



Supplemental Analysis for *Leading by Doing: A Practice-Based Approach to Improving Mathematics Outcomes*

This supplement presents the results from an evaluation of four MCSD schools using a quasi-experimental design to ascertain if the intentional improvement efforts initiated in the first two Transformation Zone (TZ) schools (Kirksville Elementary and Madison Middle School) resulted in increased rates of mathematics performance for students with disabilities. In this study, the MCSD TZ schools that received ongoing intensive coaching were compared to Non-Transformation Zone (Non-TZ) schools that did not receive the same level of support (2016-17 to 2018-19). TZ and non-TZ schools were matched by geographic location, enrollment or total number of students, percent of students receiving Free and Reduced Meals, percent of students white and non-white, and percent of students in special education.

Based on their scores on Kentucky's statewide summative assessment, each student is classified into one of four levels of performance (from lowest to highest scoring: Novice, Apprentice, Proficient, Distinguished). Change in percentage of students in each category across years was examined for both elementary (3rd to 5th) and middle school (6th to 8th) students. Analyses looked both at changes for all students as well as specifically for students with disabilities for each age group. See Table 1 for the number of participants per category by year.

Limitations

While promising results for two schools emerged, there are notable limitations. Schools were not randomized to participate; thus, the evaluation represents a quasi-experimental analysis. Although comparable non-TZ schools were selected, without randomization it is possible that TZ schools differed in meaningful ways from the comparison schools and these potential differences could have influenced the results. Also, although analysis of Kentucky's statewide summative assessment data allowed for the direct analysis of student-level data, results were based on only one TZ and one non-TZ school, thus limiting the generalizability of the findings.

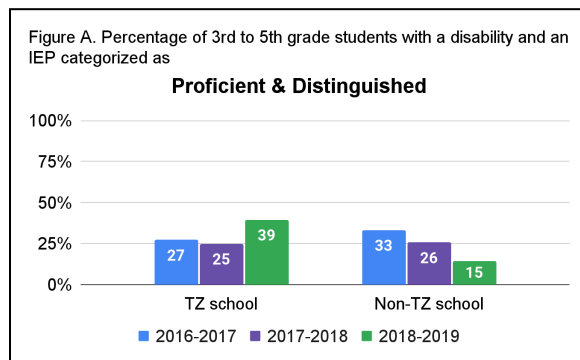
Table 1**Number of Students Assessed Per Year**

	Elementary				Middle			
	All Students		Students with Disabilities		All Students		Students with Disabilities	
	TZ	Non-TZ	TZ	Non-TZ	TZ	Non-TZ	TZ	Non-TZ
2016-2017	344	274	66	33	440	614	56	56
2017-2018	326	268	80	35	464	617	65	61
2018-2019	233	275	33	41	508	588	68	64

Students with Disabilities, 3rd to 5th-grade students

Students with disabilities in the MCSD TZ school had 402% greater odds of moving from the novice category towards the proficient and distinguished category¹ relative to students with disabilities in the MCSD non-TZ school (Odds Ratio = 5.02).² From 2016-17 to 2018-19, the distribution of students with disabilities shifted across categories as follows:

We expected Proficient and Distinguished Performance to increase over time in the TZ school.

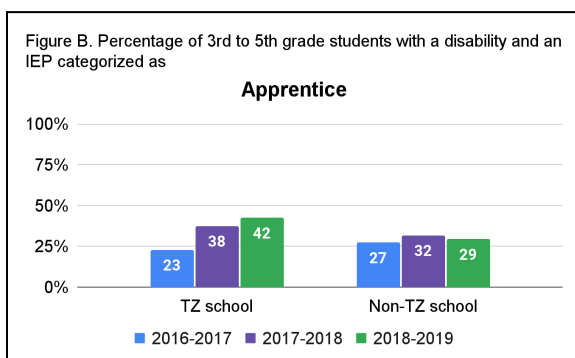


- The percentage categorized as Proficient and Distinguished in the TZ school increased from 27% to 39%, whereas in the non-TZ school, it decreased from 33% to 15% (Figure A).

¹ The Proficient category and the Distinguished category were combined into a single Proficient & Distinguished category for analysis due to small sample size within the Distinguished category.

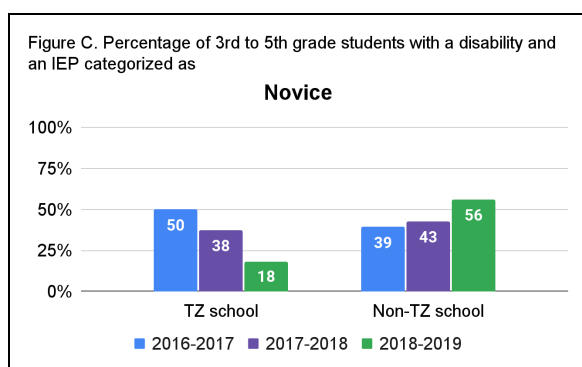
² To help interpret the effect size, Hill et al. (2008) reported that regular education students in Grades 3 to 5 typically improve at a rate of about 0.50 standard deviations from a full year of mathematics instruction in school. An odds ratio of 5.02 is equivalent to a 0.89 standard deviation change (Sánchez-Meca et al., 2003). The effect size of 0.89, however, compares gains among students in the TZ school to students in non-TZ school, all of whom received a full year of instruction.

We also expected Apprentice Performance to increase as Novice performance decreased in the TZ school.



- The percentage categorized as Apprentice in the TZ school increased from 23% to 42%; in the non-TZ school, it increased from 27% to 29% (Figure B).

We expected the Novice Performance of students to decrease over time in the TZ school receiving intensive implementation support as more students demonstrated performance in the Apprentice and Proficient & Distinguished categories.



- The percentage categorized as Novice in the TZ school decreased from 50% to 18%, whereas in the non-TZ school, it increased from 39% to 56% (Figure C).

Students with Disabilities, 6th to 8th Grade Students

The percentage change of 6th to 8th-grade students with disabilities across categories from 2016-17 to 2018-19 was not significantly different between the TZ and non-TZ schools. In the TZ school, the novice category decreased (41% to 37%), the apprentice category also decreased (46% to 43%) and the proficient and distinguished category increased (13% to 21%). In the non-TZ school, the novice category also decreased (32% to 22%), whereas the apprentice category increased (46% to 52%), and the proficient and distinguished category increased (21% to 27%).

All Students

3rd to 5th grade. For all students, the percentage of 3rd to 5th-grade students in the TZ school from 2016-17 to 2018-19 decreased in the novice category (22% to 16%), slightly increased in the apprentice category (29% to 31%), and slightly increased in the proficient and distinguished category (48% to 54%). For all 3rd to 5th-grade students in the non-TZ school, the percentage slightly increased in the novice category (18% to 20%), decreased in the apprentice category (39% to 26%), and increased in the proficient and distinguished category (43% to 54%).

Differences in percentage change for all students between the TZ and the non-TZ schools were not statistically significant.

6th to 8th grade. Differences in percentage change were also not significant for all students in the 6th-8th grade. In the TZ school, the novice category decreased (24% to 17%), the apprentice category increased (38% to 42%) and the proficient and distinguished category increased (38% to 41%). In the non-TZ school, the novice category decreased (9% to 6%), the apprentice category slightly decreased (32% to 31%), and the proficient and distinguished category increased (59% to 63%).