MathPath Program Analysis

November 7, 2014
Office of Planning and Institutional Research

Executive Summary

An analysis was conducted to evaluate the effectiveness of the MathPath course offered during the summer of 2014, continuing the prior MathPath program work reported for summer of 2013, summer 2012, and summer of 2011. MathPath is a non-credit refresher course designed to help students refresh their prior math skills. A total of 142 students enrolled in 11 MathPath course sections scheduled for the summer of 2014 and early fall of 2014. This analysis examines the outcomes of the 122 students who attended at least six days of the eight-day MathPath course and completed both pre-course and post-course Compass testing. An examination of all MathPath paired test scores collected from 2011 through 2014 was also conducted to examine for improvement and to identify groups of students most impacted by the MathPath course.

Outcomes

Three outcomes were of interest in the present analysis: 1) percentage of students who moved up at least one math level by the end of MathPath, 2) differences in pre-course and post-course Compass Math scores, and 3) based upon initial Compass score placement into Basic Math, Elementary Algebra, or Intermediate Algebra, which group demonstrated the greatest increase in Compass test score after attending a MathPath course? Each of these outcomes and their results are discussed below.

Increasing Math Levels after MathPath

Thirty-nine of the 122 students (32%) improved enough on the Compass Math placement scores to place at least one course higher in the Mathematics course series. According to Compass course proficiency guidelines 17 students moved up to Beginning Algebra, 15 moved up to Intermediate Algebra, and 7 moved up to College Algebra or higher. Examining students who attended a MathPath course from 2011-2014, 40% of all MathPath students (127 of 315 students) increased in course placement by at least one level. See Figures 1 and 2 below.

**Figure 1. Percentage of 2014 MathPath Students
Increasing At Least One Math Level**
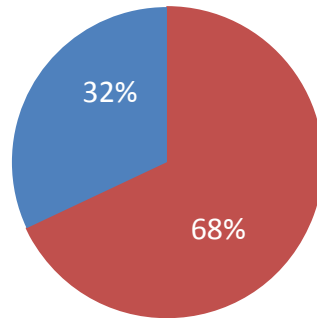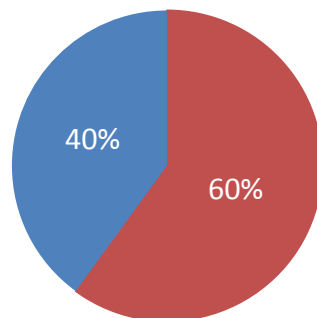
■ No Increase ■ Moved Up At Least One Level

32%

68%

**Figure 2. Percentage of 2011-2014 MathPath Students
Increasing At Least One Math Level**

■ No Increase ■ Moved Up At Least One Level

40%

60%

Pre- and Post-MathPath Compass Scores

Similar to previous findings, students' Compass Math scores were significantly higher after the MathPath course than before the course, for both the Pre-Algebra and Algebra tests. The post-MathPath scores of the 82 students completing the Compass Pre-Algebra test increased with a mean difference of M = 7.32 (SD = 14.95). The increase was statistically significant, $t(81)$ = -4.43, $p < .001$. Likewise, the post-MathPath scores of the 122 students completing the Compass Algebra test increased with a mean difference of M = 5.55 (SD = 10.48). The increase was statistically significant, $t(121)$ = -5.85, $p < .001$. See Table 1 below for means and standard deviations.

Table 1. Mean Scores on Compass Pre-Algebra and Algebra Tests

Compass Measure		Matched Sample Size (N)	Mean (Std. Deviation)	p-value
Pre-Algebra*	Pre-test	82	41.15 (16.34)	< .001
	Post-test	82	48.46 (19.51)	
Algebra*	Pre-test	122	28.46 (11.47)	< .001
	Post-test	122	34.01 (15.13)	

*Statistically significant difference with a 99% confidence level.

Placement Group Demonstrating the Greatest Increase in Compass Test Score

Post-MathPath Compass scores were examined for all students attending any MathPath session from 2011 through 2014. Only students who attended at least 6 of the 8 day schedule were included. Of the 116 students who were initially placed by the Compass test into Basic Mathematics, 56% (N = 65) improved enough on the second Compass test score to be placed at least one Mathematics course higher. Of the 159 students initially placed into Beginning Algebra, 34% (N = 54) improved enough on the second test to be placed at least one course higher. Thirty-seven students initially were placed by the Compass test at the Intermediate Algebra level and 16% (N = 6) improved on the second Compass test to be placed at least one course higher.

It should be noted that all pre and post Compass test scores gathered from 2011 through 2014 were reexamined using a paired-sample t statistic for each initial placement level (Basic, Beginning Algebra, Intermediate Algebra). The results of all tests were consistent with previous studies demonstrating statistically significant improvement on post Compass test scores following MathPath work, regardless of initial placement level (see Table 2).

Table 2. Mean Scores on Compass Pre-Algebra and Algebra Tests by Initial Placement

Compass Measure		Matched Sample Size (N)	Mean (Std. Deviation)	*p*-value
Basic Math Initial Placement				
Pre-Algebra*	Pre-test	109	28.32(6.85)	< .001
	Post-test	109	48.66 (15.85)	
Algebra*	Pre-test	116	21.20 (5.63)	< .001
	Post-test	116	26.92 (11.82)	
Beginning Algebra Initial Placement				
Pre-Algebra	Pre-test	105	54.41(15.4)	.006
	Post-test	105	58.75 (17.78)	
Algebra*	Pre-test	159	26.69 (7.37)	< .001
	Post-test	159	35.54 (13.14)	
Intermediate Algebra Initial Placement				
Algebra	Pre-test	37	47.59 (8.62)	.004
	Post-test	37	53.89 (12.75)	

*Statistically significant difference with a 99% confidence level.

Conclusions

Findings from the 2014 MathPath course offerings continue to suggest that MathPath helped a number of students improve their math placement, as 32% of the students moved up one or more levels in math placement by the end of the course. This is consistent with prior MathPath results, with overall results from years of the course revealing that a total of 40% of MathPath students have moved up at least one math level after taking the course. For these students, a two-week refresher course saved them at least an entire semester's worth of coursework. Additionally, 56% of students initially placed into Basic Mathematics improved their course placement by at least one course after taking MathPath, suggesting that they may be especially likely to benefit from the refresher course.

Analysis of placement scores revealed that both Compass Pre-Algebra and Algebra scores increased significantly by the end of the MathPath course, regardless of initial placement level. These findings are consistent with prior findings showing that students' Compass scores increase after taking MathPath and suggest benefits of the program even for students who may not move up a level in math.