Research Summary
Grades 5–10

TRANSMATH®

TransMath 3rd Edition Results for 2015–2016

VOYAGER SOPRIS LEARNING®

TransMath® is a comprehensive math intervention curriculum that targets middle and high school students who lack the foundational skills necessary for entry into algebra and are two or more years below grade level in math. The new third edition emphasizes fewer topics in greater depth while accelerating students to more advanced math, **from number sense to rational numbers to understanding algebra**.

During the 2015–2016 school year, the benchmark assessment for *TransMath* 3rd Edition changed to the Progress Assessment of Mathematics (PAM). The PAM, created by MetaMetrics, developer of The Quantile® Framework for Mathematics, is designed to monitor and measure growth in mathematical skills across the school year. There are three benchmarks each year. Each 30-item test yields a Quantile score that indicates students' optimal learning range and monitors progress toward grade-level goals. Quantile scores indicate what mathematic content a student is ready for and what they already understand. MetaMetrics also established cut scores by grade for a basic level of performance and a proficient level of performance. The categorical change from Below Basic to Basic and Proficient is also used in this report. This report presents results based on the program levels in *TransMath*. Each level is presented as a set of bars in Figure 1. BOY indicates average Quantile scores at the beginning of the year, and EOY indicates average Quantile scores at the end of the year.

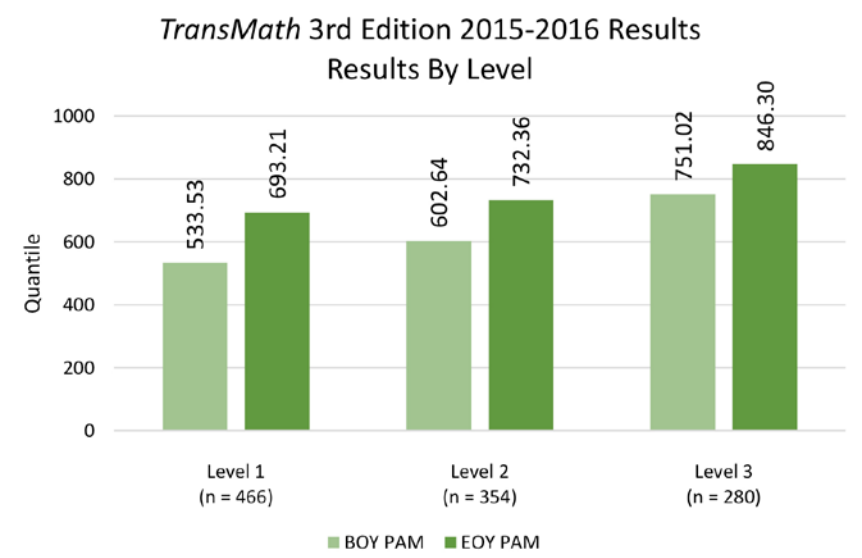

Figure 1. TransMath *3rd Edition 2015–2016 Results by Program Level*

Table 1 shows additional information about the results presented in Figure 1, including Quantile gain and effect size for each of the *TransMath* levels.

Table 1.* TransMath *3rd Edition 2015–2016 Results by Program Level with Additional Detail

Level 1	466	533.53	693.21	159.68	1.11
Level 2	354	602.64	732.36	129.72	.85
Level 3	280	751.02	846.30	95.28	.74

The effect size statistic[1], only calculated for groups of 10 or more students, is used as an indicator of program effectiveness. Effect size is the difference between the mean BOY and EOY scores of students expressed in terms of standard deviation units. Recently, Scammacca, Fall, and Roberts[2] reported on annual growth effect sizes for K–12 students computed from nationally normed assessments and a longitudinal study of students receiving special education services. Their results provide the effect sizes that represent a year's worth of growth and provide a better interpretation of the *TransMath* effect size results.

Table 2 shows the annual gains in effect size for students in the 10th, 25th, and 50th percentile rank (PR) based on the combined results from four nationally normed math tests. For clarity, Table 2 shows only grades relevant to this analysis, 5th to 12th grades. Since students from different grades receive instruction from different levels, an average effect size will be used. Averaging the effect sizes in Table 2 across grade levels gives an average effect size of 0.35 for both the 10th and 25th percentiles for grades 5 to 8 for Level 1 and 0.23 for grades 7 to 10 for Level 2 and 0.18 for grades 8 to 12 for Level 3. These averaged effect sizes will serve as a year's worth of growth for students receiving *TransMath* instruction.

Table 2. Annual Effect Size Gains by Grade Level based on Nationally Normed Math Tests

Annual Gains in Effect Size for Nationally Normed Math Tests				
Grade (Spring)	Expected Growth During	Means of Tests		
		10th PR	25th PR	50th PR
4 to 5	5th Grade	0.51	0.51	0.46
5 to 6	6th Grade	0.33	0.32	0.31
6 to 7	7th Grade	0.21	0.23	0.24
7 to 8	8th Grade	0.36	0.34	0.29
8 to 9	9th Grade	0.08	0.17	0.14
9 to 10	10th Grade	0.25	0.23	0.20
10 to 11	11th Grade	0.16	0.11	0.08
11 to 12	12th Grade	0.03	0.03	0.03

Note: Adapted from Scammacca et al. (2015)

Table 3 shows the estimated annual gain for each of the *TransMath* levels in the last column, based on the average annual gains in effect sizes from Table 2. The estimated gains are from 3 to 4 years based on the information from Scammacca et al. (2015).

Table 3.* TransMath *3rd Edition 2015–2016 Results by Program Level with Additional Detail

Level 1	466	159.68	1.11	0.35	3 years, 2 months
Level 2	354	129.72	0.85	0.23	3 years, 7 months
Level 3	280	95.28	0.74	0.18	4 years, 1 month

[1] According to Cohen (1988), effect sizes (for differences expressed as means) of 0.2 are considered small, 0.5 are regarded as medium, and 0.8 are regarded as large. An effect size of 0.3 is considered educationally meaningful.

[2] Scammacca, N. K., Fall, A., & Roberts, G. (2015). Benchmarks for expected annual academic growth for students in the bottom quartile of the normative distribution. *Journal of Research on Educational Effectiveness, 8,* 366–379.

One additional way to look at the progress made by students who received *TransMath* 3rd Edition instruction is by categorical change on the PAM across the school year. Figures 2 through 4 show the percent of students who were in each of the categories—Below Basic, Basic, and Proficient—at the beginning of the year and at the end of the year.

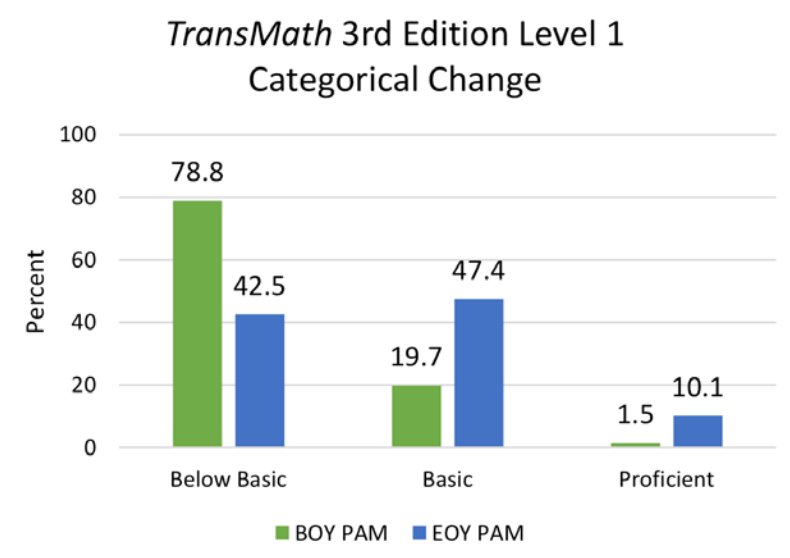

Figure 2. TransMath *3rd Edition 2015–2016 Categorical Change for Level 1*

Tables 4 to 6 show additional detail on the categorical change. The "Total" column, farthest to the right, shows the total number of students who were in each category at the beginning of the year (BOY). The "Total" row at the bottom shows the total number of students who were in each category at the end of the year. The cells in between the total column and row show what happened to students in between. For instance, there were 367 students at BOY in the Below Basic category. At the EOY, there were 198 students in the Below Basic category, 166 from the original students in Below Basic and 32 students who were in the Basic category at BOY. So, 168 of the original Below Basic students moved into the Basic category by EOY, and 33 students moved into the Proficient category.

Table 4. **TransMath** *3rd Edition 2015–2016 Categorical Change for Level 1 with Additional Detail*

Level 1: B1 Category to B3 Category					
		EOY Category			Total
		Below Basic	Basic	Proficient	
BOY Category	Below Basic	166 (35.6%)	168 (36.1%)	33 (7.1%)	367 (78.8%)
	Basic	32 (6.9%)	50 (10.7%)	10 (2.1%)	92 (19.7%)
	Proficient	0 (0.0%)	3 (0.6%)	4 (0.9%)	7 (1.5%)
Total		198 (42.5%)	221 (47.4%)	47 (10.1%)	466 (100%)

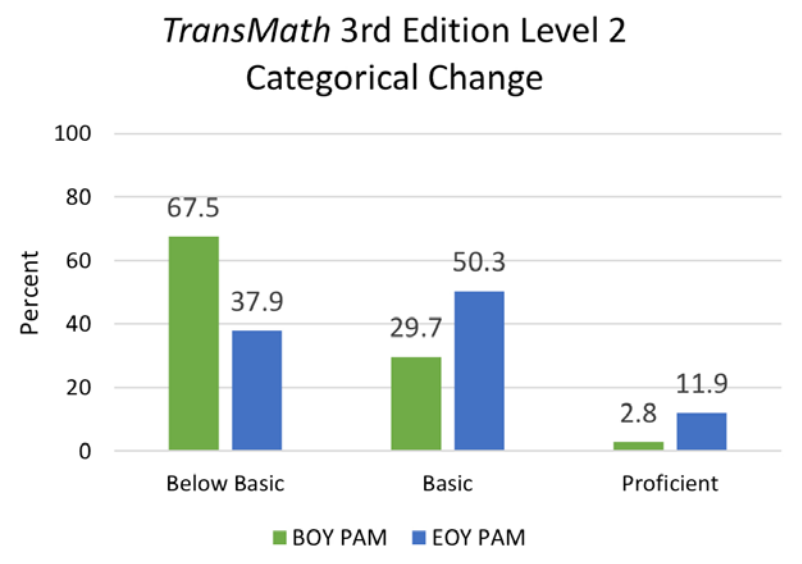

Figure 3. TransMath *3rd Edition 2015–2016 Categorical Change for Level 2*

Table 5.* TransMath *3rd Edition 2015–2016 Categorical Change for Level 2 with Additional Detail

Level 2: B1 Category to B3 Category					
		EOY Category			Total
		Below Basic	Basic	Proficient	
BOY Category	Below Basic	102 (28.8%)	114 (32.2%)	23 (6.5%)	239 (67.5%)
	Basic	32 (9.0%)	57 (16.1%)	16 (4.5%)	105 (29.7%)
	Proficient	0 (0.0%)	7 (2.0%)	3 (0.8%)	10 (2.8%)
Total		134 (37.9%)	178 (50.3%)	42 (11.9%)	354 (100%)

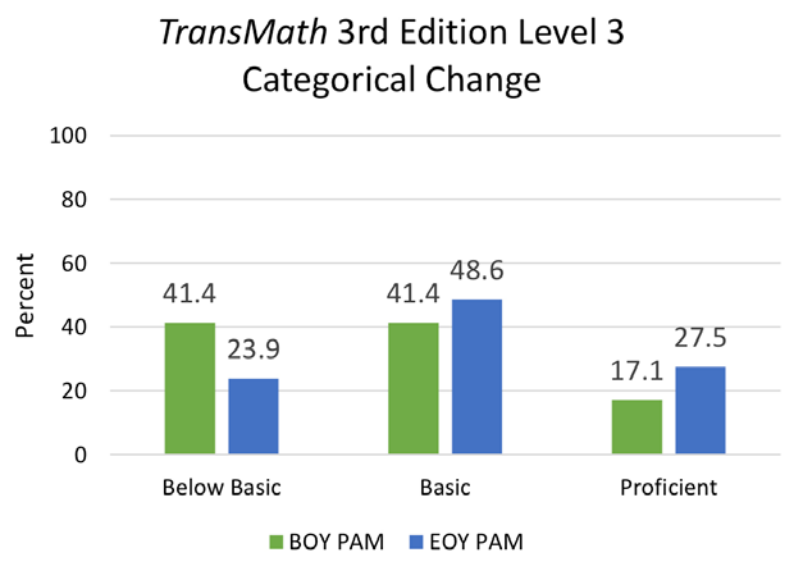

Figure 4. TransMath *3rd Edition 2015–2016 Categorical Change for Level 3*

Table 6. **TransMath** *3rd Edition 2015–2016 Categorical Change for Level 3 with Additional Detail*

Level 3: B1 Category to B3 Category					
		EOY Category			Total
		Below Basic	Basic	Proficient	
BOY Category	Below Basic	47 (16.8%)	48 (17.1%)	21 (7.5%)	116 (41.4%)
	Basic	18 (6.4%)	65 (23.2%)	33 (11.8%)	116 (41.4%)
	Proficient	2 (0.7%)	23 (8.2%)	23 (8.2%)	48 (17.1%)
Total		67 (23.9%)	136 (48.6%)	77 (27.5%)	280 (100%)

In summary, students receiving *TransMath* 3rd Edition instruction show strong growth in mathematical skills as measured on the PAM from BOY to EOY. The Quantile gains, on average, are about 160Q for Level 1 students, 130Q for Level 2 students, and 95Q for Level 3 students. Expected gains, based on studies by MetaMetrics, for students in grades 5 to 8 are about 80Q. Additionally, when using the Scammacca et al. (2015) annual gain in effect size, students in all three levels are showing three to four years of annual gain in one academic year. These results are further supported by the categorical changes for students, with a decrease in students in the Below Basic category of 36.3 percentage points for Level 1 students, 29.6 for Level 2, and 17.5 for Level 3 students.