



Institutional Effectiveness, Research, & Planning

Math Success Center Academic Year 2016

June 16th, 2016

This report seeks to examine the use and impact of the Math Success Center (MSC) in Academic Year (AY) 2016 (Fall 2015 and Spring 2016) on students enrolled in Math courses at Cerritos College that participated MSC services. Students enrolled in Math courses were able to visit the MSC for tutoring or to complete Directed Learning Activities (DLAs).

Executive Summary

It appears that the students using the Math Success Center’s tutoring and directed learning activities may be more successful in passing and completing their Math courses than those that do not. Based on the data, it is recommended that students should use the MSC more, frequent users of the MSC had higher success and completion rates in their Math courses. It is difficult to draw specific cause and effect conclusions due to the large difference in the number of students using the MSC and DLAs compared to all the students enrolled in a math course. If MSC attendance could be increased in future semesters more sophisticated statistical analyses could be conducted.

Detailed Analysis Math Success Center

The MSC served 1,828 unique students in Fall 2015, and 1,616 unique students in Spring 2016. The students were responsible for 13,959 visits and 24,661 hours spent in the MSC during Fall 2015, and 13,155 visits and 23,188 hours spent in Spring 2016 (see Table 1). Approximately 27% of students enrolled in a Math class visited the MSC at least once in Fall 2015 (1,828 students out of the 6,862 total students enrolled in a Math course), and 27% in Spring 2016 (1,616 students out of 6,068). Of the students who visited the MSC during AY 2016, most students visited two to five times, for both Fall 2015 and Spring 2016 (table 2). Of the students who visited the MSC during the two terms, Math 60 students utilized MSC most frequently (table 3).

Table 1. Frequencies for MSC Student Visits

	Minimum	Maximum	Total	Average
Fall 2015				
Visits to the MSC	1	103	13,959	7.6
Minutes Spent in the MSC	1.1	18,728.8	1,479,630.5	809.4
Hours Spent in the MSC	0.02	312.2	24,660.5	13.5
Spring 2016				
Visits to the MSC	1	119	13,155	8.1
Minutes Spent in the MSC	1.1	22,217.7	1,391,256.9	860.9
Hours Spent in the MSC	0.02	370.3	23,187.6	14.4

Table 2. Counts of MSC Student Visits

Number of Visits	Count of Students Fall 2015	Count of Students Spring 2016
1	585	475
2-5	601	540
6-10	255	240
11-20	215	197
21 and up	172	164
Total	1,828	1,616

Table 3. Counts of MSC Students by Math Course

Math Enrollment	Fall 2015		Spring 2016	
	Total Enrolled	Visited MSC	Total Enrolled	Visited MSC
MATH 5	108	24	87	18
MATH 40	926	137	568	85
MATH 60	1708	418	1357	316
MATH 70	117	33	152	18
MATH 75	38	7	76	17
MATH 80	1239	258	1029	218
MATH 80A	377	69	398	88
MATH 80B	313	80	258	45
MATH 105	31	15	N/A	N/A
MATH 110A	43	7	36	6
MATH 110B	N/A	N/A	31	11
MATH 112	433	135	568	162
MATH 114	477	148	487	136
MATH 115	12	2	18	2
MATH 116	114	47	140	43
MATH 140	300	76	212	77
MATH 150	198	74	199	86
MATH 170	202	120	209	74
MATH 190	102	35	123	77
MATH 220	85	28	78	31
MATH 250	39	7	42	15
Total	6,862	1,720	6,068	1,525

Demographic information is provided for Math students who visited the MSC in Fall 2015 and Spring 2016 semesters.

Table 4. Academic Information for DLA Users and All Math Students

Academic Information	Fall 2015		Spring 2016	
	MSC Users	All Math Students	MSC Users	All Math Students
Cum GPA	2.87	2.67	2.89	2.70

Cum Units	56.1	47.6	60.9	53.1
Units Taken	7.9	6.7	8.1	6.7

Table 5. Comparison of MSC Users and All Students Enrolled in a Math Course by Gender

Gender	Fall 2015				Spring 2016			
	ALL Math Students		MSC Users		ALL Math Students		MSC Users	
	Count	%	Count	%	Count	%	Count	%
Female	1,520	51.5%	942	51.5%	1,343	51.6%	302	51.7%
Male	1,369	46.3%	836	45.7%	1,212	46.6%	268	45.9%
Unknown	65	2.2%	50	2.7%	48	1.8%	14	2.4%
Total	2,954	100%	1,828	100%	2,603	100%	584	100%

Table 6. Comparison of MSC Users and All Students Enrolled in a Math Course by Race/Ethnicity

Race/Ethnicity	Fall 2015				Spring 2016			
	ALL Math Students		MSC Users		ALL Math Students		MSC Users	
	Count	%	Count	%	Count	%	Count	%
African-Americans	107	3.6%	76	4.2%	95	3.6%	28	4.8%
Alaskans/Native American	104	3.5%	107	5.9%	106	4.1%	35	6.0%
Asian	375	12.7%	240	13.1%	354	13.6%	66	11.3%
Hispanic/Latino	2,005	67.9%	1,212	66.3%	1,737	66.7%	391	67.0%
Other, Non-White	3	0.1%	1	0.1%	2	0.1%	1	0.2%
Pacific Islander	16	0.5%	9	0.5%	8	0.3%	2	0.3%
White	149	5.0%	64	3.5%	115	4.4%	27	4.6%
Unknown/Non-Response	195	6.6%	119	6.5%	186	7.1%	34	5.8%
Total	2,954	100%	1,828	100%	2,603	100%	584	100%

Table 7. Comparison of MSC Users and All Students Enrolled in a Math Course by Age Range

Age	Fall 2015				Spring 2016			
	ALL Math Students		MSC Users		ALL Math Students		MSC Users	
	Count	%	Count	%	Count	%	Count	%
19 or younger	728	24.6%	562	30.7%	503	19.3%	85	14.6%
20-24	1,268	42.9%	733	40.1%	1,222	46.9%	247	42.3%
25-29	496	16.8%	261	14.3%	478	18.4%	108	18.5%
30-34	204	6.9%	92	5.0%	163	6.3%	54	9.2%
35-39	114	3.9%	64	3.5%	92	3.5%	25	4.3%
40-49	100	3.4%	70	3.8%	108	4.1%	50	8.6%
50 or older	44	1.5%	46	2.5%	37	1.4%	15	2.6%
Total	2,954	100%	1,828	100%	2,603	100%	584	100%

Overall, the MSC students have slightly higher success and completion rates than the regular math students. Table 8 shows the overall Math course success and completion rates for students that visited the MSC compared to all students enrolled in a Math course. Success was defined as a

student earning a grade of A, B, C, or P (passing). Not passing was defined as a student earning a grade of W, D, F, or NP (not passing). Success rates are further broken down for MSC users and all students enrolled in a Math course by course in Table 9. MSC users had higher success rates in all math courses except Math 80, 80A, 116, and 140 in Fall 2015; Math 110B, 115, and 170 for Spring 2016. However, with such a large difference in the size of the groups, direct comparisons should be made with caution.

Table 8. Overall Success & Completion Rate Comparison

Overall Math Rates	Fall 2015		Spring 2016	
	All Math Courses	MSC Students Only	All Math Courses	MSC Students Only
Success	69.6%	73.4%	50.1%	60.5%
Completion	84.2%	86.6%	72.0%	81.3%

Table 9. Course Breakdown of Success Rates for MSC Users and All Students Enrolled in a Math Course

Success Rates	Fall 2015				Spring 2016			
	Total Enrolled	All Student Rate	Visited MSC	MSC Student Rate	Total Enrolled	All Student Rate	Visited MSC	MSC Students Only
MATH 5	108	75.0%	24	91.7%	87	55.2%	18	72.2%
MATH 40	926	55.3%	137	67.9%	568	53.3%	85	61.2%
MATH 60	1,708	39.2%	418	43.1%	1357	41.6%	316	50.3%
MATH 70	117	57.3%	33	66.1%	152	66.4%	18	83.3%
MATH 75	38	52.6%	7	71.4%	76	56.6%	17	64.7%
MATH 80	1,239	47.9%	258	46.5%	1029	44.1%	218	51.4%
MATH 80A	377	58.6%	69	58.0%	398	57.0%	88	67.0%
MATH 80B	313	62.9%	80	73.8%	258	51.2%	45	64.4%
MATH 105	31	51.6%	15	73.3%	N/A	N/A	N/A	N/A
MATH 110A	43	90.7%	7	100%	36	97.2%	6	100%
MATH 110B	N/A	N/A	N/A	N/A	31	74.2%	11	63.6%
MATH 112	433	55.0%	135	63.7%	568	60.4%	162	66.7%
MATH 114	477	40.0%	148	51.4%	487	38.0%	136	49.3%
MATH 115	12	66.7%	2	100%	18	44.4%	2	0.0%
MATH 116	114	77.2%	47	74.5%	140	55.7%	43	69.8%
MATH 140	300	54.0%	76	61.8%	212	42.0%	77	46.8%
MATH 150	198	62.1%	74	63.5%	199	57.3%	86	62.8%
MATH 170	202	44.6%	120	55.7%	209	50.7%	74	50.0%
MATH 190	102	48.0%	35	54.3%	123	65.0%	77	74.0%
MATH 220	85	57.6%	28	75.0%	78	34.6%	31	54.8%
MATH 250	39	56.4%	7	71.4%	42	66.7%	15	80.0%

Completion rates are further broken down for MSC users and all students enrolled in a Math course by course in Table 10. Completion was defined as the percentage of students that earned a grade in the course (A, B, C, D, F, P, or NP) and did not withdraw. MSC users had higher completion rates in all math courses with the exceptions of Math 75 and 80A in Fall 2015, and Math 115 in Spring 2016. MSC users had higher completion rates in all math courses in Spring 2016. Again, with such a large difference in the size of the groups direct comparisons should be made with caution.

Table 10. Course Breakdown of Completion Rates for MSC Users and All Students Enrolled in a Math Course

Completion Rates	Fall 2015				Spring 2016			
	Total Enrolled	All Student Rate	Visited MSC	MSC Student Rate	Total Enrolled	All Students Rate	Visited MSC	MSC Students Only
MATH 5	108	86.1%	24	100%	87	67.8%	18	77.8%
MATH 40	926	79.3%	137	84.7%	568	73.8%	85	78.8%
MATH 60	1,708	69.4%	418	70.6%	1,357	68.4%	316	77.8%
MATH 70	117	79.5%	33	93.9%	152	79.6%	18	100%
MATH 75	38	76.3%	7	71.4%	76	89.5%	17	100%
MATH 80	1,239	70.1%	258	73.6%	1,029	73.0%	218	84.4%
MATH 80A	377	79.8%	69	76.8%	398	76.1%	88	86.4%
MATH 80B	313	82.7%	80	91.3%	258	72.9%	45	82.2%
MATH 105	31	67.7%	15	86.7%	N/A	N/A	N/A	N/A
MATH 110A	43	95.3%	7	100%	36	100%	6	100%
MATH 110B	N/A	N/A	N/A	N/A	31	87.1%	11	90.9%
MATH 112	433	70.0%	135	79.3%	568	76.9%	162	85.8%
MATH 114	477	60.0%	148	73.0%	487	57.9%	136	69.1%
MATH 115	12	83.3%	2	100%	18	50.0%	2	0.0%
MATH 116	114	91.2%	47	91.5%	140	75.7%	43	93.0%
MATH 140	300	75.3%	76	80.3%	212	64.6%	77	71.4%
MATH 150	198	76.3%	74	78.4%	199	70.4%	86	75.6%
MATH 170	202	67.3%	120	73.3%	209	74.2%	74	81.1%
MATH 190	102	62.7%	35	65.7%	123	77.2%	77	81.8%
MATH 220	85	78.8%	28	85.7%	78	67.9%	31	74.2%
MATH 250	39	74.4%	7	85.7%	42	73.8%	15	80.0%

Students who visited the MSC were classified according to their total number of visits during AY 2016. The categories consist of: minimal user (1 visit), casual user (2-5 visits), moderate user (6-10 visits), frequent user (11-20 visits) and extreme user (21 and more visits). Frequent and extreme users show a marked increase in success and retention rates over the other types of users.

Table 11. MSC User Profile Data Fall 2015

Type of MSC User Fall 2015	# of Student Visits	# of MSC Students	% of MSC Students	Avg. # Visits	Avg. Time Spent (hours)	Success Rate	Completion Rate
Minimal User	1	585	32.0%	1	1.3	68.7%	82.8%
Casual User	2-5	601	32.9%	3	4.7	72.9%	87.0%
Moderate User	6-10	255	13.9%	8	11.9	78.7%	90.1%
Frequent User	11-20	215	11.8%	15	23.8	70.2%	87.0%
Extreme User	21 and up	172	9.4%	37	75.2	87.2%	92.4%
Total		1,828	100%	13	19.5	75.5%	87.9%

Table 12. MSC User Profile Data Spring 2016

Type of MSC User Spring 2016	# of Student Visits	# of MSC Students	% of MSC Students	Avg. # Visits	Avg. Time Spent (hours)	Success Rate	Completion Rate
Minimal User	1	475	29.4%	1	1.2	72.2%	88.4%
Casual User	2-5	540	33.4%	3	4.8	73.5%	85.6%
Moderate User	6-10	240	14.9%	8	12.3	75.8%	87.9%
Frequent User	11-20	197	12.2%	14	24.4	75.6%	87.3%
Extreme User	21 and up	164	10.1%	38	74.7	84.8%	94.5%
Total		1,616	100%	13	23.5	76.4%	88.7%

Detailed Analysis Directed Learning Activity

There were 1,611 Directed Learning Activity (DLA) visits from 227 unduplicated students in Fall 2015, 408 visits from 164 in Spring 2016. Many students worked on a DLA multiple times. For a list of DLA Type and count of students, please see Table 14.

Table 13. Number of DLA Visits in Academic Year 2015

Number of DLA visits	Count of Students Fall 2015	Count of Students Spring 2016
1	94	90
2	40	24
3	29	17
4	16	12
5	12	6
6	8	3
7	8	4
8	5	2
9	4	1
10	4	3
11	2	0
12	1	0
13	2	0
16	1	0
17	0	1
19	1	1

Total	227	164
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Table 14. Counts of DLA visits by DLA type

DLA Name	Fall 2015 Count	Spring 2016 Count
Adding and Subtracting Decimals	3	4
Adding and Subtracting Fractions-Fraction Tiles	9	3
Adding and Subtracting Integers	17	19
Adding and Subtracting Whole Numbers	9	3
After-Exam Debriefing	114	86
Applying The Concepts of Percent	5	0
Equivalent Fractions	11	15
Factoring Up to Four Terms	31	22
Factoring: 3-Terms (does not equal 1)	22	2
Factoring: 3-Terms (a=1)	17	15
Factoring: 3-Terms (ac Method)	17	12
Factoring: Two Terms	63	39
Graphing Sine and Cosine Functions (Part One)	1	0
Linear Model Applications	18	15
Multiplying and Dividing Decimals	2	5
Multiplying and Dividing Whole Numbers	3	4
Order of Operations	12	7
Order of Operations - Scientific Calcula	4	1
Pharmacology Calculations	3	41
Proportional Reasoning	3	0
Pythagorean Theorem	9	3
Quadratic Formula	47	23
Scientific Notation	23	30
Simplifying Using Trigonometric Identities	1	0
Solving Basic Linear Equations Using Chips	11	2
Solving Linear Equations	52	12
Transformations Using Parent Graphs	15	6
Translating Algebraic Expressions	23	9
Unit Conversion	5	1
Word Problems (Coin)	34	0
Word Problems (Investments)	39	10
Word Problems (Mixtures)	40	10
Word Problems (Translation)	28	3
Word Problems: Uniform Motion	9	3
Total	700	405

Demographic information is provided for Math students who used DLAs in AY 2016.

Table 15. Academic Information for DLA Users and All Math Students

Academic Information	Fall 2015		Spring 2016	
	DLA Users	All Math Students	DLA Users	All Math Students

Cum GPA	2.80	2.67	3.01	2.70
Cum Units	48.0	47.6	53.6	42.8
Units Taken	8.4	6.7	10.2	7.0

Table 16. Comparison of DLA Users and All Students Enrolled in a Math Course by Gender

Gender	Fall 2015				Spring 2016			
	DLA User		All Math		DLA User		All Math	
	Count	%	Count	%	Count	%	Count	%
Female	54	60.7%	1,520	51.5%	30	54.5%	1,343	51.6%
Male	34	38.2%	1,369	46.3%	24	43.6%	1,212	46.6%
Unknown	1	1.1%	65	2.2%	1	1.8%	48	1.8%
Total	89	100%	2,954	100%	55	100%	2,603	100%

Table 17. Comparison of DLA Users and All Students Enrolled in a Math Course by Race/Ethnicity

Race/Ethnicity	Fall 2015				Spring 2016			
	DLA User		All Math Students		DLA User		All Math Students	
	Count	%	Count	%	Count	%	Count	%
African-Americans	2	2.2%	107	3.6%	4	7.3%	95	3.6%
Alaskans/Native American	0	0.0%	104	3.5%	3	5.5%	106	4.1%
Asian	8	9.0%	375	12.7%	10	18.2%	354	13.6%
Hispanic/Latino	71	79.8%	2,005	67.9%	33	60.0%	1,737	66.7%
Other, Non-White	0	0.0%	3	0.1%	0	0.0%	2	0.1%
Pacific Islander	1	1.1%	16	0.5%	0	0.0%	8	0.3%
Unknown/Non-Response	5	5.6%	149	5.0%	4	7.3%	186	7.1%
White	2	2.2%	195	6.6%	1	1.8%	115	4.4%
Total	89	100%	2,954	100%	55	100%	2,603	100%

Table 18. Comparison of DLA Users and All Students Enrolled in a Math Course by Age Group

Age	Fall 2015				Spring 2016			
	DLA User		All Math		DLA User		All Math	
	Count	%	Count	%	Count	%	Count	%
19 or younger	19	21.3%	728	24.6%	9	16.4%	503	19.3%
20-24	36	40.0%	1,268	42.9%	26	47.3%	1,222	46.9%
25-29	18	20.2%	496	16.8%	10	18.2%	478	18.4%
30-34	7	7.9%	204	6.9%	4	7.3%	163	6.3%
35-39	4	4.5%	114	3.9%	1	1.8%	92	3.5%
40-49	3	3.4%	100	3.4%	2	3.6%	108	4.1%
50 or older	2	2.2%	44	1.5%	3	5.5%	37	1.4%
Total	89	100%	2,954	100%	55	100%	2,603	100%

Overall the DLA students have slightly higher success and completion rates than the regular math students. Table 19 shows the overall Math course success and completion rates for students that used DLAs compared to all students enrolled in a Math course. Success was defined as a student

earning a grade of A, B, C, or P (passing). Not passing was defined as a student earning a grade of W, D, F, or NP (not passing). Success and Completion rates are further broken down for DLA users and all students enrolled in a Math course by course in Table 20 and 21.

In Fall 2015, DLA users did not enroll in many of the offered Math courses, except for Math 5, 40, 60, 70, 80, 80A, 80B, 114, and 150; DLA users had higher success rates with the exception of Math 80B and 150. In Spring, DLA users only enrolled in Math 5, 40, 60, 80, 80A, 80B, 114, and 150; DLA users had higher success rates in all courses except Math 60 and 80B. However, with such a large difference in the size of the groups, direct comparisons should be made with caution.

Table 19. Overall Success & Completion Rate Comparison

Overall Math Rates	Fall 2015		Spring 2016	
	DLA Users	All Math	DLA Users	All Math
Success	62.9%	50.2%	72.7%	50.1%
Completion	87.6%	72.0%	87.3%	72.0%

Table 20. Course Breakdown of Success Rates for DLA Users and All Students Enrolled in a Math Course

Success Rates	Fall 2015				Spring 2016			
	DLA Users		All Math Students		DLA Users		All Math Students	
	Count	%	Count	%	Count	%	Count	%
MATH 5	13	92.3%	108	75.0%	6	83.3%	87	55.2%
MATH 40	40	70.0%	926	55.3%	12	83.3%	568	53.3%
MATH 60	80	56.3%	1,708	39.2%	20	40.0%	1,357	41.6%
MATH 70	1	100.0%	117	57.3%	N/A	N/A	152	66.4%
MATH 75	N/A	N/A	38	52.6%	N/A	N/A	76	56.6%
MATH 80	47	74.5%	1,239	47.9%	37	75.7%	1,029	44.1%
MATH 80A	1	100.0%	377	58.6%	11	90.9%	398	57.0%
MATH 80B	19	57.9%	313	62.9%	1	0.0%	258	51.2%
MATH 105	N/A	N/A	31	51.6%	N/A	N/A	N/A	N/A
MATH 110A	N/A	N/A	43	90.7%	N/A	N/A	36	97.2%
MATH 110B	N/A	N/A	N/A	N/A	N/A	N/A	31	74.2%
MATH 112	N/A	N/A	433	55.0%	1	100%	568	60.4%
MATH 114	2	100.0%	477	40.0%	N/A	N/A	487	38.0%
MATH 115	N/A	N/A	12	66.7%	N/A	N/A	18	44.4%
MATH 116	N/A	N/A	114	77.2%	N/A	N/A	140	55.7%
MATH 140	N/A	N/A	300	54.0%	N/A	N/A	212	42.0%
MATH 150	31	61.3%	198	62.1%	47	66.0%	199	57.3%
MATH 170	1	100.0%	202	44.6%	N/A	N/A	209	50.7%
MATH 190	N/A	N/A	102	48.0%	N/A	N/A	123	65.0%
MATH 220	N/A	N/A	85	57.6%	N/A	N/A	78	34.6%
MATH 250	N/A	N/A	39	56.4%	N/A	N/A	42	66.7%

Completion rates are further broken down for DLA users and all students enrolled in a Math course by course in Table 21. Completion was defined as the percentage of students that earned a grade in the

course (A, B, C, D, F, P, or NP) and did not withdraw. DLA users had higher completion rates in all math courses with the exceptions of Math 80B in Spring. Again, with such a large difference in the size of the groups direct comparisons should be made with caution.

Table 21. Course Breakdown of Completion Rates for DLA Users and All Students Enrolled in a Math Course

Course Completion	Fall 2015				Spring 2016			
	DLA Users		All Math Students		DLA Users		All Math Students	
	Count	%	Count	%	Count	%	Count	%
MATH 5	13	92.3%	108	86.1%	6	83.3%	87	67.8%
MATH 40	40	97.5%	926	79.3%	12	91.7%	568	73.8%
MATH 60	80	82.5%	1,708	69.4%	20	80.0%	1,357	68.4%
MATH 70	1	100%	117	79.5%	N/A	N/A	152	79.6%
MATH 75	N/A	N/A	38	76.3%	N/A	N/A	76	89.5%
MATH 80	47	95.7%	1,239	70.1%	37	100%	1,029	73.0%
MATH 80A	1	100%	377	79.8%	11	100%	398	76.1%
MATH 80B	19	100%	313	82.7%	1	0.0%	258	72.9%
MATH 105	N/A	N/A	31	67.7%	N/A	N/A	N/A	N/A
MATH 110A	N/A	N/A	43	95.3%	N/A	N/A	36	100.0%
MATH 110B	N/A	N/A	N/A	N/A	N/A	N/A	31	87.1%
MATH 112	N/A	N/A	433	70.0%	1	100%	568	76.9%
MATH 114	2	100%	477	60.0%	N/A	N/A	487	57.9%
MATH 115	N/A	N/A	12	83.3%	N/A	N/A	18	50.0%
MATH 116	N/A	N/A	114	91.2%	N/A	N/A	140	75.7%
MATH 140	N/A	N/A	300	75.3%	N/A	N/A	212	64.6%
MATH 150	31	83.9%	198	76.3%	47	83.0%	199	70.4%
MATH 170	1	100%	202	67.3%	N/A	N/A	209	74.2%
MATH 190	N/A	N/A	102	62.7%	N/A	N/A	123	77.2%
MATH 220	N/A	N/A	85	78.8%	N/A	N/A	78	67.9%
MATH 250	N/A	N/A	39	74.4%	N/A	N/A	42	73.8%