Carnegie Foundation for the Advancement of Teaching

Community College Pathways:

2013-2014 Descriptive Report

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COMMUNITY COLLEGE PATHWAYS
TECHNICAL REPORT

ABSTRACT

The Community College Pathways initiative consists of two pathways, Statway® and Quantway®, that accelerate post-secondary students' progress through their developmental mathematics sequence and a college-level course for credit. Launched in 2011, the Pathways have been remarkably successful, helping thousands of students achieve success in college-level mathematics. In 2013-2014, the Pathways maintained the positive outcomes attained in the first two years of implementation, including successful course completion rates of approximately 50 percent for both Pathways. The initiative was able to achieve these results while serving almost three times as many students as in its first year.

This report provides descriptive statistics on 2013-2014 student outcomes as well as insights into potential areas for improvement based on data from the third year's implementation of the Pathways.

WHAT IS THE PROBLEM?

Nearly 60 percent of the nation's incoming community college students are required to take at least one developmental mathematics class as a first step towards earning associate's or bachelor's degrees (Bailey, Jeong, & Cho 2010). However, 80 percent of the students who place into developmental math do not successfully complete any college-level mathematics courses within three years (Bailey et al., 2010). Many of these students spend long periods of time repeating courses and ultimately leave college without a credential. As a result, millions of students each year fail to acquire essential mathematics skills and are unable to progress toward their career and life goals.

THE PATHWAYS SOLUTION

To address this national problem, the Carnegie Foundation for the Advancement of Teaching formed a network of college faculty, administrators, researchers, and program designers that worked together to create a transformative approach to developmental mathematics education: the Community College Pathways (CCP).

There are two offerings currently within the pathways program: Statway® and Quantway®. Statway is designed as a year-long course that allows students to simultaneously complete their developmental mathematics and college-level statistics requirements to receive college credit in statistics. Quantway is designed as two separate semester courses: Quantway 1, which fulfills the requirements for students' developmental mathematics sequence, and Quantway 2, the subsequent semester course that allows students to receive college mathematics credit. The Pathways join students and faculty in a common, intensive pursuit of a shared goal—for students to achieve college math credit in one year, rather than requiring students to struggle through the typical two-year sequence of courses leading to calculus.

STATWAY

Statway integrates developmental mathematics skills and college-level statistics into a collaborative, problem-focused class.

It is a year-long pathway that replaces the traditional algebra sequence and a statistics course, allowing developmental math students to earn college-level credit for statistics in a single academic year.

QUANTWAY

Quantway 1 is a single-semester quantitative reasoning course that fulfills the requirements for students' developmental mathematics sequence and prepares them for success in college-level math.

Students who succeed in Quantway 1 are then eligible to enroll in Quantway 2, a college credit-bearing quantitative reasoning course, or another college-level course appropriate for their field of study.

PATHWAYS ENROLLMENT

The Pathways are growing rapidly. Each year, the program has spread to new campuses and dramatically increased the number of students served. There were 4,126 students enrolled in 273 sections[1] of Statway and Quantway taught by 123 faculty at 33 institutions during the 2013-2014 academic year, almost **triple** the number of students enrolled in the first year of implementation.[2]

As the next few pages will show, this growth has not compromised the program's effectiveness. The Pathways have maintained successful course completion rates around **50 percent** while serving increasing numbers of students (Strother, Van Campen, & Grunow, 2013; Van Campen, Sowers & Strother, 2013).

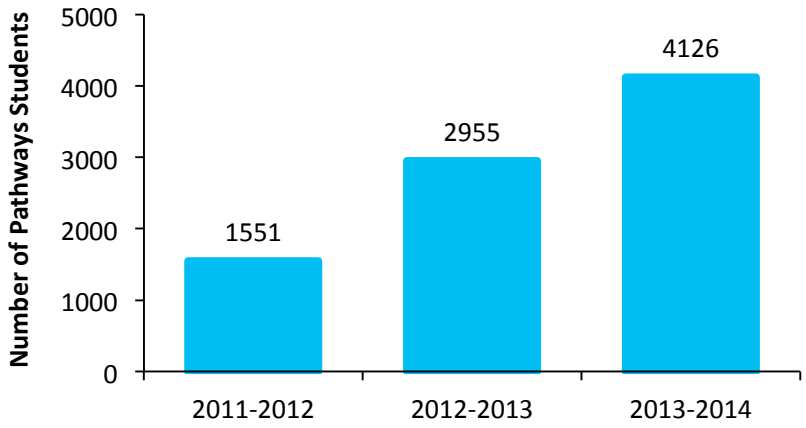

Figure 1. Pathways Enrollment, 2011-2014

Table 1. Pathways Enrollment, 2011-2014

		2011-2012	2012-2013	2013-2014
Statway	Students	1,133	1,553	2,283
	Institutions	21	22	22
Quantway	Students	418	1,402	1,843
	Institutions	8	8	11
Total	Students	1,551	2,955	4,126
	Institutions	29	30	33

[1] To determine the overall number of sections, we summed each separate section of the first term of Statway, the second term of Statway, Quantway 1, and Quantway 2 offered in 2013-2014. This differs from previous years' reports, wherein only sections of the first term of Statway were included in the Statway counts (Strother et al., 2013; Van Campen et al., 2013). Due to increased variation in administration, that method is no longer appropriate.

[2] One additional California State University offered Statway but was unable to submit data in time to be included these counts. See the Appendix for detailed section, faculty, and enrollment data.

STUDENT PERFORMANCE IN STATWAY

To determine Statway success, we selected students who enrolled in the first term of Statway during the fall academic term and computed the percentage who completed the full Pathway with a grade of C or higher (the level of performance required on most campuses for college credit to be awarded). Of the 1,296 community college students in the Fall 2013 cohort, 614 (47 percent) completed the full Pathway with a grade of C or higher and earned college credit.[3] This is a consistent reproduction of Year 1 and 2 outcomes, when approximately 50 percent of community college students successfully completed Statway.

These results represent a dramatic improvement on typical outcomes: only 6 percent of a baseline group of developmental math students successfully earned college-level math credit in one year.[4] Even when allowing a two-year timeframe for the baseline group to fulfill their requirements, only 15 percent successfully completed the traditional sequence and earned college math credit. Compared to these outcomes, students in Statway are achieving triple the success in half the time.

Table 2. Student Success in Statway at Community Colleges

	Institutions	Students Enrolled	Students Successfully Completing the Full Pathway
Fall '11 Cohort	18	974	475 (49%)
Fall '12 Cohort	18	853	445 (52%)
Fall '13 Cohort	19	1,296	614 (47%)
All Fall Cohorts	**26**	**3,123**	**1,534 (49%)**

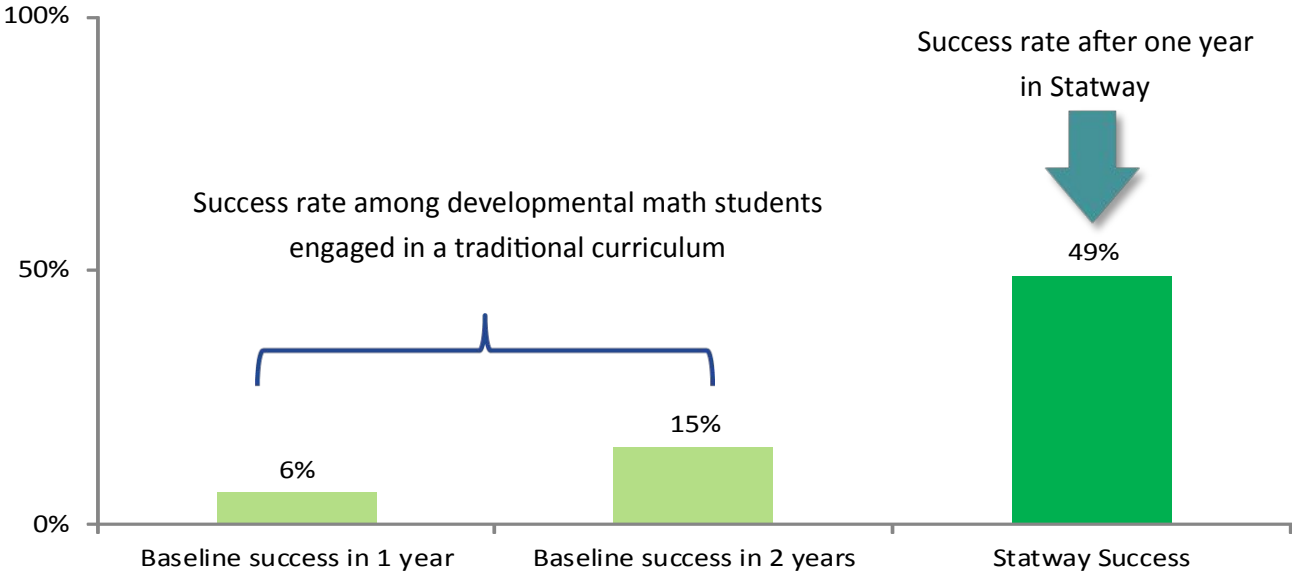

Figure 2. Student Success in Traditional Pathway versus Statway

[3] All 19 community colleges that offered Statway in 2013-14 submitted official data that was used in this analysis.

[4] To compute this baseline success rate, we worked with institutional researchers from 18 of the Year 1 Statway colleges to collect data on developmental mathematics course-taking prior to Statway implementation. Analyses revealed that only 5.9 percent of non-Statway developmental math students enrolled at these colleges in 2008 received credit for college-level mathematics in one year. Additionally, only 15.1 percent had achieved this goal after two years, 20.4 percent after three years, and 23.5 percent after four years.

Though it was designed to serve community college students, Statway has been employed successfully for students at four-year universities as well. Statway has so far been offered at four California State Universities (CSUs), where successful completion rates have been extremely high. In 2013-2014, 108 of the 132 (82 percent) CSU students in our analytic sample successfully completed the full Pathway with a C or higher and earned college credit.[5] Because students at community versus traditional colleges tend to differ in some important ways, these results suggest that Statway can be usefully applied for a range of students in a variety of contexts.

Table 3. Student Success in Statway at California State Universities

	Institutions	Students Enrolled	Students Successfully Completing the Full Pathway
Fall '11 Cohort	2	109	81 (74%)
Fall '12 Cohort	4	204	153 (75%)
Fall '13 Cohort	3	132	108 (82%)
All Fall Cohorts	**4**	**445**	**342 (77%)**

[5] Three California State Universities submitted official data that was used in this analysis. Data was limited to first-time freshmen who were enrolled in Statway in fall 2013. One additional California State University offered Statway in 2013-2014 but was unable to submit data in time to be included.

STUDENT PERFORMANCE IN QUANTWAY

To determine Quantway 1 success, we computed the percent of students who enrolled in either the fall or spring term and completed the course with a C or higher, or a Pass in a Pass/Fail grading system. Of the 1,805 students enrolled in Quantway 1 in 2013-2014, 1,062 (59 percent) successfully completed the course.[6] This is even higher than in Years 1 and 2 when successful completion rates were 56 and 52 percent, respectively.

Student success in Quantway 1 far exceeds that of students in traditional developmental math sequences. Only 21 percent of a baseline group of developmental math students passed a developmental math course in one year.[7] Extending that timeframe to two years only increased the cumulative pass rate to 29 percent. Quantway students, on the other hand, consistently achieve double the success of the typical approach in a single semester.

Table 4. Student Success in Quantway 1

	Institutions	Students Enrolled	Students Successfully Completing Quantway 1
2011-2012	8	418	234 (56%)
2012-2013	8	1402	732 (52%)
2013-2014	11	1805	1062 (59%)
Total	**11**	**3625**	**2028 (56%)**

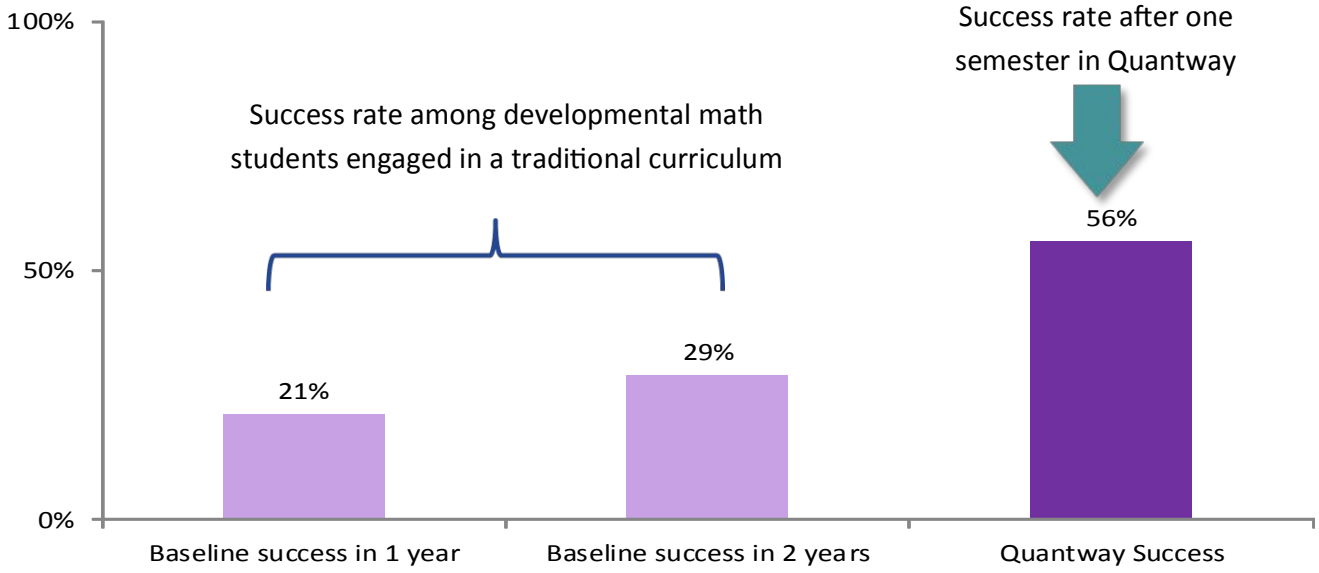

Figure 3. Student Success in Traditional Pathway versus Quantway

[6] All 11 Quantway institutions submitted official fall 2013 data. For spring 2014, 10 institutions submitted official data in time to be included in our analysis. Unofficial grade data was used to compute student success for the one remaining institution.

[7] To compute this baseline success rate, we worked with institutional researchers from six of the first Quantway colleges. Analyses revealed that only 20.6 percent of students were able to successfully complete their developmental math sequence within a full year. Additionally, 28.5 percent achieved this goal after two years, 31.6 percent after three years, and 33.3 percent after four years.

Quantway 2, the college-level companion course to Quantway 1, also displayed encouraging results in its second year of implementation. Of the 217 students enrolled in Quantway 2 in 2013-2014, 145 (67 percent) successfully completed the course with a grade of C or better and earned college credit.[8] Compared with the first year of Quantway 2 implementation, this represents a fivefold increase in the number of students enrolled and a consistent rate of success. These findings lend evidence to the utility of Quantway 2 as a college-level mathematics option.

Table 5. Student Success in Quantway 2

	Institutions	Students Enrolled	Students Successfully Completing Quantway 2
2012-2013	3	44	30 (68%)
2013-2014	5	217	145 (67%)
Total	**5**	**261**	**175 (67%)**

[8] All five institutions that offered Quantway 2 in 2013-2014 submitted official data for this analysis.

IMPROVEMENT PRIORITIES FOR PATHWAYS SUCCESS

As we now continue in the Pathways' fourth year, we encounter another question: how might we further improve the Pathways offerings to increase developmental math success? While outcomes so far have been hugely positive, we continue to study why some students have difficulty completing the course. We are using improvement research tools to explore the ways in which students fail to succeed in order to better target interventions. To illuminate this problem, we turn our attention to those students who did *not* successfully complete their Pathways courses.

In Statway, there were five primary patterns of non-success[9] in the 2013-2014 academic year:

1. Students who completed but failed the first term of Statway and thus did not enroll in the second term (30 percent of non-successful students in 2013-2014).
2. Students who withdrew from the first term of Statway and did not enroll in the second term (23 percent).
3. Students who succeeded in the first term of Statway but did not enroll in the second term (18 percent).
4. Students who succeeded in the first term of Statway but failed the second term (17 percent).
5. Students who succeeded in the first term of Statway but withdrew from the second term (11 percent).

In the Pareto chart below, the green bars depict the number of students falling into each category of non-success (Provost & Murray, 2011). The blue line then sums up the counts in each bar to represent the cumulative percentage of students who failed to succeed in the Pathway.

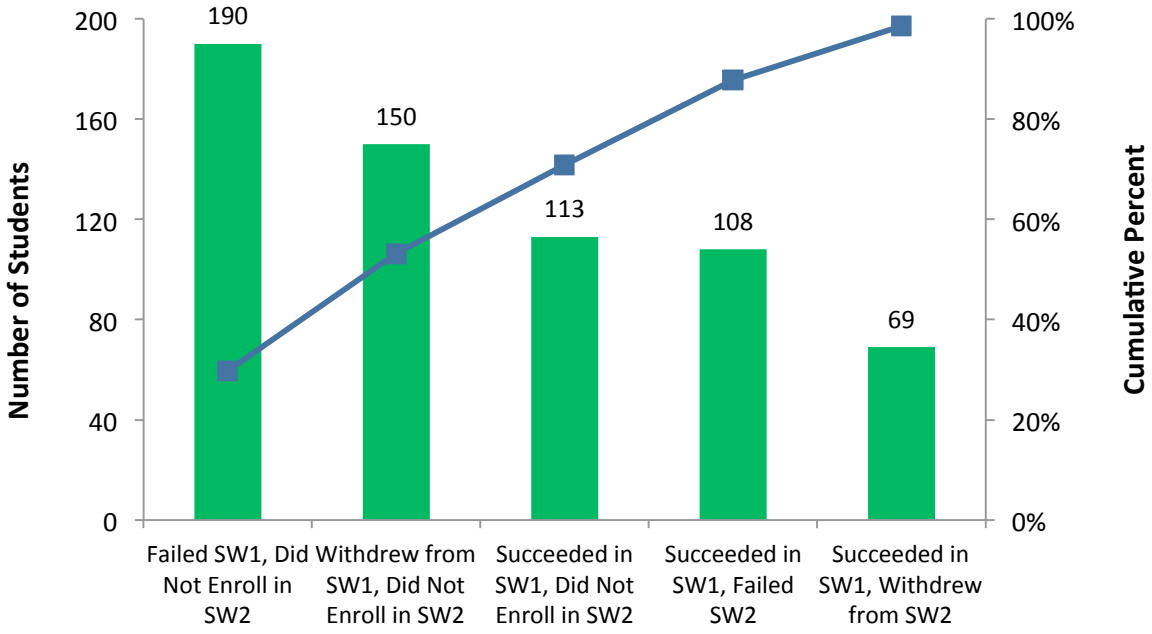

Figure 4. Statway (SW) 2013-2014 Fail

[9] Nine students exhibited other, miscellaneous patterns of non-success that were not included in these counts.

These results identify high-leverage points that are ripe for improvement by researchers, faculty, and college administrators. The large number of students falling into patterns #1 and #2 indicate that Carnegie can have the biggest impact on overall student success rates if it prioritizes improving student success in the first term of Statway.

Another key group to target for improvement is described by pattern #3: students who succeeded in the first semester of Statway but did not subsequently enroll in the second semester. These students were academically successful in the first term, so it is important to understand why they unexpectedly failed to enroll in the second term. There are numerous reasons why this might occur, including lack of available sections and other scheduling difficulties, taking time off from school, or enrolling in a different college-level math course. Carnegie plans to collaborate closely with faculty and college administrators to better understand the causes of this pattern and devise solutions.

Because Quantway 1 is a single term course, there are only two patterns of non-success: withdrawing from the course or failing it. Across fall 2013 and spring 2014, the majority of students who did not succeed in Quantway 1 failed the course (516 students, or 64 percent of non-successful students). Conversely, 288 students, or 36 percent of non-successful students, withdrew from the course. As with Statway, efforts to address these patterns of non-success are underway.

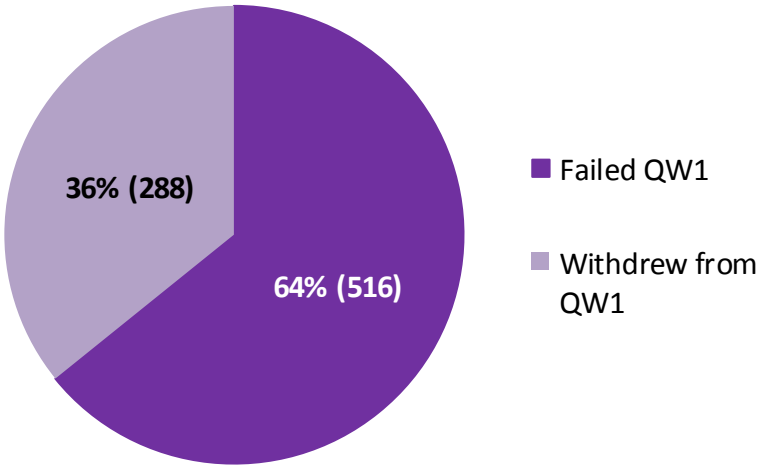

Figure 5. Quantway (QW) 2013-2014 Fail

CONCLUSION

In the 2013-2014 academic year, the Community College Pathways initiative sustained the positive outcomes realized in the first two years of implementation. Forty-seven percent of Statway community college students and 82 percent of Statway California State University students successfully completed the course, earning college credit within one year. Quantway 1 results were similarly great, with 59 percent of students successfully completing the course and fulfilling their developmental math requirements. These rates are consistent with prior results and dramatically higher than the typical completion rates of other developmental math students.

The fact that these results were achieved while the Community College Pathways initiative served a larger overall number of students in increasingly diverse settings speaks to the reliability of the program's effectiveness as it scales. Year 3 data add to the evidence that the Pathways can help large numbers of students in a variety of contexts gain essential mathematics skills and achieve their academic goals.

Participating Institutions in the 2013-2014 Academic Year

STATWAY

American River College
Austin Community College
Capital Community College
California State University, East Bay
California State University, Sacramento
De Anza College
Diablo Valley College
Foothill College
LaGuardia Community College
Los Angeles Pierce College
Minneapolis Community and Technical College
Naugatuck Valley Community College
Normandale Community College
North Hennepin Community College
Richland College
San Diego City College
San Francisco State University
San Jose State University
Seattle Central Community College
South Seattle Community College
Tacoma Community College
Tallahassee Community College
Valencia College

QUANTWAY

Borough of Manhattan Community College
Cuyahoga Community College
East Georgia State College
Gainesville State College
Onondaga Community College
Ridgewater College
Rockland Community College
Sinclair Community College
South Georgia State College
University of North Georgia, Gainesville
Westchester Community College

REFERENCES

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Provost, L. P., & Murray, S. K. (2011). *The Health Care Data Guide: Learning from Data for Improvement* (1st ed.). San Francisco, CA: Jossey-Bass.

Strother, S., Van Campen, J., & Grunow, A. (2013). *Community College Pathways: 2011-2012 Descriptive Report*. Stanford, CA: Carnegie Foundation for the Advancement of Teaching.

Van Campen, J., Sowers, N., & Strother, S. (2013). *Community College Pathways: 2012-2013 Descriptive Report*. Stanford, CA: Carnegie Foundation for the Advancement of Teaching.

APPENDIX

Table A1. Pathways Enrollment, 2013-2014

	Institutions	Sections	Faculty	Students Enrolled
Statway	22	158	70	2,283
Quantway	11	115	53	1,843
Total	33	273	123	4,126

The Pathways student body is diverse and includes groups that have been historically underserved in higher education. Both Pathways enroll more female students than males, and the average age of students is higher than that of a typical entering college student. Additionally, the Pathways student body includes a high degree of racial/ethnic diversity. Both Pathways enroll large percentages of students who are African-American, Hispanic/Latino, or multiracial.

Table A2. 2013-2014 Pathways Student Demographics

	Statway (n=1,428)	Quantway (n=1,480)
Gender		
Female	62%	59%
Male	37%	41%
Declined to State/Missing	<1%	0%
Average Age in Years		
	26.12	24.94
Race/Ethnicity		
White	29%	42%
Hispanic/Latino	28%	17%
African-American	22%	29%
Multiracial	10%	5%
Asian	6%	2%
Pacific Islander	1%	0%
American Indian/Alaska Native	0%	0%
Unknown	4%	4%

Note: For Statway, the demographic analytic sample consists of the 1,428 students who began Statway 1 in fall 2013 at 19 community colleges and three state universities. For Quantway, the demographic analytic sample consists of the 1,480 students enrolled in Quantway 1 in either fall 2013 (demographic data available from all 11 community colleges) or spring 2014 (demographic data available from 10 community colleges) for whom demographic data was available.

Table A3. Statway Enrollment and Success, Fall 2011-2013

		Colleges	SW1 Enroll	SW1 Complete	SW1 Success	SW2 Enroll	SW2 Complete	SW2 Success	SW1 Enroll	SW1 Complete	SW1 Success	SW2 Enroll	SW2 Complete	SW2 Success
Fall '11 Cohort	CCs Only*	18	974	896	656	601	562	475	100%	92%	67%	62%	58%	49%
	CSUs Only	2	109	108	100	94	92	81	100%	99%	92%	86%	84%	74%
	Combined	20	1,083	1,004	756	695	654	556	100%	93%	70%	64%	60%	51%
Fall '12 Cohort	CCs Only	18	853	774	603	524	501	445	100%	91%	71%	61%	59%	52%
	CSUs Only	4	204	199	180	170	167	153	100%	98%	88%	83%	82%	75%
	Combined	22	1,057	973	783	694	668	598	100%	92%	74%	66%	63%	57%
Fall '13 Cohort	CCs Only	19	1,296	1,115	884	790	718	614	100%	86%	68%	61%	55%	47%
	CSUs Only	3	132	131	122	113	113	108	100%	99%	92%	86%	86%	82%
	Combined	22	1,428	1,246	1,006	903	831	722	100%	87%	70%	63%	58%	51%
Total	CCs Only	26	3,123	2,785	2,143	1,915	1,781	1,534	100%	89%	69%	61%	57%	49%
	CSUs Only	4	445	438	402	377	372	342	100%	98%	90%	85%	84%	77%
	Combined	30	3,568	3,223	2,545	2,292	2,153	1,876	100%	90%	71%	64%	60%	53%

*"CCs" refers to community colleges participating in Statway

Table A4. Quantway 1 Enrollment and Success, Spring 2012-2014

	Colleges	Enroll	Complete	Success	Enroll	Complete	Success
Spring 2012	8	418	346	234	100%	83%	56%
Fall 2012	8	630	552	357	100%	88%	57%
Spring 2013	8	772	628	375	100%	81%	49%
Fall 2013	11	1,091	919	656	100%	84%	60%
Spring 2014	11	714	617	406	100%	86%	57%
Total	11	3,625	3,062	2,028	100%	84%	56%

Table A5. Quantway 2 Enrollment and Success, Spring 2013-2014

	Colleges	Enroll	Complete	Success	Enroll	Complete	Success
Spring 2013	3	44	42	30	100%	95%	68%
Fall 2013	3	72	54	38	100%	75%	53%
Spring 2014	5	145	133	107	100%	92%	74%
Total	5	261	229	175	100%	88%	67%

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