times the dropout rate of their peers (First Generation Foundation, 2013). This is why Metro was established as a lower-division program.

Comparison With Other Long-Duration Multicomponent Programs

The literature suggests that there are few long-duration, multicomponent retention program models similar to Metro. In this section, we describe two that have received significant attention—guided pathways (GP) and Accelerated Study in Associate Programs (ASAP), looking at their similarities and differences with Metro.

The GP approach was first developed in university settings and later went to scale in community college settings (MDRC & CUNY, 2016). ASAP has been mounted in community college settings. The challenges facing Metro's disadvantaged university students are, in many ways, similar to those facing disadvantaged community college students seeking to transfer, so we found the literature on these programs to be very relevant.

Evolving from a series of studies carried out at the Community College Research Center (CCRC) at Columbia University, GP is a comprehensive set of institutional reform principles and a broad framework for postsecondary redesign, rather than a specific program model with required components, and refers to itself as "a movement." As of spring 2018, more than 250 community colleges had committed to using a GP approach (Center for Community College Student Engagement, 2020). The GP model is built upon three design principles:

> First, colleges' program redesigns must pay attention to the entire student experience, rather than to just one segment of it (such as developmental education or the intake process). Second, a GP redesign is not the next in a long line of discrete reforms, but rather a framework or general model that helps unify a variety of reform elements around the central goal of helping students choose, enter, and complete a program of study aligned with students' goals for employment and further education. Third, the redesign process starts with student end goals for careers and further education in mind and "backward maps" programs and supports to ensure that students are prepared to thrive in employment and education at the next levels (CCRC & AACC Pathways Project, 2015, p. 1).

GP is similar to Metro in that it requires full-time enrollment and is built around structured programs with degree road maps, required advising, and updated graduation plans from day one through completion. Like Metro, it calls for strong data systems to guide program improvement and provide early intervention if students start to falter. Both programs specify program-level student learning outcomes across courses and have predictable class times to make it easier for students to schedule classes. Both build in some professional development time for faculty (Bailey et al., 2015b).

GP is different than the Metro program in that it suggests reorganizing much of the institution into a small number of standard and career-aligned meta-majors. This might have the unintended consequence of tending

to narrow the curriculum and squeeze out locally responsive curricular innovations. Students are required to pick their meta-major early and are provided with a highly prescribed course roadmap. In contrast, Metro prescribes only two courses per semester and allows more room for choice and exploration. Metro also differs in that it intervenes strongly in the classroom, with a sequenced social justice curriculum aimed at strengthening students' core academic skills and providing faculty with 45 hours of professional development on engaging pedagogies.

We turn now to the second multicomponent and long-duration program, the ASAP. To our knowledge, ASAP is the only such program that has been evaluated with randomized controlled trials. ASAP targets multiple potential barriers to student success over a 3-year period by providing a number of supports outside of the classroom, including intrusive academic advising, career advising, free transportation contingent on required activities, free textbooks, and full tuition support (Scrivener et al., 2015). It requires students to attend full-time and offers prescheduled blocked courses for ASAP students in their first year. ASAP, first launched at City University of New York (CUNY), has since been replicated in a number of community college locations and evaluated by the Manpower Demonstration Research Corporation (MDRC) and CUNY (2016). ASAP produced the most significant results MDRC has found in decades-long evaluations of community colleges, nearly doubling the percentage of students who earned an associate's degree in 3 years—40% for program students versus 22% for a control group. Despite ASAP's substantially higher cost per student over the 3 years (about $16,300 more than usual practice), MDRC found that the cost per degree was ultimately lower because it produced so many more graduates in 3 years.

In MDRC's report on lessons learned over the past 15 years of postsecondary research, they noted that when short-term intervention strategies such as financial awards and enhanced guidance are combined, they have significantly larger and earlier impacts (2016). Additionally, academic progress is enhanced by strategies such as regular analysis of student activity data, advisors contacting students rather than waiting to hear from them, and advisors working consistently with the same groups of students.

ASAP is similar to Metro in that it is a specific program model with required components and full-time attendance, has required advising, is of long duration, and provides tutoring (MDRC & CUNY, 2016). It is unlike Metro in that it provides free tuition, books, and transportation. It also differs in that its interventions fall in the categories of student services and financial assistance, taking place outside the classroom; it does not redesign curriculum with a social justice orientation. Neither GP nor ASAP sets out to change pedagogy or the curriculum of individual classes.

Theoretical Framework

Aligned with McCallen's (2016) conceptualization of educational resilience, Metro's theoretical framework seeks to identify the "individual, social, and institutional factors that foster positive educational outcomes among students confronting a range of barriers to success in higher education" (p. 11). This framework aims to address the barriers faced by underrepresented and low-income students.

The applied theory of educational resilience makes use of critical ecological systems methodology that examine important contextual influences in several domains (intrapersonal, family, peer, neighborhood, school, community, institution, policy, and culture). It brings together the ecological system method with Perna and Thomas'(2006) integrated theory of college student success, proposing a conceptual model. Educational resilience theory takes into account the interaction of protective proximal contexts including resilience-promoting factors such as high-quality instruction, solidarity among peers, and school cultures promoting belonging (McCallen, 2016), along with time spent with caring faculty, as well as distal barriers such as escalating costs of tuition or the high cost of rent (McCallen, 2016).

Goldrick-Rab and colleagues (2018) found that about 36% of college students struggle with food insecurity or inadequate access to nutritious food, while more than 33% also face housing insecurity. Although a program such as Metro does not have the capacity to solve such distal challenges, its relevant curriculum allows students to analyze and construct meaning from stressful experiences, such as financial stress or living in overcrowded conditions. Students who have the opportunity to discuss and analyze such challenges can together gain understanding of the roots of such problems and begin to build solidarity (Madden, 2015). Working in a supportive learning community, they can more easily tap networks of concrete support such as counselors and tutors who know them over time, study groups, book loan programs, and the like. A strength of the model is that in contrast to deficit-oriented schema, the curriculum emphasizes the family, community, peer group, and cultural assets on which underrepresented students can rely.

McCallen (2016) underscores that there are competing notions of resilience. She advocates an understanding of resilience as a process that must be understood in the context of institutions, policy, and social injustice, versus a conceptualization from positive psychology that defines resilience as trait-based optimism or "grit." The latter personality-centered view "has the effect of ignoring structural inequality and fetishizing individuals' positive character development and capacity to bootstrap 'even in the face' of our increasingly unequal society" (p. 17).

Background to the Study

 San Francisco State University (SFSU) was established in 1899 and belongs to the California State University (CSU) system. It is a Western Association of Schools and Colleges (WASC)-accredited public university, offering 118 bachelor's, 94 master's, and five doctoral degrees to more than 30,000 students. The student body is diverse, and the institution has earned designation as an Emerging Hispanic-Serving Institution and an Asian-Serving Institution. At the time of this investigation, 36.8% of the SFSU first-time freshmen class were first-generation college-goers and a large percentage (42.8%) were low income, defined as those eligible for a Pell Grant. Latinx students made up 41.5% of the freshmen population; 27.1% were Asian (including Filipino); 18.8% were White; 7.6% were multiracial/Pacific Islander/American Indian or Alaskan Native; and 4.9% were African American (Office of Institutional Research, 2016).

Metro students are more ethnically diverse than the overall student body. For the program's 2009–2016 cohorts, 53.8% of Metro's students were Latinx and 11.5% African American, versus 41.5% and 4.9%, respectively, of freshmen overall. This ethnic composition has remained steady over the years of the study, with approximately 75% of Metro students identifying as part of an historically underrepresented race/ethnicity.

Program Description and Components

As of the 2017–2018 academic year, Metro had served approximately 3,000 students through 10 academies since its inception in 2009, with one or more in each of the university's six colleges. Each academy serves as a "school within a school" focused on a broad career or topic theme. There are two Metro academies of Health, two academies of Liberal/Creative Arts, and six additional academies titled Business, Child and Adolescent Development, Education, Engineering, Ethnic Studies, and Science.

Metro is open on a voluntary, first-come, first-served basis to any first-time, full-time freshman who can carry a course load of 12 or more units per semester. Some recruitment efforts focus on high schools and community-based retention programs that serve Metro's target populations. Metro outreach staff develop ongoing relationships with high school counselors and others. Many near-peer student workers who have recently completed the program are actively involved in recruitment. Outreach staff, generally also Metro completers and graduates of the university, contact lists composed of Pell-eligible students who have already

accepted admission. Potential Metro students complete a short application that includes first and second interests in majors and brief questions asking how they heard about Metro and what makes them interested in the program. These questions are not used to screen students for admission but simply to place them in an appropriate academy. Outreach staff understand that their mission is to give guidance throughout the sometimes complex onboarding process. They generally have multiple contacts with incoming students, giving encouragement and navigation tips until students are admitted, set up with financial aid, enrolled in classes, oriented, welcomed, and settled in.

These recruitment methods have resulted in virtually all Metro students (95%) being low income, underrepresented, and/or first generation, an often overlapping demographic. In addition, 95% are placed into developmental math and/or English.

The program enrolls each new student into an academy. Each entering cohort then completes a pathway of two GE courses each semester throughout the lower division, with the aim of building a tight-knit learning community. These pathway courses count toward graduation for all 289 majors in the SFSU system as well as the CSU system. Considering that a significant percentage of students end up changing majors (Gordon & Steele, 2015), centering the pathway on GE courses reduces the risk of students losing credits for classes that otherwise might not count toward graduation in a newly changed major.

One of the two Metro classes each semester is a core course that serves as the home base for advising, cohort community-building, tutoring, and financial aid reminders. These courses make a required assignment of attending academic advising and having an updated education plan in place. This course also introduces the academy's broad career or topic theme. The second course taken in each semester is a GE academic fundamentals course—writing, math, critical thinking, or oral communication. Through a 45-hour faculty learning community and tailored Metro curriculum, the program devotes intensive efforts to be sure that students experience engaging pedagogies and compelling material relevant to their lives.

To systematically build complex academic skills such as writing and critical thinking, Metro's core courses are scaffolded into a sequenced curriculum. This allows repeated practice through increasingly challenging signature assignments within and across semesters; e.g., moving stepwise from writing a two-page autobiographical paper, building up to a 15-page research paper with APA citations. All academies use tailored versions of the same signature assignments in the first-year experience course, the second-year experience course, and a capstone course. This allows for program-wide assessment of student learning outcomes.

To provide academic and social support, a faculty coordinator leads each academy, serving as the guide for each cohort during the students' first four semesters. Each academy coordinator teaches Metro's first-year experience course, setting up a supportive relationship with each student that lasts throughout the program and helping students explore their areas of professional interest. Coordinators are selected in part based on their leadership skills in building communities. They aim to create a climate of mutual support in which students in the cohort will (for example) form study groups, go to Metro tutoring together, share college knowledge, and generally "watch each other's back." The coordinators are ethnically diverse and come from educational backgrounds similar to those of the students. They participate in 45 hours of training prior to starting in their roles. Coordinators also meet weekly for troubleshooting student issues and discussions of program improvement. This design creates a personalized educational home.

Each coordinator monitors students' grades in their Metro classes and non-Metro gatekeeper classes, such as math and English. The coordinator convenes regular meetings of each academy's faculty to review student progress. To foster long-term retention of these faculty leaders and ensure that instructors have time to meet students outside of class, coordinator duties were configured as full-time positions for each academy, combining teaching (20%) plus academy coordination at an additional 30% effort (most coordinators lead two academies).

Metro also anchors student services in the classroom. Graduate counseling interns, supervised by a master's-prepared academic counselor, follow a specific academy cohort over time. These advisors stop by the Metro classes to set up appointments. As a class assignment, students are required to meet with this advisor each semester for individualized support. They develop and/or update an education plan, including looking ahead to career and graduate school options. Invited by the coordinators, financial aid staff members visit the classroom to inform students of deadlines, answer questions, and troubleshoot issues that come up.

Metro peer tutors, generally upper-division Metro completers, provide support for students in courses with high failure rates (e.g., calculus). Tutoring is mandatory if a student's grade slips below a C and includes proactive follow-through to ensure students' needs are met. Tutoring is based in Metro's Academic Resource Center where students can hold study groups and use computers, printers, and a microwave. Students are encouraged to come to the resource center with friends from the cohort, cutting through potential stigma.

Each incoming Metro faculty member participates in a Metro Faculty Learning Community (FLC), a 1-year, 45-hour intensive professional development process starting with a 3-day summer institute. Metro core class instructors are required to participate and receive a small stipend to do so. The FLC fosters an ongoing dialogue about pedagogy, curriculum, implicit bias, and how race and class impact students' lives. The FLC creates an alternative to the isolation that faculty members sometimes experience and provides a way to address program challenges and issues that come up with individual students. It also creates a venue for continuous program improvement. FLC leaders are mentor instructors who have expertise in critical pedagogy and curriculum development. Metro has established course and program learning objectives in writing and critical thinking, and faculty members learn how to both assess and support student progress.

In the FLC, faculty members develop their skills in engaging pedagogy (Kuh, 2008) and social-justice-oriented curriculum development. Workshops present and model techniques for eliciting active small-group participation by students, e.g., how to lead a "jigsaw" activity to deconstruct a difficult academic article or how to teach marshalling evidence to back up claims. The FLC leaders facilitate class observations and meet one-on-one with instructors for feedback, advice, and troubleshooting.

Research Questions

The literature on college completion contains very little on interventions that provide students with long-duration, multicomponent support. The purpose of the current study was to compare the outcomes of Metro students who received such an intervention with a matched comparison group of students from the same institution who did not. Researchers carried out a quasiexperimental study to inquire if Metro students demonstrated higher graduation rates at the end of 4, 5, and 6 years in college and had higher GPAs. Key milestones toward graduation were also measured, including (1) completion of developmental coursework and (2) persistence into sophomore, junior, and senior years.

Methodology

Sample

The Metro group had 2,281 students enrolled between academic years (AYs) 2009–2010 and 2016–2017. Some metrics in this study applied to only subsets of the larger Metro sample and the matched comparison group; e.g., GPA at time of graduation was collected only from students who had graduated by the time the analysis began—Metro (n = 388) and matched comparison group (n= 304). The matched comparison group had 2,276 non-Metro participants, also enrolled between AY 2009–2010 and 2016–2017. The university's Office of Institutional Research (IR) carried out case-control matching using SPSS to pull deidentified data

from the university-wide database. IR then established a comparison group that closely matched the composition of the Metro sample with respect to admission date, gender, race/ethnicity, Pell Grant eligibility (a proxy for low-income status), first generation in college status, and need for math and/or English remediation.

Data Collection Procedures

Researchers collected data about Metro students and their comparison group counterparts who were enrolled at SFSU from 2009 to 2016. Students self-reported their demographic and personal information during the process of applying to the Metro program via an online application form. In collaboration with IR and in accordance with the criteria listed in the preceding subsection, the demographic data collected were used to create a comparison group of students at SFSU who were not participants in the Metro program and received none of the benefits and services of Metro as described in the Background section. The academic performance, persistence, and graduation data for both the Metro and comparison student groups were maintained by and collected via queries from the university's Campus Solutions (CS) database, a type of Oracle database tailored to higher education institutions. Likewise, researchers collected personal and demographic information of the Metro and comparison students via queries of the CS database, with such information being collected and maintained by the university. The datasets generated and analyzed in the current study are anonymized and protected within the SFSU system, but these datasets may be obtained from the first author upon reasonable request. It should be noted that this study was determined to be exempt from review by the SFSU Institutional Review Board.

Academic Outcomes

Researchers collaborated with the Information Technology Services department to query the university's CS system to gather data on students' level of needed remediation; completion of these developmental course requirements; most recent GPA; persistence; and 4-, 5- and 6-year graduation rates. A nonpassing score on the English and mathematics placement exams at SFSU determined remediation. For the current study, (a) the need for English and/or mathematics remediation and (b) the completion of the remedial coursework were treated as dichotomous variables (yes, no).

For persistence into sophomore and junior year, students were classified as belonging to one of three levels of a categorical variable: persisted, left-out, or graduated. The "persisted" category was classified as current enrollment in SFSU at the time of data collection regardless of academic performance (e.g., probation). For senior-year persistence, the category of "graduated" was added to include those students who met the graduation requirements of the university and the academic department of the students' majors. "Left-out" described students who were no longer active in the SFSU system at the time of data collection, including students who were not enrolled in classes, were dismissed, or voluntarily left the university.

To conduct the analysis that follows, researchers used the Scipy software library (version 0.17.0) for statistical inference and odds ratios, as well as the *R* statistical computing environment (version 3.4.4) for logistic regression models.

Results

As indicated in Table 1, the comparison group was closely homogenous to the Metro sample on demographic characteristics. The Pearson X^2 test was used to test for the existence, if any, of the relationship between participation in Metro and each of the variables indicated in the left column of Table 1 (Agresti, 2018). The "First-Generation College Students" variable was the only variable for which statistically significant evidence of the relationship was discovered.

Table 1: *Demographic Information for Metro and Comparison Groups*

Variable	Metro *n* = 2,281	Comparison *n* = 2,276	*p*
Gender			
Male	783 (34.3%)	817 (35.9%)	0.28
Female	1,498 (65.7%)	1,459 (64.1%)	
Underrepresented minority (URM)	1,516 (66.5%)	1,481 (65.1%)	0.34
Pell Grant eligible	1,612 (70.7%)	1,593 (70.0%)	0.64
First-generation college student	1,667 (73.1%)	1,593 (70.0%)	0.02
Needing math and/or English remediation	2,159 (94.7%)	2,130 (93.6%)	0.14

Grade Point Average

The study investigated whether Metro students would demonstrate higher gains in GPA at the time of graduation than the comparison group (note the smaller sample size was because researchers were only looking at a subset of the two groups—those who had graduated). The mean GPA values upon graduation between Metro and the comparison group were compared using the independent two-sample *t* test to compute the *p* value. The *t* test analyses revealed a statistically significant difference in GPA upon graduation between Metro and the comparison group [t (691) = 2.18, p = .029] with Metro students outperforming (N = 388, M = 3.13; SD = 0.43) the comparison group (N = 304, M = 3.06; SD = 0.41).

Completion of Developmental Coursework

Researchers examined the relationship between the variables of Metro participation and completion of remedial coursework using Pearson's X^2 test to compute the *p* value. This analysis was done only on the students who were required to take remedial coursework. Metro students (n = 1,742) showed a higher completion rate of English and/or mathematics remedial coursework than the comparison group (n = 1,719), 1,484 of 1,742 (85.2%) versus 1,348 of 1,719 (78.4%), p < .001, with an odds ratio of 1.58, and 95% confidence interval (CI) of 1.33 to 1.89.

Persistence

Likewise, researchers asked whether participation in Metro would result in higher gains in persistence. Data were aggregated for both groups from 2009 to 2016, as shown in Table 2. Simple binary logistic regression was used for analyzing persistence and graduation with Metro participation as the predictor variable and student outcome (persistence or graduation) as the response variable. The Pearson's X^2 statistic was computed for each fitted regression model to find the *p* values reported here and in Table 2. Results from the binary logistic regression revealed a statistically significant difference in second-year persistence between the Metro and comparison groups (X^2= 22.19, df = 1, p < .001), with Metro students showing less frequency of attrition (11.05% vs. 22.68%) and greater frequency of persistence (88.95% vs. 77.32%) than the comparison group.

Table 2: *Persistence and Graduation Rates for Metro and Comparison Group*

	Metro	Comparison	*p*	Odds Ratio	95% CI
2nd-year persistence (2009–2016 cohorts)					
Persisted	2,029 (88.95%)	1,760 (77.32%)	<.001	2.36	2.00– 2.78
Left outs	252 (11.05%)	516 (22.68%)			
3rd-year persistence (2009–2016 cohorts)					
Persisted	1,813 (79.49%)	1,518 (66.75%)	<.001	1.93	1.69– 2.21
Left outs	468 (20.51%)	756 (33.25%)			
4th-year persistence (2009–2015 cohorts)					
Persisted	1,252 (74.39%)	1,003 (59.91%)	<.001	1.94	1.68– 2.25
Left outs	431 (25.61%)	671 (40.09%)			
4-year completion (2009–2013 cohorts)					
Graduated	139 (21.35%)	72 (11.06%)	<.001	2.18	1.60– 2.97
5-year completion (2009–2012 cohorts)					
Graduated	224 (49.23%)	177 (38.90%)	.0021	1.52	1.17– 1.98
6-year completion (2009–2011 cohorts)					
Graduated	166 (60.80%)	142 (52.01%)	.047	1.43	1.02– 2.01

Note: Numbers in parentheses represent column percentages. For remedial coursework, we included in the analyses only those students who required such coursework. Fourth-year persistence did not include graduated participants for Metro and comparison group (.05% and .05%, respectively). Results were equal for Metro and comparison group (2009 cohort only).

For third-year persistence, results from the binary logistic regression again revealed a statistically significant difference between Metro and the comparison group (X^2= 95.41, *df* = 1, *p* < .001), with Metro students showing less frequency of attrition (20.51% vs. 33.25%) and greater persistence (79.49% vs. 66.75%) than the comparison group.

Findings showed a statistically significant difference between the Metro and comparison groups at the fourth-year persistence (X^2= 81.22, *df* = 1, *p* < .001), with Metro students showing lower frequency of attrition (25.61% vs. 40.09%), and greater frequency of persistence (74.39% vs. 59.91%) than the comparison group. In short, the study yielded statistically significant evidence of higher persistence for Metro students versus the comparison group.

Graduation

Continuing the analysis, researchers asked whether participation in Metro would result in greater gains in graduation at the end of 4, 5, and 6 years. Given the availability of institutional data, the 2009–2013 cohorts were compared at 4-year graduation, 2009–2012 cohorts were compared at 5-year graduation, and 2009–2011 cohorts were compared at 6-year graduation. The Pearson's X^2 statistic was computed for each fitted regression model to determine the p values reported here and in Table 2. Results from the binary logistic regression revealed a statistically significant difference for 4-year graduation rates ($X^2 = 15.21$, $df = 1$, $p < .001$), with Metro students showing higher rates of graduation (21.35% vs. 11.06%) than the comparison group. Similarly, Metro students outperformed the comparison group for 5-year graduation rates ($X^2 = 9.43$, $df = 1$, $p = .0021$), with Metro students showing higher rates of graduation (49.23% vs. 38.90%) than the comparison group. Furthermore, Metro students outperformed the comparison group for 6-year graduation rates ($X^2 = 3.94$, $df = 1$, $p = .047$), with Metro students showing a higher graduation rate (60.80% vs. 52.01%). As indicated in Table 2, this study produced statistically significant evidence of higher graduation rates for Metro students.

Discussion

The Metro College Success Program demonstrated statistically significant evidence of its effectiveness in supporting disadvantaged students to achieve their academic goals. This was true not only during the 2-year Metro program proper, but also in students' junior and senior years. Metro students outperformed the comparison group on completion of developmental coursework and persistence into the second year. Metro students showed higher rates of persistence into the third and fourth years after the 2-year Metro program compared to the comparison group. The program has also shown a significant impact on the ultimate goal of timely graduation. Metro students were nearly twice as likely as the comparison group to graduate in 4 years and graduated at rates of more than 10 and 8 percentage points higher at 5 and 6 years, respectively. Additionally, Metro students outperformed the comparison group with respect to GPA upon graduation.

While students were actively participating in the program, the authors expected to see a difference in the outcomes of Metro students versus the comparison group. They anticipated that the effects would outlast the program's 2-year duration and were pleased to find that to be the case. At the 6-year mark, the more disadvantaged Metro students also outperformed a parallel cohort of all FTFs at the university (the 2009–2011 cohorts at the university had a 6-year graduation rate ranging between 50.0% and 53.0%, while Metro students graduated at an average rate of 60.0%). The fact that cohorts with more disadvantages could outperform cohorts with fewer disadvantages once again suggests that comprehensive interventions such as Metro can help to eliminate the equity gap in college completion. As raw data become available, researchers expect to conduct statistical analysis on the comparison of Metro students to all other FTFs at the university.

With its multipronged approach and long-duration program, Metro addresses many institutional barriers to completion for low-income, first-generation, historically underrepresented students. Metro addresses these with a range of efforts including strengthening students' foundation skills in their GE course pathway, integrating student services into the classroom, providing faculty members with in-depth work on pedagogy and curriculum development, and building small communities for students to support one another and experience tutoring, counseling, faculty advising, and academic support in a supportive social environment.

The program is unusual in that it is not only an "add-on" retention program but makes changes in both student services and academics. Using educational resilience theory, the program sets out to promote factors that can be influenced by a college program. These include strong peer culture and social support, high-quality classroom teaching, relevant curriculum, and contact with college faculty members and peers who provide "insider knowledge" and social support on how to navigate higher education institutions and financial

aid (McCallen, 2016). Similarly, through its long-duration cohort format and proactive tutoring and advising program, the program sets out to minimize stressors reported to affect students' academic achievement, such as subpar precollege preparation, isolation in the college environment, academic competitiveness, cultural separation from family origins, and feelings of low self-esteem (McCallen, 2016).

In terms of student services, Metro changes the way the first 2 years of college are structured, providing proximal protective factors by pulling student services around the students (e.g., academic advising, financial aid advising, tutoring). In sharp contrast with sending students out to remote central services where students are likely to never see the same staff person twice, the Metro approach of bringing services to the classroom assures that students can easily access services from caring people who know their names, their aspirations, their goals, and challenges over time. Metro provides targeted recruitment and closer onboarding than usual, along with hands-on guidance for course enrollment and proactive academic advising each semester. Community-building activities are integrated into the core courses to foster a culture of "each one, teach one," so that stronger students work with less-prepared students, gaining valuable experience at the same time. A vibrant community means that students no longer struggle in isolation to understand difficult material, conquer fears of math and science, get the right classes, or troubleshoot financial aid or bureaucratic hurdles.

A disproportionate number of studies of college success draw data from selective private colleges (Perna & Thomas, 2006). This study contributes to the literature by examining the experiences of students who are low income, first generation, and/or historically underrepresented, and attending a nonflagship state institution (McCallen, 2016), open to the top third of high school graduates. The study also adds to the literature by reporting on outcome data on one of a very limited number of long-duration and comprehensive programs. Researchers followed students for more than 8 years, providing data on a mature program over time.

There are limits to the scope of this study, some of which would require much greater resources to address. It was not designed to discern the relative effectiveness or weight of each program element. It was also not designed to assess differences in outcomes based on demographic factors such as gender, race, income, or major. The study took place in only one region of the U.S. that has unique conditions that could have impacted student success and, therefore, limit generalizability; e.g., the ethnic diversity of the institution or the city's extremely high cost of housing make it currently the most expensive city globally in which to be a renter (Numbeo, 2018). Additionally, the Metro students observed in this study self-selected to be in and remain in the Metro College Success program. These students may represent a unique population, given their decision. A quasiexperimental design using a matched comparison group was employed to address self-selection bias in this study; however, a true control group may have yielded different results.

Implications

This 8-year study shows that, by comprehensively addressing important "in-school" barriers to college completion in the first 2 years of college, universities can make significant improvements to outcomes. By targeting and supporting low-income, first-generation, and/or historically underrepresented students, Metro has zeroed out the equity gap in college completion. Plans are in place to extend a light-touch version of the program throughout the upper division, which could lead to even greater impact. Interventions such as these will be increasingly important as higher education becomes more diverse.

To build on the current study and address some of its limitations, we have identified five future research directions:

1. Testing the program's effectiveness in a community college setting and following those students post-transfer into their upper-division years. The groundwork for this is currently underway with Metro's partner community college program at City College of San Francisco, Metro Transfer Academies.

2. Assessing the potential for dissemination, it would be valuable to test the efficacy of the Metro approach in other regions and settings (e.g., rural or suburban).

3. Assessing the impact of the program on students' critical-thinking skills and on psychosocial factors, such as a feeling of belonging in college.

4. Exploring the cost-efficiency and policy issues raised by the program, as in "what is the cost per graduate in cases of high attrition vs. the cost per graduate when a wraparound retention program is in place, and what are the policy implications?"

Metro has evolved from a small pilot program to a fully institutionalized university-wide program that provides a multipronged, long-duration intervention throughout the lower division, along with lighter touch upper-division follow-up. Indicating that it is not a boutique program, by 2018–2019 Metro had expanded to the point that it was serving 74% of low-income freshmen or 18% (774 of 4,212) of all FTF.

By focusing on persistence and graduation for disadvantaged students, Metro is increasing graduation rates while eliminating all equity gaps for underrepresented students and Pell-eligible low-income students. In fact, Metro students are outperforming even their more advantaged peers of all FTF by 7–10% in 6-year graduation rates. Metro's comprehensive restructuring of the lower division has promise for practitioners and researchers who have an interest in equity and excellence in graduation. As urban areas become more diverse and college completion gaps continue to worsen, effective interventions such as Metro hold significant promise to achieve educational equity and close the opportunity gap.

Conflict of Interest

We declare no conflict of interest.

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