

Research Report

5-Year Study--Patterns in MJC Math Course Retention, Success, and Within-Course Success Rates Gaps, Fall 2011-Spring 2016

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December 2016

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Introduction

In November 2016 a major study of Mathematics course activity at MJC was conducted with the objective of measuring patterns in student success and student retention at the course level, for the semesters Fall 2011 through Spring 2016. Data for this report was obtained through the Crystal Report in Datatel “Student Success and Retention”, which is the standard MJC internal data report for tracking course success rates and retention rates, along with CCCCO Datamart Basic Skills Progress Tracker and internal data from the MJC Office of Research and Planning.

The emphasis in this study is on courses **Math 10, Math 20, Math 70, Math 89, and Math 90**. These courses do not transfer to 4-year institutions for the purpose of fulfilling college-level mathematics requirements. Data for college-level (“transfer-level”) courses **Math 101** (Math Ideas/Applications) through **Math 174** (Intro to Differential Equations and Linear Algebra) is also provided for the period of Fall 2014-Spring 2016 in **Appendix A** for overall reference comparison.

I: Trends: Math 10, 20, 70, 89, and 90 Patterns in Enrollment, Course-Level Success Rates and Retention Rates, and Course Success Rate Gaps

(1) Enrollment: Overall average course enrollment during the researched periods was greatest in **Math 70** (Elementary Algebra), with a 5-year figure of **885**, followed by **Math 90** (Intermediate Algebra), which averaged **737**. The census enrollment counts (Fall 2011 through Spring 2016) for the five pre-transfer courses emphasized in this study were the following:

TABLE 1

*****1st Census Course Enrollment*****

<u>Course</u>	<u>Title</u>	<u>Fall 2014</u>	<u>Spring 2015</u>	<u>Fall 2015</u>	<u>Spring 2016</u>	<u>2-Yr. Avg</u>
Math 10	Introduction to Math	119	110	116	172	129
Math 20	Pre-Algebra	373	340	313	276	325
Math 70	Elementary Algebra	798	903	897	987	896
Math 89	Intermediate Algebra Essentials	535	578	588	587	572
Math 90	Intermediate Algebra	525	489	516	614	536

*****1st Census Course Enrollment*****

<u>Course</u>	<u>Fall 2011</u>	<u>Spring 2012</u>	<u>Fall 2012</u>	<u>Spring 2013</u>	<u>Fall 2013</u>	<u>Spring 2014</u>	<u>5-Yr. Avg</u>
Math 10	199	149	168	198	174	122	135
Math 20	351	420	303	364	458	327	353
Math 70	902	1035	897	704	929	798	885
Math 89	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Math 90	910	1090	929	861	909	525	737

(2) Course Success Rates: Success rates at the course level are defined as the percentage of students enrolled at first-census who achieve a grade of “A”, “B”, “C”, or “Pass” in the course. Average 5-year success rate for **Math 70** was the lowest, at **55.23%** for the period Fall 2011 through Spring 2016, followed by **Math 90** at **56.12%** for the same period. Rates for all courses were the following:

TABLE 2

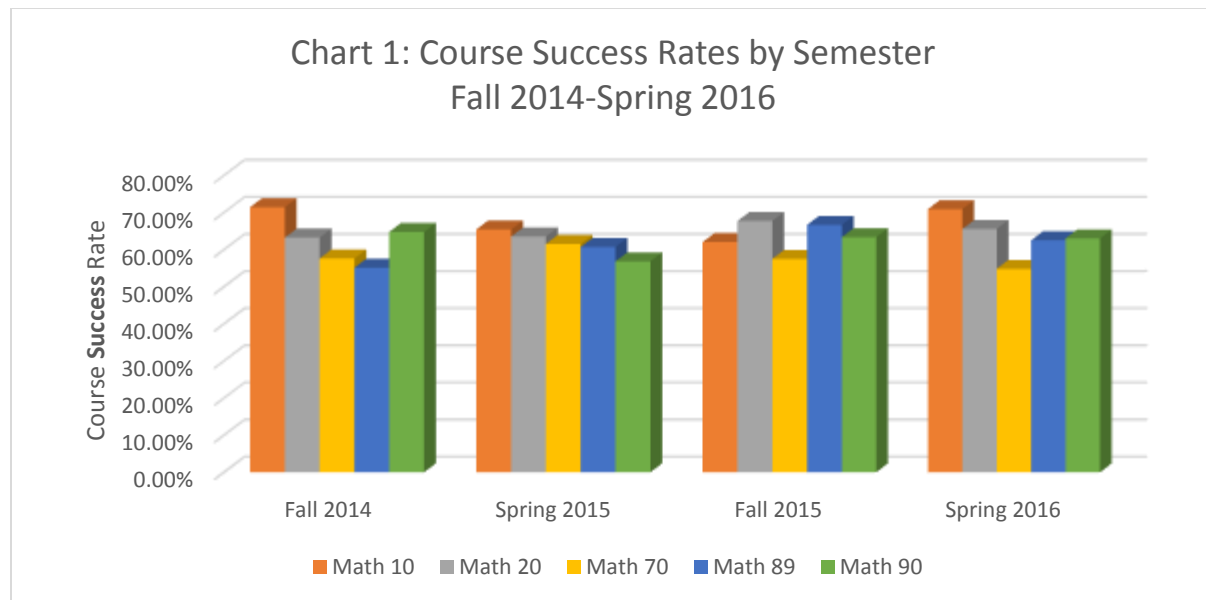
*****Course Success Rates*****

<u>Course</u>	<u>Title</u>	<u>Fall 2014</u>	<u>Spring 2015</u>	<u>Fall 2015</u>	<u>Spring 2016</u>	<u>2-Yr. Avg</u>
Math 10	Introduction to Math	71.43%	65.43%	67.24%	70.93%	67.47%
Math 20	Pre-Algebra	63.27%	63.53%	67.73%	65.58%	65.02%
Math 70	Elementary Algebra	57.64%	61.57%	57.53%	54.81%	57.89%
Math 89	Intermediate Algebra Essentials	55.14%	60.73%	66.67%	62.52%	61.26%
Math 90	Intermediate Algebra	64.76%	56.85%	63.37%	63.03%	62.00%

*****Course Success Rates*****

<u>Course</u>	<u>Fall 2011</u>	<u>Spring 2012</u>	<u>Fall 2012</u>	<u>Spring 2013</u>	<u>Fall 2013</u>	<u>Spring 2014</u>	<u>5-Yr. Avg</u>
Math 10	54.77%	47.65%	55.36%	62.63%	63.79%	62.30%	62.15%
Math 20	64.10%	65.24%	57.76%	66.21%	58.08%	53.82%	62.53%
Math 70	52.22%	53.72%	48.61%	52.70%	54.79%	55.71%	55.23%
Math 89	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Math 90	55.82%	46.51%	49.73%	50.41%	55.01%	55.70%	56.12%

Chart 1 below displays the overall patterns in student success rates at the course level for the period Fall 2014 through Spring 2016.



(3) Course Success Rates by Race/Ethnicity: Success rate differences were measured for **African-American, Asian, Hispanic, and White** students across **Math 10** through **Math 90**. Average 2-year success rate gap (Highest Ethnicity vs. Lowest Ethnicity 2-year average) for **Math 20** was the greatest at nearly **24.0%** for Fall 2014 through Spring 2016, followed by **Math 70**, at **18.53%**. Rates for all courses during this 2-year period are below; 5-year trend data continues on the next page.

TABLE 3

*****Course Success Rates*****

<u>Course</u>	<u>Title</u>	<u>Fall 2014</u>	<u>Spring 2015</u>	<u>Fall 2015</u>	<u>Spring 2016</u>	<u>2-Yr. Avg</u>
Math 10	All Students	71.43%	65.43%	67.24%	70.93%	67.47%
	African-Americans	62.50%	75.00%	60.00%	80.00%	69.38%
	Asians	66.67%	60.00%	66.67%	50.00%	60.84%
	Hispanics	71.21%	65.67%	65.79%	71.15%	68.46%
	Whites	70.00%	67.74%	73.91%	69.81%	70.37%
	GAP (High to Low)					8.71%
Math 20	All Students	63.27%	63.53%	67.73%	65.58%	65.02%
	African-Americans	33.33%	45.45%	50.00%	40.00%	42.19%
	Asians	62.96%	66.67%	66.67%	50.00%	61.58%
	Hispanics	64.21%	62.98%	69.01%	68.00%	66.05%
	Whites	62.20%	68.18%	66.67%	67.39%	66.11%
	GAP (High to Low)					23.92%
Math 70	All Students	57.64%	61.57%	57.53%	54.81%	57.89%
	African-Americans	42.31%	35.48%	59.09%	34.48%	42.84%
	Asians	62.96%	51.43%	60.00%	65.52%	59.98%
	Hispanics	56.75%	59.16%	55.18%	53.66%	56.19%
	Whites	60.35%	66.67%	60.40%	57.94%	61.37%
	GAP (High to Low)					18.53%
Math 89	All Students	55.14%	60.73%	66.67%	62.52%	61.26%
	African-Americans	37.50%	45.48%	53.85%	57.89%	48.68%
	Asians	42.86%	66.67%	66.67%	75.00%	62.80%
	Hispanics	51.63%	59.29%	64.63%	59.37%	58.73%
	White	60.38%	63.68%	69.86%	66.67%	65.15%
	GAP (High to Low)					16.47%
Math 90	All Students	64.76%	56.85%	63.37%	63.03%	62.00%
	African-Americans	50.00%	50.00%	66.67%	42.86%	52.38%
	Asians	70.59%	57.14%	57.14%	69.05%	63.48%
	Hispanics	63.41%	53.91%	61.76%	62.88%	60.49%
	Whites	63.37%	61.34%	65.17%	63.56%	63.36%
	GAP (High to Low)					11.10%

TABLE 3 (Cont.)

*****Course Success Rates*****

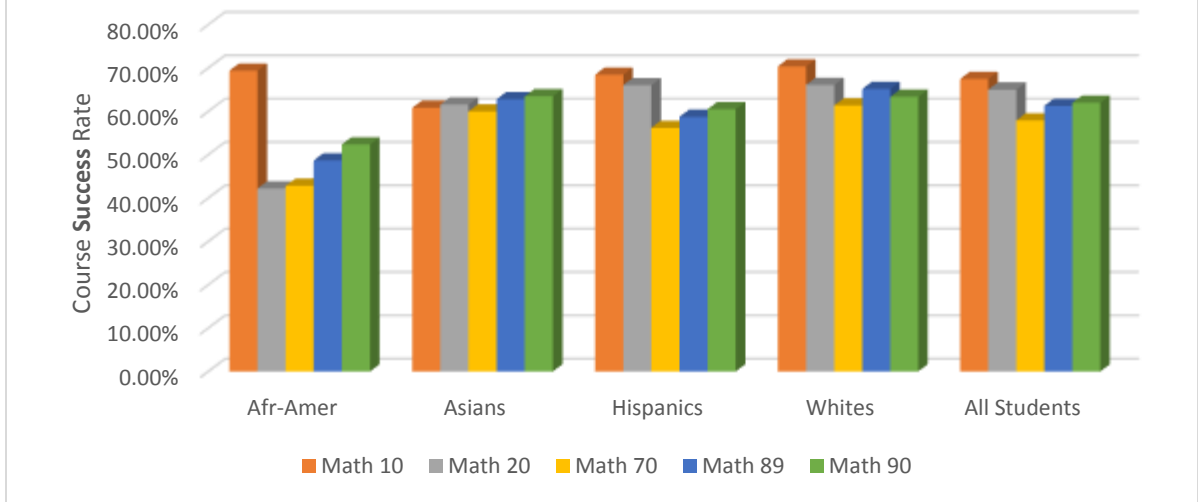
<u>Course</u>	<u>Ethn</u>	<u>Fall 2011</u>	<u>Spring 2012</u>	<u>Fall 2012</u>	<u>Spring 2013</u>	<u>Fall 2013</u>	<u>Spring 2014</u>	<u>5-Yr. Avg</u>
Math 10	All	54.77%	47.65%	55.36%	62.63%	63.79%	62.30%	62.15%
	AfAm	35.00%	36.84%	60.00%	47.37%	50.00%	50.00%	55.67%
	Asian	40.00%	75.00%	90.00%	85.71%	70.00%	100%	70.41%
	Hispan	50.00%	40.38%	52.00%	57.45%	66.67%	63.08%	60.34%
	White	63.08%	55.17%	50.82%	67.86%	57.78%	61.76%	63.79%
GAP (High-Low)								14.74%
Math 20	All	64.10%	65.24%	57.76%	66.21%	58.08%	53.82%	62.53%
	AfAm	42.86%	43.75%	33.33%	18.18%	47.83%	44.44%	39.91%
	Asian	64.29%	85.71%	73.33%	78.57%	53.85%	46.67%	64.87%
	Hispan	60.28%	59.50%	54.01%	67.07%	55.60%	50.00%	61.07%
	White	66.67%	72.11%	64.81%	64.93%	64.24%	57.52%	65.47%
GAP (High-Low)								25.56%
Math 70	All	52.22%	53.72%	48.61%	52.70%	54.79%	55.71%	55.23%
	AfAm	29.17%	42.31%	21.43%	39.13%	40.00%	50.00%	39.34%
	Asian	58.33%	62.50%	45.00%	52.63%	52.50%	55.00%	56.59%
	Hispan	52.19%	51.84%	48.94%	54.52%	53.04%	57.11%	54.24%
	White	55.49%	55.33%	49.86%	50.92%	57.76%	54.91%	56.96%
GAP (High-Low)								17.62%
Math 90	All	55.82%	46.51%	49.73%	50.41%	55.01%	55.70%	56.12%
	AfAm	60.00%	38.10%	31.82%	45.45%	21.43%	66.67%	47.30%
	Asian	57.14%	47.46%	58.93%	52.08%	64.58%	48.72%	58.28%
	Hispan	56.20%	42.25%	49.46%	50.15%	52.26%	53.39%	54.57%
	White	55.24%	50.34%	50.54%	49.86%	57.30%	57.55%	57.13%
GAP (High-Low)								10.98%

Overall equity gaps among **African-American, Asian, Hispanic, and White** students for the 5-year period Fall 2011 through Spring 2016 were calculated for the courses **Math 10, Math 20, Math 70, and Math 90**. For each course, the gap between highest 5-year average ethnicity and lowest 5-year average ethnicity was calculated.

Average 5-year success rate gap (Highest Ethnicity vs. Lowest Ethnicity 2-year average) for **Math 20** was the greatest at **25.56%** for Fall 2011 through Spring 2016, followed by **Math 70**, at **17.62%**.

Chart 2 on the next page displays the variations in student success rates by major ethnic group at MJC at the course level, averaged for the 2-year period Fall 2014 through Spring 2016.

Chart 2: 2-Year Average Course Success Rates Gaps by Ethnicity, Fall 2014-Spring 2016



(4) Course Retention Rates: Retention rates at the course level are defined as the percentage of students enrolled at first-census who remain enrolled in the course regardless of whether they pass or don't pass. Average 5-year retention rate for **Math 90** was the lowest, at **78.1%** for the period Fall 2011 through Spring 2016. Rates for all courses were the following:

TABLE 4

*****Course Retention Rates*****

Course	Title	Fall 2014	Spring 2015	Fall 2015	Spring 2016	2-Yr. Avg
Math 10	Introduction to Math	84.03%	86.36%	82.76%	87.21%	85.09%
Math 20	Pre-Algebra	87.40%	86.47%	89.46%	86.23%	87.39%
Math 70	Elementary Algebra	83.08%	83.61%	84.50%	78.93%	82.53%
Math 89	Intermediate Algebra Essentials	80.56%	82.87%	84.69%	82.79%	82.73%
Math 90	Intermediate Algebra	85.52%	75.05%	83.14%	82.08%	81.44%

*****Course Retention Rates*****

Course	Fall 2011	Spring 2012	Fall 2012	Spring 2013	Fall 2013	Spring 2014	5-Yr. Avg
Math 10	74.37%	67.79%	78.26%	76.77%	82.76%	80.33%	80.06%
Math 20	85.75%	84.76%	82.18%	85.44%	81.44%	83.49%	85.26%
Math 70	77.72%	78.26%	78.15%	80.82%	84.18%	80.63%	80.99%
Math 89	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Math 90	75.27%	71.19%	75.67%	75.38%	79.21%	78.41%	78.09%

(5) Course Success Rates Gap Analysis: Overall success rates at the course level (reported above) represent the average of success rates for all sections of each course that is offered in the specific semester measured (in this case, Fall 2011 through Spring 2016).

In order to measure the degree of variation in course success rates across the range of sections offered in a given semester, an additional calculation was created for this report: the **Course Success Rates Gap Analysis**.

For example, the course **Math 70** (Elementary Algebra) had **19 sections** with **798** enrolled students in Fall 2014, **21 sections** with **903** enrolled students in Spring 2015, **23 sections** with **897** enrolled students in Fall 2015, and **25 sections** with **987** enrolled students in Spring 2016. The **Success Rate Gap Analysis** calculates the difference between the course section with the highest success rate and the section with the lowest success rate.

Overall, **Math 70** had the highest 5-year average Success Rate Gap at **65.32%**, followed by **Math 90** at **60.24%**. Rates for all courses were the following:

TABLE 5

*****Course Success Rates Gaps*****

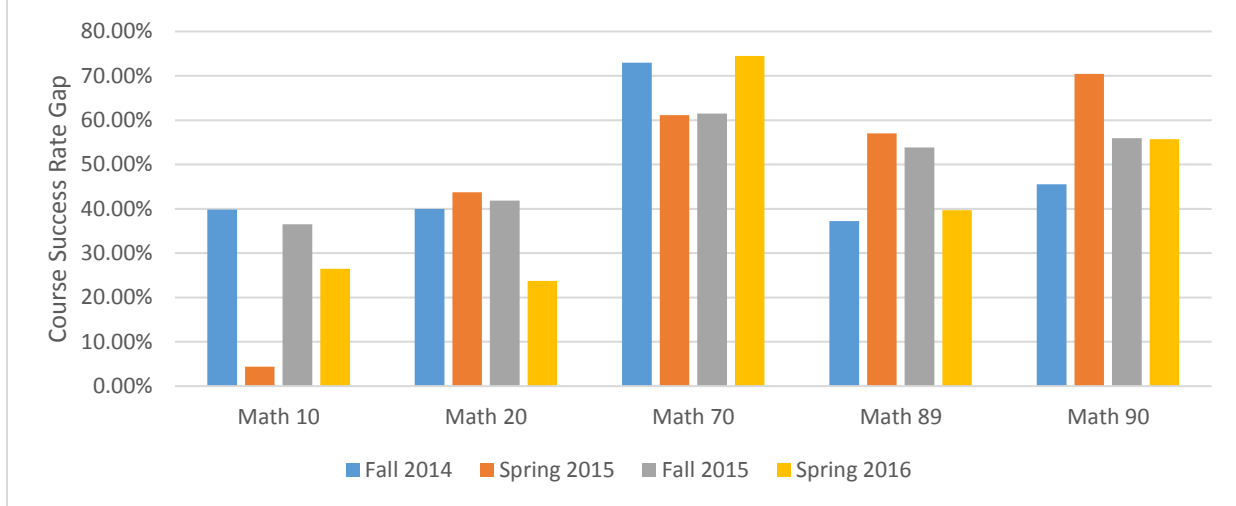
<u>Course</u>	<u>Title</u>	<u>Fall 2014</u>	<u>Spring 2015</u>	<u>Fall 2015</u>	<u>Spring 2016</u>	<u>2-Yr. Avg</u>
Math 10	Introduction to Math	39.85%	4.38%	36.53%	26.50%	16.85%
Math 20	Pre-Algebra	39.94%	43.74%	41.85%	23.74%	37.31%
Math 70	Elementary Algebra	72.97%	61.09%	61.45%	74.46%	67.49%
Math 89	Intermediate Algebra Essentials	37.21%	57.01%	53.83%	39.67%	46.93%
Math 90	Intermediate Algebra	45.56%	70.44%	55.90%	55.69%	56.90%

*****Course Success Rates Gaps*****

<u>Course</u>	<u>Fall 2011</u>	<u>Spring 2012</u>	<u>Fall 2012</u>	<u>Spring 2013</u>	<u>Fall 2013</u>	<u>Spring 2014</u>	<u>5-Yr. Avg</u>
Math 10	48.49%	28.53%	28.77%	34.78%	51.25%	26.18%	32.53%
Math 20	32.33%	24.11%	26.60%	16.11%	42.29%	33.81%	32.45%
Math 70	77.34%	47.78%	56.85%	55.21%	63.50%	82.59%	65.32%
Math 89	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Math 90	47.26%	64.10%	69.09%	70.29%	64.84%	59.19%	60.24%

Chart 3 on the next page displays the overall patterns in Success Rates Gaps at the course level for the period Fall 2014 through Spring 2016.

Chart 3: Course Success Rate Gap Analysis by Semester
Fall 2014-Spring 2016



II: Key Findings from this Study

Several findings from this immediate study and other data from the MJC Research and Planning Office help to underscore the importance of measuring and documenting patterns of student enrollment, persistence, and success (completion) in the **Math 10-90** course sequence at MJC. Among the most significant observations are the following:

- (1) Although substantial proportions of MJC students assess at the **Math 10** or **20** levels, the number of course sections and enrollment capacity in these courses (average **455** enrollments over the 5-year study) is typically far less than in **Math 70** (average enrollments=**885**). (**TABLE 1**).
- (2) While **Math 70** averages the largest number of enrolled students during the Fall 2011 through Spring 2016 period, at nearly **900** students (**TABLE 1**), it has the lowest overall success rate at just **55.23%** over the 5 years included in this study (**TABLE 2**). It also has an overall 5-year retention rate at **81%** (**TABLE 4**). *Perhaps the most notable finding is the wide Course Success Rate Gap in **Math 70** when compared with the same gaps in the other studied courses.* The average Success Rate Gap for **Math 70** during the 5 years studied is **65.3%** (**TABLE 5**). Only **Math 90** with its average **60.2%** Success Rate Gap comes close to **Math 70** in the overall impact of course section variability in Success Rates as a factor shaping overall student pass rates in Basic Skills Math courses. Further research into the possible “gatekeeping” function of **Math 70** is currently underway (December 2016).
- (3) As evidenced in **TABLE 3** (pp. 4-5), measurement of **equity** gaps (based on Race/Ethnicity) is important for further understanding about the variation in course success rates for each Basic Skills Math course when ethnicity is taken into consideration. For this immediate study, the rates among MJC’s largest ethnicity groups (**African-Americans, Asians, Hispanics** and **Whites**) were calculated for the courses **Math 10, 20, 70, 89,** and **90**. A future edition of this report may

include data for other ethnic student groups at MJC whose overall enrollment headcount are considerably smaller.

- Generally speaking, **African-Americans** show lowest course success rates in Basic Skills Math courses based on the 5-year data analysis (Fall 2011 through Spring 2016). The highest-performing ethnic groups typically are **Asians** and **Whites** for most courses. This trend is consistent with overall patterns measured in the overall success rate equity gap analysis data for total MJC courses, Fall 2011-Spring 2016 (available at <http://mjc.edu/general/research/mjcsuccesstrendsbyethn2011-2016.pdf>)
- The course with the widest equity gap in this study was **Math 20**, with an overall gap of **25.6%** (highest scoring ethnicity vs. lowest-scoring). In this course, the overall 5-year student success rate was **62.5%**. For **Asians**, the rate was **64.9%**, for **Whites** the rate was **65.5%**, for **Hispanics** it was **61.1%**, but for **African-Americans** it was just **39.9%**.
- The course with the second widest equity gap in this study was **Math 70**, with an overall gap of **17.6%** (highest scoring ethnicity vs. lowest-scoring). In this course, the overall 5-year student success rate was **55.2%**. For **Asians**, the rate was **56.6%**, for **Whites** the rate was **57.0%**, for **Hispanics** it was **54.2%**, but for **African-Americans** it was just **39.3%**.
- Because the courses **Math 20** and **Math 70** are enrolled by a significant proportion of MJC students based on their assessment scores, *the variations in success rates by ethnicity in these two courses have significant impact on subsequent differential rates of overall enrollment persistence (term to term, and on to graduation) based on ethnicity.*
- Future research for this report may include focus on broader differential patterns of Basic Skills Math course persistence to college-level math, as measured in the latest MJC Student Success Scorecard 6-year (2009-10 entering cohort) study of Remedial Math success data at <http://scorecard.cccco.edu/scorecardrates.aspx?CollegeID=592>

(4) *Ability to make timely academic progress and academic persistence through the **Math 10** to **Math 90** course sequences has substantial impact on students' overall ability to complete their academic degrees in 4 years or less.*

- If students initially assess at the **Math 10** or **20** level, it commonly takes at least 3 years for these students to progress to successful passing of College-level Math (see persistence measurement models at <http://mjc.edu/general/research/mjcstudentpersistencecmath20.pdf>) when compared with students who initially assess at **Math 70** (see <http://mjc.edu/general/research/mjcstudentpersistencecmath70.pdf>).
- Among a sample 3-year cohort study of MJC students who entered **Math 20** in Fall 2012, **21%** went on to pass **Math 89** or **Math 90** (one level below college transfer) and **9%** went on to pass a college-transfer level course within 3 years. These findings are relatively consistent with overall Basic Skills math course success and progression rates for a nationwide sample of Achieving the Dream (ATD) colleges cited by Hayward & Willett (2014) and Bailey, Jeong & Cho (2010). These studies cited nationwide progression patterns of 20% success rates at one level below college transfer for Math students who began at three levels down and 10% success rates at college transfer.
- While it is conceivable that students who assess at **Math 70** may be able to complete their overall Basic Skills coursework at MJC within 2 years (and, in theory, complete their degrees

in 4 years or less), this scenario would be highly unlikely for **Math 10/20** placement students. **TABLE 6** provides results from a six-year graduation rate (degree or certificate) study of MJC students who initially enrolled Fall 2010 based on Math assessment level. Only **8.2%** of students who assessed at **Math 20** and **2.9%** of students who assessed at **Math 10** graduated in six years; **14.4%** of students who assessed at **Math 70** graduated in the same time period; **26.7%** of students who assessed at **Math 90** graduated; **27.3%** of students who assessed at college-level Math (**101** or above) graduated.

TABLE 6

**** 6-Year Graduation Rate Data by Assessment Level ****

<u>Assessment Level Fall 2010</u>	<u>Count</u>	<u>% Graduated as of November 2016</u>
All Students (At census)	3468	12.3%
Not Assessed	888	7.2%
Math 10	312	2.9%
Math 20	638	8.2%
Math 70	1107	14.4%
Math 90	329	26.7%
College-Level (101-above)	194	27.3%

- (5) Data analyzed by our office has determined the following overall rates of non-passing and multiple times for enrolling in Basic Skills Math courses, based on seven years of overall enrolled students at MJC:
- **Math 10:** 34% of students who enroll never pass; 59% pass on the first try; 7% on second try
 - **Math 20:** 25% of students never pass; 64% pass on the first try; 11% on second try
 - **Math 70:** 27% of students never pass; 56% pass on the first try; 17% on second or third try
 - **Math 90:** 25% of students never pass; 60% pass on the first try; 15% on second try
- (6) Course waitlist data from the period 2011-12 through 2015-16 provides a significant indicator of overall student demand relative to available course enrollment spaces (**TABLE 7**). Based on data from census enrollment and waitlist calculations for each semester, **Math 70** had the largest number of waitlisted students, averaging **859** students per semester during the five years analyzed. To determine the relative ratio of waitlisted to enrolled (at census) students in each course, the comparison of waitlist counts against census enrollments for each course was calculated (i.e. **WL to Enrollment Ratio** calculation). **Math 10** had the highest overall WL to Enrollment Ratio averaged over the five years at **1.55**.

TABLE 7

**** Waitlist and Enrollment Ratios by Course ****

<u>Course</u>	<u>2011-12</u>	<u>2012-13</u>	<u>2013-14</u>	<u>2014-15</u>	<u>2015-16</u>	<u>5-Year Avg.</u>
Math 10 Waitlisted	284	299	183	138	145	210
WL to Enrollment Ratio	1.43	1.78	1.05	1.16	1.25	1.55
Math 20 Waitlisted	464	425	320	268	173	330
WL to Enrollment Ratio	1.32	1.40	0.70	0.72	0.55	0.92
Math 70 Waitlisted	817	1004	827	820	829	859
WL to Enrollment Ratio	0.91	1.12	0.89	1.03	0.92	0.97
Math 89 Waitlisted	n/a	n/a	n/a	286	507	397
WL to Enrollment Ratio	n/a	n/a	n/a	0.53	0.86	0.71
Math 90 Waitlisted	798	852	803	608	588	730
WL to Enrollment Ratio	1.14	1.09	1.13	1.16	1.14	0.96

(7) In a preliminary comparative study of student math course persistence rate data from MJC and 15 other California community colleges which was conducted in July 2016 (see <http://mjc.edu/general/research/basicskillsmathpersistencecomparisonsmjc.pdf>), MJC students who began their Mathematics Basic Skills coursework in Fall 2013 were tracked via the CCC DataMart Basic Skills Progress Tracker for overall course success and persistence rates as of the end of Spring 2016 (i.e. over a three-year enrollment period). Findings included:

- MJC students who entered **Math 10** or **20** (data combined) in Fall 2013 had a success rate in these courses of **73.5%**. Only three other institutions in this study had higher success rates at this level (Folsom Lake College, at 80.3%, City College of San Francisco, at 77.5% and San Joaquin Delta, at 74.0%), while the remaining 12 institutions had lower success rates at this course level than MJC.
- Among the cohort of tracked MJC students who entered **Math 10** or **20** (combined data) in Fall 2013, **9.1%** of this student cohort subsequently succeeded (i.e. passed) a transfer-level Math course (**101 or higher**) within three years (as of Spring 2016). Six other institutions had higher rates for students attaining transfer-level Mathematics success, while nine institutions had lower transfer-level success attainment rates.
- MJC students who initially entered **Math 70** in Fall 2013 had a success rate for that course of **73.0%**. Only two other institutions had higher success rates for this course level (Deanza College, at 79.2%, and Santa Rosa Junior College, at 73.7%), one college tied with MJC (Las Positas) at 73.0%, while the remaining 12 institutions had lower success rates at this course level than MJC.
- Among the cohort of tracked MJC students who entered **Math 70** in Fall 2013, **24%** of this student cohort subsequently succeeded (i.e. passed) a transfer-level Math course within three years (as of Spring 2016). Only three other institutions had higher rates for students attaining transfer-level Mathematics success (Deanza College, at 35.7%, Folsom Lake College, at 27.6%, and San Joaquin Delta College, at 24.4%), while 12 institutions had lower transfer-level course success attainment rates.

III: Utilizing MJC’s Basic Skills Initiative (BSI) Plan

Data from this current report contributes to greater understanding about the overall impact of Basic Skills Math course success rates and retention rates on MJC students’ persistence and degree completion rates as measured in the Student Success Scorecard (see <http://scorecard.cccco.edu/scorecardrates.aspx?CollegeID=592>). Toward this end, the MJC Basic Skills Initiative (BSI) Plan has defined several long-term goals for the period of 2015-16 and beyond (see Sections 7 and 8 of the MJC BSI plan at <http://mjc.edu/general/research/mjcbasicskillsinitiative201516.pdf>).

Two important measures for planning and evaluating the effectiveness of our Basic Skills Math courses come from Goal #3 and Goal #4 of the BSI Plan:

- Long-term Goal #3: **The successful 2-year progression rate from beginning algebra to intermediate algebra will increase by 3% by 2016-17 over the year 2011-13 rate.**
- For this immediate analysis, cohorts of students entering each Fall semester from Fall 2010 through Fall 2014 were tracked using the Basic Skills Progress Tracker (http://datamart.cccco.edu/Outcomes/BasicSkills_Cohort_Tracker.aspx) from entry at **Math 70** for two years to measure persistence from **Math 70** to enrollment in either **Math 89** or **Math 90**. The Fall 2011 entering cohort was used as a baseline year for tracking overall improvement in this indicator.
- **TABLE 8** displays results of this analysis, showing that as of the Fall 2013 entering cohort, the **3%** improvement goal had been reached, though it declined somewhat to **2.54%** improvement for the Fall 2014 cohort. Data for the Fall 2015 entering cohort will be available for calculation during summer 2017.

TABLE 8

***** Algebra Course Progression Rates within 2 Years*****

<u>Cohort Year</u>	<u>#Completing MATH 70</u>	<u># Entering MATH 89 or 90</u>	<u>2-Year Progression Rate</u>	<u>Improvement Over Fall 2011*</u>
Fall 2010*	377	291	77.18%	n/a
Fall 2011*	360	275	76.39%	n/a
Fall 2012	273	211	77.29%	1.18%
Fall 2013	305	240	78.69%	3.01%
Fall 2014	263	206	78.33%	2.54%

* Fall 2011 cohort data tracked to Spring 2013 represents baseline data year for this goal.

- Long-term Goal #4: **The percentage of students who assess into Basic Skills level Math who ultimately complete college-level Math within 2 years will increase by 3% in 2015-16 and 2016-17, and 4% in 2018-19.**

- For this immediate analysis, cohorts of all Basic Skills Math students entering each Fall semester from Fall 2010 through Fall 2014 were tracked using the Basic Skills Progress Tracker (http://datamart.cccco.edu/Outcomes/BasicSkills_Cohort_Tracker.aspx) from entry semester through two years of study. Statistics on total Basic Skills entering cohort students were computed, along with statistics on cohort members who persisted to passing college-level Math courses. **TABLE 9** on the next page displays the results.
- Results of this analysis show that as of the Fall 2013 entering cohort, the **3%** improvement goal had been substantially exceeded (at **13.7%** improvement over the Fall 2011 baseline year), and it continued to improve for the Fall 2014 cohort (reaching **20.70%** improvement from the Fall 2011 baseline). Data for the Fall 2015 entering cohort will be available for calculation during summer 2017.

TABLE 9

Math Basic Skills to College Math Completion Rates within 2 Years

<u>Cohort Year</u>	<u>#Entering Basic Sk. Math</u>	<u># Completing College Math</u>	<u>2-Year Progression Rate</u>	<u>Improvement Over Fall 2011</u>
Fall 2010*	1119	185	16.53%	n/a
Fall 2011*	1144	186	16.26%	n/a
Fall 2012	982	163	16.60%	2.10%
Fall 2013	1179	218	18.49%	13.70%
Fall 2014	989	194	19.62%	20.70%

** Fall 2011 cohort data tracked to Spring 2013 represents baseline data year for this goal; Fall 2010 data is provided for reference only.*

IV: Utilizing MJC CCSSE Data from 2015: Developmental Students (Including Math)

Survey data collected in the 2015 CCSSE Community College Survey of Student Engagement at MJC allows substantial analysis based on students who enroll in “developmental” (i.e. Basic Skills Math, English, and/or ESL) courses at MJC. A detailed summary of comparison data on a question-by-question basis is available at <http://mjc.edu/general/research/ccssemjc2015compareddevnondev.pdf>. Several questions are currently being evaluated for use in measuring overall institutional improvement between the 2015 survey and the upcoming Spring 2017 survey, and will be discussed in the 2017 edition of this report.

V: Discussion and Implications

Several observations in this study enable further analysis into the patterns of student academic progress at MJC.

* It is especially important to note from the recent update of the Achieving the Dream Data Summit

report Basic Skills data (November 2016 update, available at <http://mjc.edu/general/research/atddataupdate2016november.pdf>) that the vast majority of students enrolled in degree and certificate programs at MJC are assessed as needing to complete one or more Mathematics courses in the **Math 10** through **Math 90** sequence. Among total enrolled MJC students in Fall 2016 (approximately 18,000 students), **18%** had not yet been assessed for appropriate Math placement, and **78%** of students were assessed into the **Math 10-Math 90** course sequence. Only **4%** of total students had been assessed into a college Math course (**Math 101** or above).

Clearly, the overwhelming majority of MJC students need to enroll in at least one Basic Skills-level (or “pre-transfer level”) Math course. The impact of their educational experiences in these courses has significant bearing on their subsequent academic progress.

* Among the MJC students who are first-time enrolled in Fall 2016 (approximately **3000** students), the largest proportion were assessed as needing to begin their Math studies at the **Math 10** or **Math 20** level (**36%**), followed by **Math 70** (**31%**) and **Math 89** or **90** (**20%**). Again, only **4%** were initially assessed at the College-Math level. Among **Hispanic** and **African-American** students entering in Fall 2016, the proportion requiring **Math 10** or **20** is even higher: **53%** of **African-American** students and **39%** of **Hispanic** students (see MJC Placement Data: Math and English Students Enrolling Fall 2016 (First-time) at <http://mjc.edu/general/research/mjcplacementdatamathandenglishfall2016.pdf>).

* Significant variation exists among MJC-area high schools in the proportions of their graduating students who assess at lowest (**Math 10** or **Math 20**) levels when they subsequently enroll at MJC. Based on students initially enrolling at MJC in Fall 2016, the schools with highest proportions of **Math 10/20** students included Grace Davis High (54%), Peter Johansen High (43%), Orestimba High (42%), Thomas Downey High (40%), and Patterson High (38%). (see <http://mjc.edu/general/research/mjcplacementdatamathandenglishfall2016.pdf>).

* The most recent **Institutional Effectiveness Partnership Initiative** (IEPI) goals at MJC, 2016-17 (see <http://mjc.edu/general/research/iepigoalsmjc2016-17.pdf>) reference the CCCCO Scorecard data for measuring long-term trends and aspirational goals in Basic Skills math student progression to college-level math. The data for Math from Table b) is cited here:

b) Remedial Rate

Scorecard definition: Percentage of credit students tracked for six years who first enrolled in a course below transfer level in English, mathematics, and/or ESL and completed a college-level course in the same discipline.

Year of Completion	09-10	10-11	11-12	12-13	13-14	14-15	15-16 est*	16-17 goal*** (prelim)	6 year goal
Math	27.4	26.9	30.8	38.2	40.2	40.1	45.0	49.1	54.3

Data from the newest Scorecard report, which covers the completing cohort from 2015-16, will be available early in the year 2017. At that time, we will be able to determine whether MJC was able to meet or even exceed its 2015-16 estimated six-year completion rate for Basic Skills Math students of **45.0%**, which is a significant improvement over one year earlier (2014-15 completion year, at 40.1%).

Given that MJC aspires to strengthen the Basic Skills Math completion rate even further to **49.1%** in the 2016-17 year (data measurements available in 2018) and to **54.3%** as a 6-year goal, this present study has presented data of critical importance when assessing for patterns and variations in student success rates in individual Basic Skills Math courses. General improvements in course-level student success, particularly in **Math 20** and **Math 70**, will have significant impact on this overall Basic Skills Math completion rate.

APPENDIX A: MJC Math Course Enrollment, Retention, Success, and Success Gaps Fall 2014-Spring 2016

Fall 2014								
Course	Title	Sections	Enrollment 1st Census	Overall Success %	Lowest Section Success %	Highest Section Success %	Range: Highest- Lowest	Overall Retention %
<u>Pre-Transfer</u>								
MMATH-10	Intro to Math	3	119	71.43	51.06	90.91	39.85	84.03
MMATH-20	Pre-Algebra	9	373	63.27	40.91	80.85	39.94	87.40
MMATH-47	Skills Success: Non Trsfr Crs	2	73	54.79	53.85	55.32	1.47	97.26
MMATH-49	Success Skills Trans Level Math	1	1	100.00	n/a	n/a	n/a	100.00
MMATH-70	Elementary Algebra	19	798	57.64	27.03	100	72.97	83.08
MMATH-89	Interm. Algebra Essentials	14	535	55.14	62.79	100	37.21	80.56
MMATH-90	Intermediate Algebra	13	525	64.76	41.67	87.23	45.56	85.52
Overall		61	2,424	66.72				88.27
<u>Transfer-Level</u>								
MMATH-101	Math Ideas/Applications	4	153	79.74	69.70	84.78	15.08	89.54
MMATH-105	Structure of Mathematics 1	2	75	60.00	55.00	65.71	10.78	86.67
MMATH-111	Applied College Algebra	1	26	46.15	n/a	n/a	n/a	57.69
MMATH-121	Pre-Calculus 1	5	231	63.20	42.86	85.71	42.85	86.58
MMATH-122	Pre-Calculus 2	3	93	46.24	34.62	61.11	26.49	66.67
MMATH-130	Finite Mathematics	2	75	54.67	47.50	62.86	15.36	84.00
MMATH-134	Elementary Statistics	8	349	51.86	34.38	85.00	50.62	74.21
MMATH-138	Calculus Bus-Socsc	1	37	70.27	n/a	n/a	n/a	86.49
MMATH-171	Calculus: First Course	4	127	61.42	14.29	75.56	61.27	75.59
MMATH-172	Calculus: 2nd Course	1	38	44.74	n/a	n/a	n/a	73.68
MMATH-173	Calculus: Third Course	1	34	44.74	n/a	n/a	n/a	58.82
Overall		32	1,238	56.64				75.76

Spring 2015								
Course	Title	Sections	Enrollment 1st Census	Overall Success %	Lowest Section Success %	Highest Section Success %	Range: Highest- Lowest	Overall Retention %
<u>Pre-Transfer</u>								
MMATH-10	Intro to Math	3	110	65.45	83.72	88.1	4.38	86.36
MMATH-20	Pre-Algebra	9	340	63.53	37.21	80.95	43.74	86.47
MMATH-47	Skills Success: Non Trsfr Crs	1	61	55.74	n/a	n/a	n/a	93.44
MMATH-70	Elementary Algebra	21	903	61.57	26.67	87.76	61.09	83.61
MMATH-89	Interm. Algebra Essentials	13	578	60.73	38.64	95.65	57.01	82.87
MMATH-90	Intermediate Algebra	13	489	56.85	25.64	96.08	70.44	75.05
Overall		60	2,481	60.65				84.64
<u>Transfer-Level</u>								
MMATH-101	Math Ideas/Applications	4	164	84.15	77.50	87.80	10.30	92.07
MMATH-105	Structure of Mathematics 1	2	73	72.60	72.22	72.97	0.75	94.52
MMATH-106	Structure of Math 2	1	19	84.21	n/a	n/a	n/a	94.74
MMATH-111	Applied College Algebra	1	33	36.36	n/a	n/a	n/a	60.66
MMATH-121	Pre-Calculus 1	5	207	53.62	27.03	75.00	47.97	78.74
MMATH-122	Pre-Calculus 2	4	138	64.49	40.00	84.13	44.13	77.54
MMATH-130	Finite Mathematics	3	128	64.06	53.66	73.91	20.25	82.81
MMATH-134	Elementary Statistics	8	320	56.56	51.16	74.19	33.03	78.75
MMATH-138	Calculus Bus-Socsc	1	41	43.90	n/a	n/a	n/a	63.41
MMATH-171	Calculus: First Course	2	70	61.43	34.62	77.27	42.65	65.71
MMATH-172	Calculus: 2nd Course	2	106	63.21	62.22	88.52	26.30	77.36
MMATH-173	Calculus: Third Course	1	38	78.95	n/a	n/a	n/a	86.84
MMATH-174	Intro to Diff Equat & Linear Algebra	1	18	66.67	n/a	n/a	n/a	83.33
Overall		35	1,355	63.86				77.17

Fall 2015								
Course	Title	Sections	Enrollment 1st Census	Overall Success %	Lowest Section Success %	Highest Section Success %	Range: Highest- Lowest	Overall Retention %
<u>Pre-Transfer</u>								
MMATH-10	Intro to Math	3	116	67.24	48.84	85.37	36.53	82.76
MMATH-20	Pre-Algebra	8	313	67.73	47.62	89.47	41.85	89.46
MMATH-47	Skills Success: Non Trsfr Crs	1	66	48.48	n/a	n/a	n/a	93.94
MMATH-70	Elementary Algebra	23	897	57.53	21.88	83.33	61.45	84.50
MMATH-89	Interm. Algebra Essentials	13	588	66.67	37.84	91.67	53.83	84.69
MMATH-90	Intermediate Algebra	12	516	63.37	30.77	86.67	55.90	83.14
Overall		60	2,496	61.84				86.42
<u>Transfer-Level</u>								
MMATH-105	Structure of Mathematics 1	3	116	62.07	52.78	75.00	22.22	84.48
MMATH-111	Applied College Algebra	1	41	68.29	n/a	n/a	n/a	75.61
MMATH-121	Pre-Calculus 1	5	216	59.72	43.24	78.85	35.61	82.41
MMATH-122	Pre-Calculus 2	3	105	38.10	20.00	63.41	43.41	61.90
MMATH-130	Finite Mathematics	2	79	82.28	75.68	82.28	6.60	91.14
MMATH-134	Elementary Statistics	8	313	56.87	34.09	76.32	42.23	75.08
MMATH-135	Prob Solv Skills Tech Math 134	8	269	63.57	40.63	84.38	43.75	80.67
MMATH-138	Calculus Bus-Socsc	1	34	52.94	n/a	n/a	n/a	85.29
MMATH-171	Calculus: First Course	3	118	68.64	55.81	78.38	22.57	85.59
MMATH-172	Calculus: 2nd Course	1	45	28.89	n/a	n/a	n/a	55.56
MMATH-173	Calculus: Third Course	1	36	47.22	n/a	n/a	n/a	58.33
Overall		36	1,372	57.14				75.95

Spring 2016								
Course	Title	Sections	Enrollment 1st Census	Overall Success %	Lowest Section Success %	Highest Section Success %	Range: Highest- Lowest	Overall Retention %
<u>Pre-Transfer</u>								
MMATH-10	Intro to Math	4	172	70.93	60.34	86.84	26.50	87.21
MMATH-20	Pre-Algebra	7	276	65.58	56.82	80.56	23.74	86.23
MMATH-47	Skills Success: Non Trsfr Crs	1	55	52.73	n/a	n/a	n/a	94.55
MMATH-49	Success Skills Trans Lev Math	1	1	100.00	n/a	n/a	n/a	100
MMATH-70	Elementary Algebra	25	987	54.81	13.64	88.10	74.46	78.93
MMATH-89	Interm. Algebra Essentials	13	587	62.52	47.83	87.50	39.67	82.79
MMATH-90	Intermediate Algebra	15	614	63.03	36.11	91.80	55.69	82.08
Overall		66	2,692	67.09				87.40
<u>Transfer-Level</u>								
MMATH-101	Math Ideas/Applications	3	123	72.36	60.00	85.00	25.00	87.80
MMATH-105	Structure of Mathematics 1	2	83	77.11	71.79	81.82	10.03	93.98
MMATH-106	Structure of Math 2	1	37	89.19	n/a	n/a	n/a	94.59
MMATH-111	Applied College Algebra	1	45	68.89	n/a	n/a	n/a	80.00
MMATH-121	Pre-Calculus 1	6	223	52.91	31.43	72.09	40.66	79.37
MMATH-122	Pre-Calculus 2	3	130	57.69	29.03	89.09	60.06	71.54
MMATH-130	Finite Mathematics	2	87	78.16	72.09	84.09	12.00	88.51
MMATH-134	Elementary Statistics	10	382	66.49	41.38	81.40	40.02	87.96
MMATH-135	Prob Solv Skills Tech Math 134	10	338	73.08	64.00	92.68	28.68	90.53
MMATH-138	Calculus Bus-Socsc	1	39	51.28	n/a	n/a	n/a	71.79
MMATH-171	Calculus: First Course	2	67	65.67	36.36	80.00	43.64	73.13
MMATH-172	Calculus: 2nd Course	2	84	61.90	43.90	79.07	35.17	79.76
MMATH-173	Calculus: Third Course	1	39	61.54	n/a	n/a	n/a	79.49
MMATH-174	Intro to Diff Equat & Lin Alge	1	26	65.38	n/a	n/a	n/a	73.08
Overall		45	1,703	67.26				76.37

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