



LOS ANGELES VALLEY COLLEGE

Did MAPS Improve Student Progression in the Math Sequence?

Longitudinal analysis based on First Time Fall
2012 Students.

Office of Institutional Effectiveness

[Pick the date]

Background

Slow progress through the Mathematics sequence was identified as one of the main bottlenecks for the low completion rates at LAVC. MAPS Pilot Project is initiated and implemented to improve student progression in the Math sequence. Course redesign, paired parallel instructions, course embedded advising, and summer bridges program are some of the interventions being implemented under MAPS pilot project to improve students' progression through the Math sequence. As we are completing Year III and starting Year IV of the MAPS Project, it is time to assess what we have achieved so far and learn from the process so that we can revamp our effort to successfully implement the remaining components of the project.

Research Question

The main research question in this analysis is to find out whether the Math Accelerated Progression Sequence project improved students' progression in math or not.

1. How many first-time students placed into Math 105 in Fall 2012 eventually enrolled in a Math Course?
2. What number and percentage of the cohort took the lowest level of developmental math (Math 105 or Math 110) as their first math course and did not take another math course?
3. What number and Percentage of the cohort took the lowest level developmental math course in Fall 2012, and then took the next –highest developmental math course?
4. Which developmental math course sequence was most prevalent?
5. What number and percentage of students took the developmental math sequence in the recommended order?
6. What percentage of the cohort attempted a gate-keeper course (Math 120 or 125) or above within the two years? Was there a significant difference in attempting to take a gate-keeper course or above between the different sequences?
7. Disproportionate impact: which group is not doing well in the Math progression?

Research method

Longitudinal research method is applied to answer the research questions outlined above. The method allows tracking the performance of a group of students (i.e. a cohort) over a span of time. Tracking of a cohort over a span of time allows to identify how students are progressing through their studies, where they most fail or leave the college, which sub-group is under/over performing compared to others, and whether certain interventions are working or not.

Students placed in Math 105 in Fall 2012 and enrolled to a math course at LAVC as a first-time student are made part of the study cohort. Starting from a cohort of students who are placed at the same level and who are taking the course for the first time stages the field for comparing performances in subsequent courses. The cohort's progression in subsequent math courses is then tracked for two years, from Fall 2012 to Summer 2014, based on their graded enrollment. Courses taken by each member of

the cohort during the study period were arranged in sequences using Course Sequence Pattern methodology. Then students' progression in the Math sequence was computed to answer the research questions. Finally, Disproportionate Impact Analysis applied to analyze the impact of the progression on the different demographics.

Analysis

Q1. How many first-time students placed into Math 105 in Fall 2012 eventually enrolled in a Math Course?

First Time Students Placed into Math 105 in Fall 2012	First Time Students Placed into Math 105 in Fall 2012 and enrolled in any math course within the two years	%
511	256	50%

Q2. What number and percentage of the cohort took the lowest level of developmental math (Math 105 or Math 110) as their first math course and did not take another math course?

Lowest Level Math course	Total	# took only the lowest level	
105	169	86	51%
110	62	29	47%
Total	231	115	50%

Q3. What number and Percentage of the cohort took the lowest level developmental math course in Fall 2012, and then took the next –highest developmental math course (Math 105 to Math 112, Math 110 to Math 115)?

Math course	Total	# took the next level	%
Math 105	169	65	38%
Math 110	62	22	35%
Total	231	87	38%

Q4. What developmental math course sequence was most prevalent?

Students followed about 29 different paths to complete their math courses within the two years (Page 4). The top 10 prevalent paths are listed below. As can be seen from the list below, most of the students follow a path that did not substantially improve their Math progression in the sequence (# 1, 3, 5, 6, 10) within the two years.

1. MATH 105 (86)
2. Math 105, Math 112 (31)

3. Math 110 (29)
4. MATH 105, Math 112, Math 115 (23)
5. Math 105, Math 110 (14)
6. Math 112 (8)
7. Math 112, Math 115 (8)
8. Math 110, Math 115 (7)
9. Math 105, Math 112, Math 115, Math 125 (6)
10. Math 110, Math 112 (5)

Q5. What number and percentage of students took the developmental math sequence in the “recommended” order? Very few students took the sequence in the recommended “legacy” or “accelerated” orders. Most of the students follow a mixed trail.

Path A: Math 105, Math 112, Math 113, Math 114, Math 120 or Math 125 (only 1 student)

Path B: Math 110, Math 115 and Math 125 (9 students or 4%)

Q6. What percentage of the cohort attempted a gatekeeper course (Math 120 or 125) or above within the two years? Was their significant difference in attempting to take a gate-keeper course or above between the sequences?

34 of the 256 students (13%) who started Math 105 in Fall 2012 were able to attempt a gate keeper or above course within the two years. Comparison was made between students who started their Math sequence in Math 105 and Math 110, in the number of terms it took them to make their first attempt of a gatekeeper course. **From those who started the sequence in Math 105 and attempted a gatekeeper course, none of the students were able to make their first attempt in two terms, only one was able to make first attempt in three terms, and 91% of them require four or more terms to make their first attempts. On the other hand, from those who started the sequence in Math 110 and attempted a gatekeeper course, 33% were able to do it within two terms and 94% within three terms. Only 6% of the students required four or more terms to make their first attempt to a gatekeeper course. Therefore, it is safe to conclude that there was a significant difference in attempting a gatekeeper course between the two paths. MAPS students attempted a gatekeeper course in a short time than the others.**

Started Sequence From	Number of Terms Taken To Make First Attempt to a Gate Keeper Course							
	Two Terms		Three Terms		Four Terms		Total	
	Count	%	Count	%	Count	%	Count	%
Math 105	0	0%	1	9%	10	91%	11	100%
Math 110	6	33%	11	61%	1	6%	18	100%

Paths taken by students who attempted a gate-keeper course or above

Term 1	Term 2	Term 3	Term 4	Term 5	Path
MATH 105	MATH 110	MATH 115	MATH 125		1
MATH 105	MATH 112	MATH 113	MATH 114	MATH 259	4
MATH 105	MATH 112	MATH 115	MATH 115/125		7
MATH 105	MATH 112	MATH 115	MATH 120		8
MATH 105	MATH 112	MATH 115	MATH 125		9
MATH 105	MATH 112	MATH 115	MATH 125		9
MATH 105	MATH 112	MATH 115	MATH 125		9
MATH 105	MATH 112	MATH 115	MATH 125		9
MATH 105	MATH 112	MATH 115	MATH 125		9
MATH 105	MATH 112	MATH 115	MATH 125		9
MATH 105	MATH 112	MATH 115/125			11
MATH 110	MATH 112	MATH 115/125			15
MATH 110	MATH 113	MATH 114	MATH 125		17
MATH 110	MATH 115	MATH 115/125	MATH 120	MATH 125	19
MATH 110	MATH 115	MATH 115/125	MATH 125		20
MATH 110	MATH 115	MATH 115/125	MATH 125		20
MATH 110	MATH 115	MATH 115/125			21
MATH 110	MATH 115	MATH 125	MATH 227		22
MATH 110	MATH 115	MATH 125			23
MATH 110	MATH 115	MATH 125			23
MATH 110	MATH 115	MATH 125			23
MATH 110	MATH 115	MATH 125			23
MATH 110	MATH 115/125	MATH 120			25
MATH 110	MATH 115/125	MATH 120			25
MATH 110	MATH 115/125	MATH 227			26
MATH 110	MATH 115/125				27
MATH 110	MATH 115/125				27
MATH 110	MATH 115/125				27
MATH 112	MATH 115	MATH 115/125	MATH 120	MATH 125	30
MATH 112	MATH 115	MATH 120	MATH 125		31
MATH 112	MATH 115	MATH 125			32
MATH 112	MATH 115	MATH 125			32
MATH 115	MATH 115/125				36
MATH 115	MATH 115/125				36

Disproportionate Impact Analysis: Which group is not doing well in Math progression?

Proportionality Index¹

By Ethnicity

Ethnic Group	Count				Percentage				Proportionality Index		
	Placed Math 105	enrolled in Math 105 or 110 within the two years	# took the next level	Attempted a gatekeeper course or above within two years	Placed Math 105	enrolled in Math 105 or 110 within the two years	# took the next level	Attempted a gatekeeper course or above within two years	enrolled in Math 105 or 110 within the two years	# took the next level	Attempted a gatekeeper course or above within two years
American Indian/Other Non-White	2	1	1		0.004	0.004	0.009	0	1.106	2.203	0
Asian/Pacific Islander	28	8	3	1	0.055	0.035	0.026	0.029	0.632	0.472	0.537
Black, African-American	44	13	5	2	0.086	0.056	0.043	0.059	0.654	0.501	0.683
Caucasian, White	110	47	31	8	0.215	0.203	0.267	0.235	0.945	1.241	1.093
Hispanic	249	127	59	21	0.487	0.550	0.509	0.618	1.128	1.044	1.268
Multiple Ethnicities	55	25	12	1	0.108	0.108	0.103	0.029	1.006	0.961	0.273
Unknown	23	10	5	1	0.045	0.043	0.043	0.029	0.962	0.958	0.653
Grand Total	511	231	116	34	1	1	1	1	1	1	1

¹ Per the GUIDELINES FOR MEASURING DISPROPORTIONATE IMPACT IN EQUITY PLANS (CALIFORNIA COMMUNITY COLLEGES CHANCELLORS' OFFICE OCTOBER 15, 2013), Proportionality Index compares the percentage of a disaggregated subgroup in an initial cohort to its own percentage in the resultant outcome group

By Sex

Sex	Count				Percentage				Proportionality Index		
	Placed Math 105	enrolled in Math 105 or 110 within the two years	# took the next level	Attempted a gatekeeper course or above within two years	Placed Math 105	enrolled in Math 105 or 110 within the two years	# took the next level	Attempted a gatekeeper course or above within two years	enrolled in Math 105 or 110 within the two years	# took the next level	Attempted a gatekeeper course or above within two years
F	307	145	76	26	0.601	0.628	0.655	0.765	1.045	1.091	1.273
M	204	86	40	8	0.399	0.372	0.345	0.235	0.933	0.864	0.589
Grand Total	511	231	116	34	1	1	1	1	1	1	1

By Age Group

Age Group	Count				Percentage				Proportionality Index		
	Placed Math 105	enrolled in Math 105 or 110 within the two years	# took the next level	Attempted a gatekeeper course or above within two years	Placed Math 105	enrolled in Math 105 or 110 within the two years	# took the next level	Attempted a gatekeeper course or above within two years	enrolled in Math 105 or 110 within the two years	# took the next level	Attempted a gatekeeper course or above within two years
20-24	320	153	73	24	0.626	0.662	0.629	0.706	1.058	1.005	1.127
25-34	98	36	20	6	0.192	0.156	0.172	0.176	0.813	0.899	0.920
35-54	59	31	17	4	0.115	0.134	0.147	0.118	1.162	1.269	1.019
55 and over	25	8	4		0.049	0.035	0.034	0.000	0.708	0.705	0.000
Under 20	9	3	2		0.018	0.013	0.017	0.000	0.737	0.979	0.000
Grand Total	511	231	116	34	1	1	1	1	1	1	1

Caucasians and Hispanics; females ; and age groups 20 to 24, and 35-54 seems to be doing relatively well in their Math progression than the others. African Americans and Asians; males; and age groups under 20, 55 and above, and 25 to 34 seems to be disproportionately impacted than others.