El Camino College
Summer Math Academy Report

Summary

El Camino College (ECC) offers the Summer Math Academy (SMA) to provide students with the skills that are necessary to succeed in mathematics courses taken at ECC which lead students to graduate and/or transfer. After completing the three-week program, students have an opportunity to retake their College Mathematics Placement Test and possibly place higher to expedite their educational goals by taking fewer math courses.

This report examined the placement scores and course performance of 609 SMA students in the following cohorts: 2009, 2011, 2012, 2013 and 2014. Upon completion of the Summer Math Academy, more than half of all participants improved their math placement, some by as much as three levels. This means that the program enabled students to place at a higher level which could aid students to quickly navigate through the basic math sequence. In comparison to their counterparts (non-SMA students), SMA students succeed in their math courses at a slightly higher rate (SMA: 58% vs. Non-SMA: 53%). Even though the difference is not necessarily significant, the implications are clear: SMA students benefit from the program and reach their academic goals at a faster rate by saving at least one term of math.

Summer Math Academy

The El Camino College (ECC) Summer Math Academy (SMA) is a three-week program designed to equip students with the tools necessary to succeed in mathematics courses taken at ECC in order to graduate and/or transfer. A secondary goal of the SMA is to allow students the opportunity to retake their math placement test with the objective that students will place higher. A student who places into the most remedial math class offered at ECC (Math 12) is three levels below degree-credit and four levels below transfer credit courses. This translates to at least three terms of math before a student can take a course to satisfy the math requirement for a degree, and four terms of math before the student can take transfer-level math. By allowing students to retake their placement exam after completing the SMA, students are given the opportunity to place into a higher math class, which may put them one or more semesters closer to achieving their educational goal while taking fewer courses.

Methodology

Students were recruited to participate in the SMA after taking their initial placement test in the preceding spring semester. Over the past several years, the SMA has increased its recruitment from only those placed into basic arithmetic (Math 12), to those placed into pre-algebra (Math 23), algebra (Math 33/40 and Math 73/80), and pre-calculus (Math 180). With the exception of Math 12, all students who were placed into the previously-mentioned courses were recruited for participation in the SMA. Given that the number of students placed into Math 12 was very large, only the top 75% of these students were recruited to participate in the SMA.

This report focuses on students who were enrolled in the SMA during the summers of 2009, 2011, 2012, 2013 and 2014. The Summer Math Academy did not operate in 2010. In Summer 2009, students were recruited from those who placed into Math 12, Math 23, Math 33, and Math 73. In Summer 2011 cohort, this pool was expanded to include students placed into Math 40. In Summer 2012 and 2013, recruitment expanded to include students placed into Math 60 and Math 180. Students are included in this report only if they had valid pre- and post-SMA math placement scores. Therefore, students who, for various reasons, did not take a pre- or post-SMA assessment are not included in this report. Enrollment in the subsequent Fall semester was examined to evaluate student placement, enrollment, and success. Student grades were used to compare success rates between students who participated in the SMA and students who did not. Success rates were calculated by taking the number of students succeeding (earning an A, B, C, IB, IC, or P) divided by the total number of students with records in the class (including those who dropped or withdrew, but not including ungraded students). Please note that students from the Summer 2011 cohort enrolled in more than one math course in the Fall 2011 semester.

Summer Math Academy Students

Improvement Rates

The Summer Math Academy served 609 students (60 in 2009, 69 in 2011, 125 in 2012, 117 in 2013 and 240 in 2014). The cohort in 2014 contained more students than the prior groups. Combining all cohorts, more than half (53%, 320) improved their math placement. Essentially, 320 SMA students accelerated their educational goals by saving at least one semester in the basic math sequence. Table 1 displays the pre-test and post-test placement among SMA students; key points are detailed below:

- The greatest rate of improvement was among students who originally placed into Math 40/60 as 85% improved to a higher course.
- Over half of the students originally placed into Math 12, Math 23, Math 40, and Math 170/180 improved their placement.
- More than two-thirds of students placed into Math 73/80 did not improve their math placement.
- A substantial number of students did not improve or placed lower than their original math placement.

Table 1. Pre- and Post-SMA Placement Tests, 2009-2014

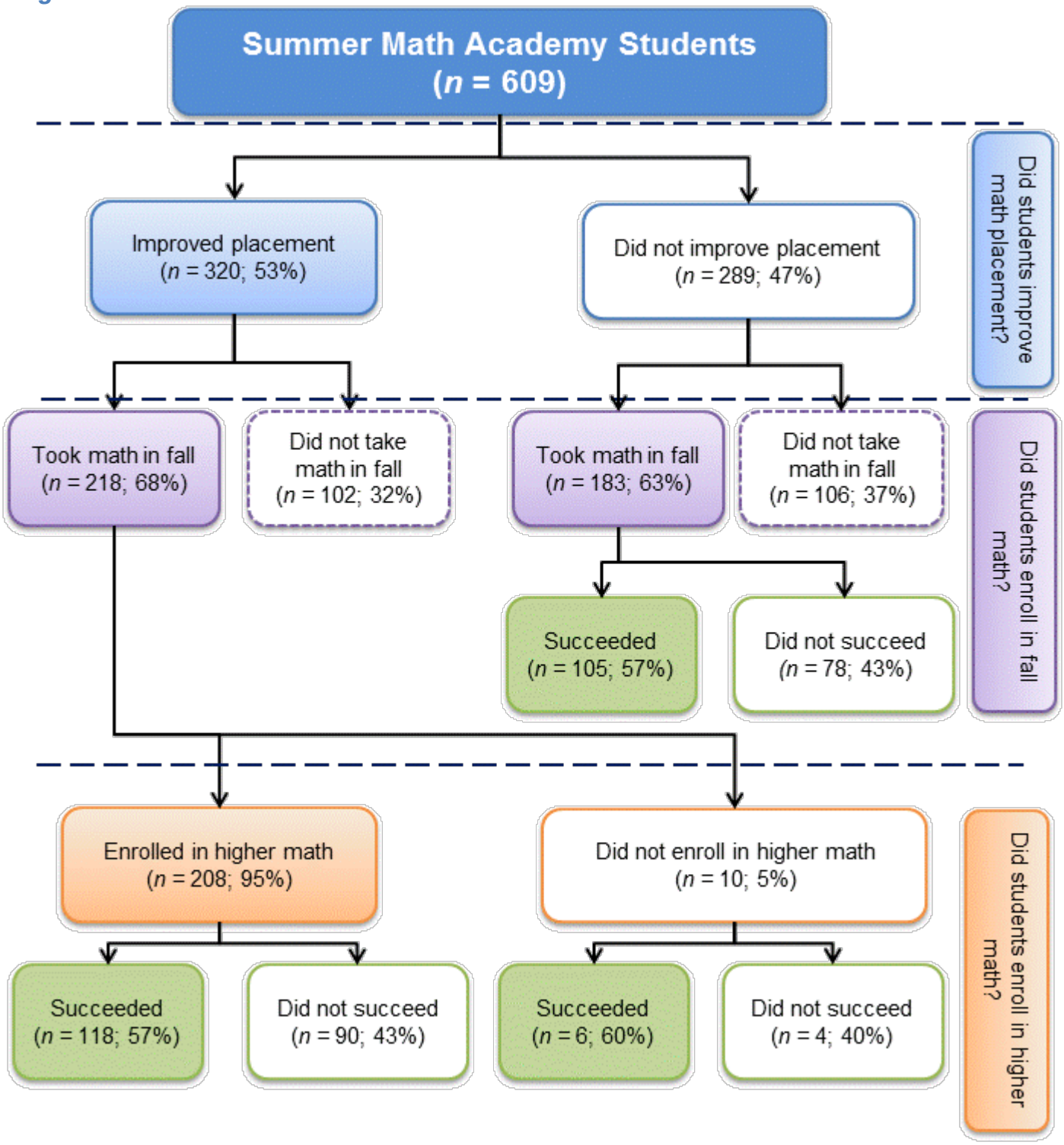
Pre-test Math Placement	Post-SMA Math Placement: 12	23	33	40/ 60/ 67	73 / 80	170 / 180	160 / 190	Total
Math-12	**90** *40%*	**100** *45%*	**2** *1%*	**20** *9%*	**11** *5%*			**223** *100%*
Math-23*	**2** *2%*	**40** *41%*	**8** *8%*	**12** *12%*	**36** *37%*			**98** *100%*
Math-33		**1** *50%*			**1** *50%*			**2** *100%*
Math-37**		**1** *14%*		**1** *14%*	**5** *71%*			**7** *100%*
Math-43					**1** 100%			**1** 100%
Math-40/ Math-60		**2** 3%	**1** 2%	**5** *8%*	**53** *85%*	**1** *2%*		**62** *100%*
Math-73/ Math-80				**6** *3%*	**126** *70%*	**39** *22%*	**8** *4%*	**179** *100%*
Math-115							**1** *100%*	**1** *100%*
Math-130							**1** *100%*	**1** *100%*
Math-160					**1** *33%*		**2** *67%*	**3** *100%*
Math-170						**3** *75%*	**1** *25%*	**4** *100%*
Math-180					**1** *4%*	**10** *36%*	**17** *61%*	**28** *100%*
Total	**92**	**144**	**11**	**44**	**235**	**53**	**30**	**609**

Fall Math Enrollment

The diagram below (Figure 1) provides a pictorial view of SMA students' progression through the program and fall math courses. Whether or not students improved placement, the majority (66%: 401[1]/609) enrolled in a math class in the fall semester after the SMA. Fall math enrollment ratios were at the lowest in 2011 compared to the other cohorts (2009: 80%, 2011: 38%, 2012: 62%, 2013: 73% and 2014: 69%). However, this was the only cohort in which students enrolled in more than one math course. Despite the variation in enrollment, the majority of SMA students in every cohort were successful in a fall math course.

[1] This number does not include students that enrolled in more than one math course.

Figure 1. Summer Math Academy (2009, 2011, 2012, 2013 and 2014) student flow diagram.



Note. Student success = grade of A, B, C, IB, IC, or P. Non-SMA student success rate: 53% (15,887/30,099).

What Math Classes Did SMA Students Take Relative to Their Math Placement?

Table 2 displays SMA students fall math enrollment relative to their pre-SMA placement levels. Among students who improved their math placement and enrolled in a fall math class, there were 118 students who took a class 1-level higher than their original placement, 73 students who took a class 2-levels higher than their original placement, and 17 students who took a class 3-levels above their original math placement.

There were 15 students who took a class below their post-SMA math assessment level. Several students placed two levels above their pre-SMA math assessment but decided to enroll one level above their initial assessment. For example, one student placed into Math 12 at their pre-SMA assessment. After the SMA, the student placed into Math 67 (two levels higher), but enrolled in Math 37 (one level higher). Although the student did not attempt the highest level math course allowed, yet they are still one semester ahead of their original placement. Hence, 95% of students that improved their math placement enrolled in a math course higher than their original placement and more than half of this group was successful.

Table 2. Fall Enrollment by Pre-SMA Math Placement: Improvers

Pre-test Math Placement	Fall Math Class Enrollment										
	No Fall Math	Math-23	Math-33	Math-37	Math-40	Math-73	Math-80	Math-180	Math-190	Other Math	Total
12	**51** *50%*	**45** *96%*	**2** *29%*	**6** *100%*	**14** *82%*	**5** *19%*	**6** *13%*			**4** *24%*	**133** *42%*
23	**25** *25%*	**2** *4%*	**5** *71%*		**2** *12%*	**9** *33%*	**9** *20%*			**2** *12%*	**54** *17%*
33							**1** *2%*				**1** *0.3%*
37							**4** *9%*				**4** *1%*
37/40										1 *6%*	1 *0.3%*
40	**7** *7%*					**5** *19%*	**11** *24%*				**23** *7%*
40/60	**8** *8%*				**1** *6%*	**7** *26%*	**13** *29%*	**1** *3%*			**30** *9%*
43	**1** ***1%***										**1** *0.3%*
73								**1** *3%*			**1** *0.3%*
73/80	**6** *6%*					**1** *4%*	**1** *2%*	**26** *84%*	**3** *14%*	**7** *41%*	**44** *14%*
80	**1** *1%*							**1** *3%*	**1** *5%*	**1** *6%*	**4** *1%*
115									**1** *5%*		**1** *0.3%*
130										**1** *6%*	**1** *0.3%*
160									**2** *10%*		**2** *1%*
170								**2** *6%*	**1** *5%*		**3** *1%*
180	**3** *3%*								**13** *62%*	**1** *6%*	**17** *5%*
Total	**102**	**47**	**7**	**6**	**17**	**27**	**45**	**31**	**21**	**17**	**320**

Did SMA Students Succeed in Their Math Classes?

The overall success rate among SMA students that completed a math course in the subsequent fall term equaled 58%. Success rates differed by the number of math levels in which a student advanced. For example, the success rate among students who advance one level above their original placement was higher than those that advanced two-levels above their original placement: 59% 1-level (70/118); 56% 2-levels (41/73); and 47% 3-levels (8/17). The success rate among students who jumped three levels above their original math placement score is promising, but should be used with caution as the sample is small and might not be projectable.

SMA Students Compared With Their Classmates

When considering only the math courses enrolled in by SMA students, the success rate of non-SMA students equaled 53% (Table 3), while the success rate of SMA students totaled 58%. Please note that these success rates were not statistically different but suggest that SMA students were just as, or even more likely to succeed than students who did not participate in the SMA.

Table 3. Success Rates of SMA and Non-SMA Students

Row Labels	Success Rate	Success	Not Success	Grand Total
Not SMA	53%	15,887	14,212	30,099
SMA	58%	236	171	407[2]
Grand Total	**53%**	**16,123**	**14,383**	**30,506**

Note. Student success = grade of A, B, C, IB, IC, or P.

Conclusion

Findings suggest that students benefit from the additional tools and training provided by the Summer Math Academy. In fact, the majority of SMA students improved their math placement by one, two, or three levels, accelerating their progression through the basic math sequence. In comparison to their peers, SMA students succeeded in their math classes at slightly higher rates (58% vs. 53%). Even though this difference was not necessarily significant, the data implies that SMA students were not placed beyond their capabilities in relation to other math students.

This report exemplifies that the SMA is achieving its goals as students place in a higher level math course and succeed in their fall math course. However, more than one-third of SMA participants do not enroll in a math course the following semester. Yet, nearly half of this group improved their math placement after the SMA. Hence, these students are not taking full advantage of the program. Additional analysis should be explored to determine why some students do not enroll in a fall math course.

[2] This number includes students that enrolled in more than one math course.

Appendix A – Comparison of Success Rates Between SMA and Non-SMA Students by Course: Fall 2009, 2011, 2012, 2013 and 2014.

Course	Success Rate	Not Success	Success	Total
Math-12	**53%**	**2,006**	**2,261**	**4,267**
Not SMA	53%	1,990	2,236	4,226
SMA	61%	16	25	41
Math-23	**54%**	**2,028**	**2,369**	**4,397**
Not SMA	54%	2,000	2,323	4,323
SMA	62%	28	46	74
Math-33	**64%**	**136**	**244**	**380**
Not SMA	63%	135	232	367
SMA	92%	1	12	13
Math-37	**51%**	**300**	**311**	**611**
Not SMA	51%	295	303	598
SMA	62%	5	8	13
Math-40	**49%**	**1,813**	**1,736**	**3,549**
Not SMA	49%	1,798	1,725	3,523
SMA	42%	15	11	26
Math-73	**54%**	**3,516**	**4,063**	**7,579**
Not SMA	54%	3,493	4,026	7,519
SMA	62%	23	37	60
Math-80	**50%**	**1,890**	**1,877**	**3,767**
Not SMA	50%	1,845	1,826	3,671
SMA	53%	45	51	96
Math-170	**51%**	**506**	**528**	**1,034**
Not SMA	51%	501	523	1,024
SMA	50%	5	5	10
Math-180	**62%**	**414**	**666**	**1,080**
Not SMA	62%	395	645	1,040
SMA	53%	19	21	40
Math-190	**53%**	**467**	**537**	**1,004**
Not SMA	54%	456	526	982
SMA	50%	11	11	22
Other Math	**54%**	**1,307**	**1,531**	**2,838**
Not SMA	54%	1,302	1,519	2,821
SMA	71%	5	12	17
Total	**53%**	**14,383**	**16,123**	**30,506**