The Impacts of ORIGO *Stepping Stones* on Student Achievement

MAGNOLIA INDEPENDENT SCHOOL DISTRICT | MONTGOMERY COUNTY, TEXAS

EXECUTIVE SUMMARY

ORIGO ***Stepping Stones*** is a core mathematics program for grades K-5, based on educational research that demonstrates how children learn math most effectively. This digital- and print-based program provides access to all online content from all grades, allowing teachers to accommodate mixed abilities in the classroom. ***Stepping Stones*** is used by districts and schools who see a need for a fundamental culture shift around math education, as a way to directly impact student achievement as it pertains to standardized test scores, the achievement gap between special needs and neuro-typical students, and preparation for more advanced math learning.

A number of population factors can negatively impact standardized test performance, including a high level of mobility, economic disadvantages, and special needs. Our subject district, Magnolia Independent School District in Montgomery County, Texas, (MISD) deals with all three of these challenges across its eight elementary schools. MISD's results indicate that with strong fidelity to the ***Stepping Stones*** program, many of these negative factors can be turned into positive achievement. In fact, when used as recommended and intended by the publisher, MISD saw their Title 1 campuses transition from "significantly behind other campuses" to on par with their sister-schools' test scores. In some cases, the most at-risk campuses have surpassed their peers on standardized tests.

Keywords: *Stepping Stones, Math Grade Level, Meets Grade Level, Approaches Grade Level*

Background

Magnolia Independent School District (http://www.magnoliaisd.org/) is a public school district based in Montgomery Country, Texas. The district consists of eight elementary schools, two intermediate schools (grade six only), two junior high schools, and two high schools. Four (4) of these elementary schools are designated Title One schools, with high numbers or high percentages (40%+) of children coming from low-income families. Standardized reading test scores across the district outpaced math performance, and district leaders began looking for solutions that would (1) raise overall Math test scores, especially in Title One schools, (2) shrink the performance gap between special populations and typical students, and (3) better prepare all students for success in Algebra when they reached Junior High.

In line with its mission to provide an educational environment that enables all students to develop essential academic skills for a lifetime of learning and to prepare students to be responsible, contributing citizens in a diverse and changing world, MISD began looking for solutions to bridge performance and achievement gaps.

The MISD began piloting ORIGO Education's ***Stepping Stones*** program in one of its eight elementary schools during the 2013-2014 school year. The results of that pilot program were positive, and strong enough to drive a district-wide adoption of ***Stepping Stones*** in grades preK-5, beginning in the 2014-2015 school year.

ORIGO Education was established in 1995 when co-founders James Burnett and Dr. Calvin Irons identified the need to meet a growing demand for professional development in mathematics. With the vision of making a positive contribution to children's education, Burnett and Irons began writing and

developing elementary math resources from a makeshift office in Burnett's home. Today, ORIGO provides and publishes a complete education solution to its customers by combining an innovative range of mathematics products with quality professional learning services.

ORIGO publishes and covers all facets of primary mathematics education, including traditional printed products to digital interactive resources and professional learning. Product offerings range from the core curriculum to visual aids and manipulatives.

Stepping Stones is core curriculum that integrates print and digital technology to give educators a flexible, balanced, and comprehensive mathematics solution. ***Stepping Stones*** balances the dimensions of rigor through powerful visual models to foster critical thinking skills and procedural fluency, apply learning across real problems, and to offer multiple methods to assess deep understanding, fluency of skills, and applications of mathematics. ***Stepping Stones*** is typically selected by districts and elementary schools who identify a need for a fundamental culture shift around math education in order to achieve goals around student achievement. In addition to improved test scores and math confidence, ***Stepping Stones*** reignites teachers' enthusiasm for teaching mathematics which they then share learners.

Problem Statement

Schools and districts invest heavily in curriculum products and services to help improve outcomes for all students. As the push for greater transparency in educational spending and for improved results continues to grow, districts are under more pressure than ever to spend wisely and carefully. In this White Paper, we will examine how ORIGO's ***Stepping Stones*** produced positive results for Magnolia Independent School District in Texas.

We sought answers to three major questions:

1. What is the impact on overall student achievement in Mathematics?
2. What is the impact as it applies to the special-needs population specifically?
3. What is the impact as it applies to other at-risk student populations, including those with Limited English Proficiency and Economically Disadvantaged students?

To evaluate the effectiveness of the program, we examined a number of data sets from the Texas Education Agency (www.tea.texas.gov). These data points include the *State of Texas Assessments of Academic Readiness* (STARR) and *Performance-Based Monitoring Analysis System* (PBMAS) results over a multi-year period. Other factors such as economic disparities, program fidelity, and school climate were considered in this analysis.

Hypothesis

The use of ORIGO Education's ***Stepping Stones*** solution creates a better overall environment for elementary mathematics for both teachers and students, and significant gains are made both during the elementary years and when these same students move on to junior high school where they encounter higher level mathematics. These gains are achieved regardless of special population or subgroup.

QUESTIONS

Question 1: What is the impact of *Stepping Stones* on the performance of MISD's traditional/typical students on standardized tests?

The State of Texas Assessments of Academic Readiness (STAAR) program was implemented in spring 2012, and includes annual assessments for:

- reading and mathematics, grades 3–8
- writing at grades 4 and 7

- science at grades 5 and 8
- social studies at grade 8
- end-of-course (EOC) assessments for English I, English II, Algebra I, biology and U.S history

STAAR performance standards relate levels of test performance to the expectations defined in the state-mandated curriculum standards known as the *Texas Essential Knowledge and Skills* (TEKS). Cut scores established by the agency distinguish between performance levels, or categories. The process of establishing cut scores that define performance levels for an assessment is standard setting. Standard setting is also used to classify students into an appropriate performance category.

For STAAR and STAAR Spanish, the labels for the performance categories are:

- Masters Grade Level
- Meets Grade Level
- Approaches Grade Level
- Did Not Meet Grade Level

For the purpose of this analysis we will be focusing on Mathematics grade 3-5 only. The evidence suggests that mainstream students are succeeding at a higher rate since the implementation of ***Stepping Stones***.

Exhibit 1 (below) clearly show trends worthy of attention. Cells in the 2017 data table are identified by color, where green shows improvement, yellow is neutral, and red shows decline. In Grade 3, the first level where the STARR exam is administered, the table clearly illustrates year-over-year improvement versus 2016 in all buildings except Nichols Sawmill Elementary School.

In Grade 4, we see year-over-year negative performance in two schools, including Ellisor Elementary School (EES) and Lyon Elementary School (LES). LES also experienced a population shift (there were 20% fewer students taking the exams in 2017 versus the 2016 4th Grade class, which has a direct impact on

the year-over-year measure. Finally, in Grade 5, the final year of elementary school, the data trends are all positive.

Exhibit 1: Number of students, by school building, who approach, meet, or master grade-level performance in Mathematics.

	Math 2016			Math 2017					
Grade 3	Approaches	Meets	Masters	Approaches		Meets		Masters	
BBES	80	45	24	83	+3	58	+13	25	+1
EES	67	31	8	84	+17	51	+20	25	+17
LES	74	26	7	85	+11	47	+21	19	+12
MES	74	34	9	78	+4	38	+4	16	+7
MPES	83	38	15	78	-5	48	+10	24	+9
NSES	96	63	24	85	-11	47	-16	15	-9
SES	81	49	24	89	+8	54	+5	32	+8
WES	56	25	9	79	+23	51	+26	26	+17
District	76	38	15	83	+7	49	+11	23	+8

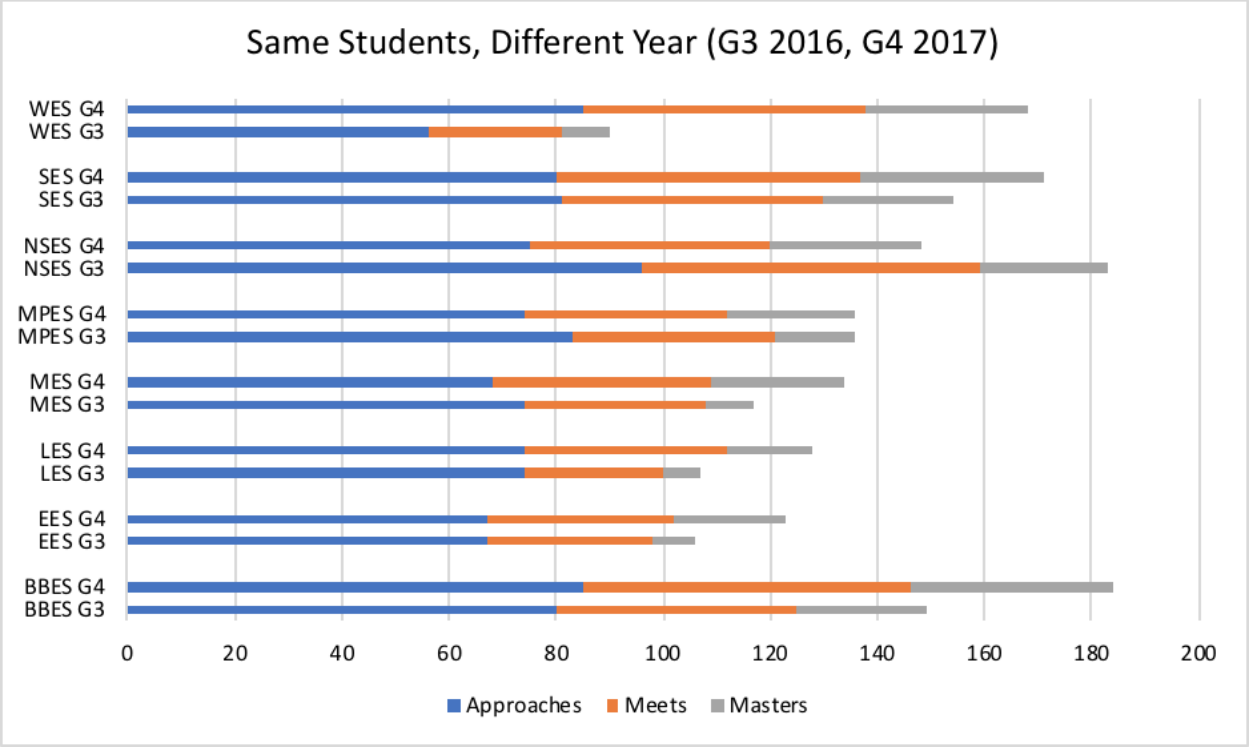
	Math 2016			Math 2017					
Grade 4	Approaches	Meets	Masters	Approaches		Meets		Masters	
BBES	79	49	26	85	+6	61	+12	38	+12
EES	79	44	13	67	-12	35	-9	21	+8
LES	87	45	23	74	-13	38	-7	16	-7
MES	80	40	16	68	-12	41	+1	25	+9
MPES	72	37	16	74	+2	38	+1	21	+5
NSES	86	50	28	75	-11	45	-5	28	0
SES	81	42	18	80	+1	57	+15	34	+16
WES	83	39	19	85	+2	53	+14	30	+11
District	81	43	20	76	-5	46	+3	26	+6

	Math 2016			Math 2017 (1st & 2nd Admin)					
Grade 5	Approaches	Meets	Masters	Approaches		Meets		Masters	
BBES	94	53	29	89	-5	48	-5	25	-4
EES	95	52	27	90	-5	53	+1	31	+4
LES	79	39	17	85	+6	46	+7	18	+1
MES	89	45	17	91	+2	46	+1	24	+7
MPES	84	46	22	88	+4	59	+13	29	+7
NSES	87	36	13	96	+9	59	+23	24	+11
SES	83	38	16	90	+7	62	+24	31	+15
WES	94	26	4	93	-1	38	+12	12	+8
District	88	42	19	90	+2	51	+9	24	+5

In preparing this White Paper, we also compared how the same students fared from third grade to fourth grade. As noted above, it is clear by examining the data that certain schools in MISD have experienced a significant population shift during the period examined. For example, Williams Elementary School (WES) had 90 third graders tested in 2016. In 2017, the WES fourth grade class included 168 students tested, for a net increase of 78 students (or 86% increase YOY). This particular

elementary school includes students from several large housing/apartment complexes and there is a high rate of mobility in this school as a result. Despite the radical shift in numbers, it is easy to see in the tables above in Exhibit 1 that the trend is positive from year-to-year and also when compared with overall MISD performance. In the graphic below labeled Exhibit 2, we can see not only the population shift at WES but also the relative strength of those improvements. As a percentage, the greatest gains at WES were made in the Meets and Masters buckets by a factor of 2.1 and 3.3 respectively.

Exhibit 2



In another case, Nichols Sawmill Elementary School (NSES) experienced a 20% decline in number of students between third and fourth grade testing. The decline in population did not impact the relative performance of this same student group year over year. In fact, 60% of the population loss (-21

students) occurred in the "Approaching" group, but the overall test score performance of this subset remained largely unchanged.

Similar trends are evident in Exhibit 3 below, when comparing Grade 4 (2016) and Grade 5 (2017) district performance. Despite population shifts across the school district, the relative performance of the students stays statistically the same.

Exhibit 3

MISD	YEAR	APPROACHES	MEETS	MASTERS	TOTAL
Grade 4	2016	81	43	20	144
Grade 5	2017	90	51	24	165

Question 2: What is the impact of *Stepping Stones* on the performance of Special Education students in standardized testing?

The Texas Education Agency collects data for selected program areas via the Performance-Based Monitoring Analysis System (PBMAS). These program areas include bilingual education/ELL, career and technical education, special education, economically disadvantaged and migrant students (federal Title One Parts A and C.) The data is collected and reported at the district, region, and state level.

PBMAS reports, produced since 2004, include specific district-level data for each performance indicator in the PBMAS, and since 2016, also include four SPP federally required elements. State-level PBMAS reports were first produced in 2006 and regional reports in 2007. State staff focused on school

improvement monitor-and-support intervention activities within this data-driven and performance-based system using a continuous improvement model. Activities targeted to improve student performance and program effectiveness reflect an emphasis on data integrity and analysis, needs assessment, improvement planning, and progress reporting and are strictly enforced.

As is the case with all funding mechanisms, school districts must be able to demonstrate they are compliant and that the programs offered are effective and impactful. In addition to Title One and other available federal funds and state-sponsored monies, the dollars associated with the federal Individuals with Disabilities Education Act (IDEA) require focused attention, reporting, and demonstrated student impact on this special population for a district to qualify. So being able to make a strong, transparent case for successful supports and interventions becomes mission critical for most school districts.

MISD is no exception. At the elementary schools, special education instruction happens in both the general education classroom (with direct and indirect support), pull out services for student who need additional instruction and assistance with the curriculum, and self-contained units for students who are not yet able to integrate into a less restrictive environment. MISD also offers related services like counseling, occupational and/or physical therapy, and adaptive equipment to further help students on their educational journey.

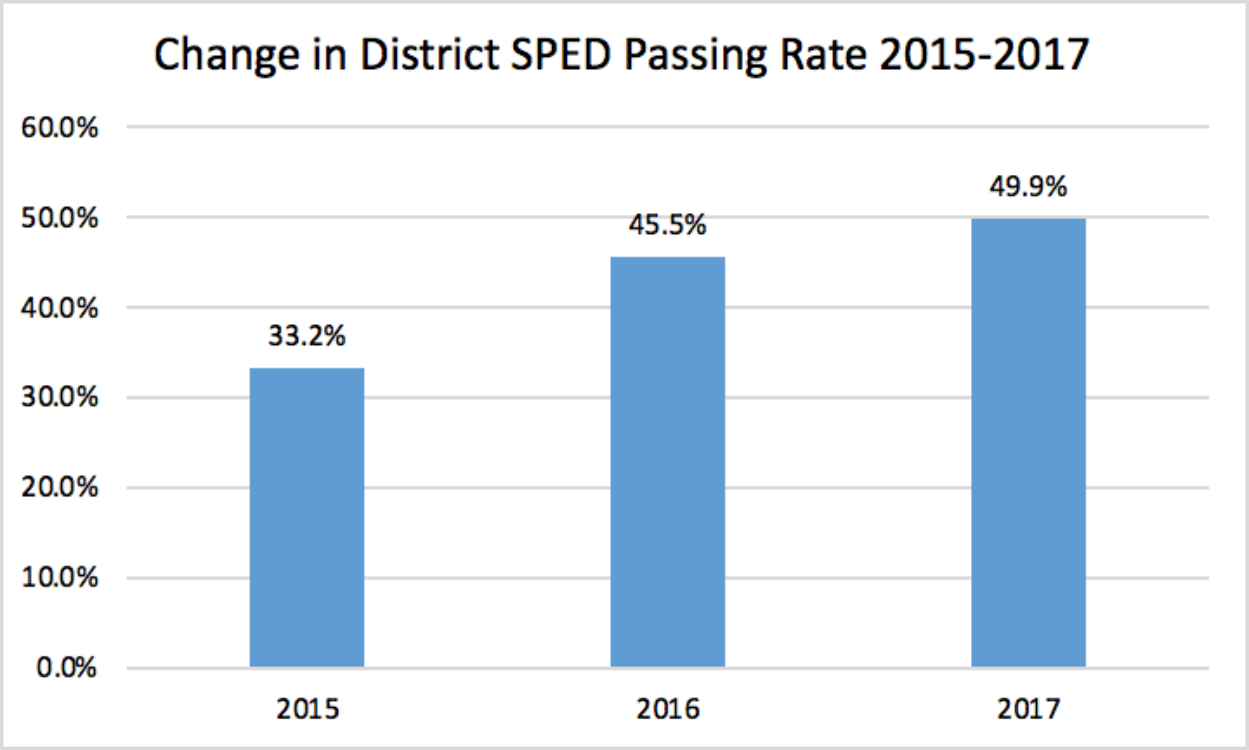
For the 2015-2016 school year, the special education population of MISD is approximately 11.6% of the total student population. The national average is 13%.

SPED Students	ALL Students
1099	**12,813**

As we look at the PMBAS data carefully an interesting pattern emerges. MISD special education students are currently performing at the same level as their peers (and in some cases surpassing their peers) on standardized math tests. Prior to the implementation of ***Stepping Stones***, the gap between the

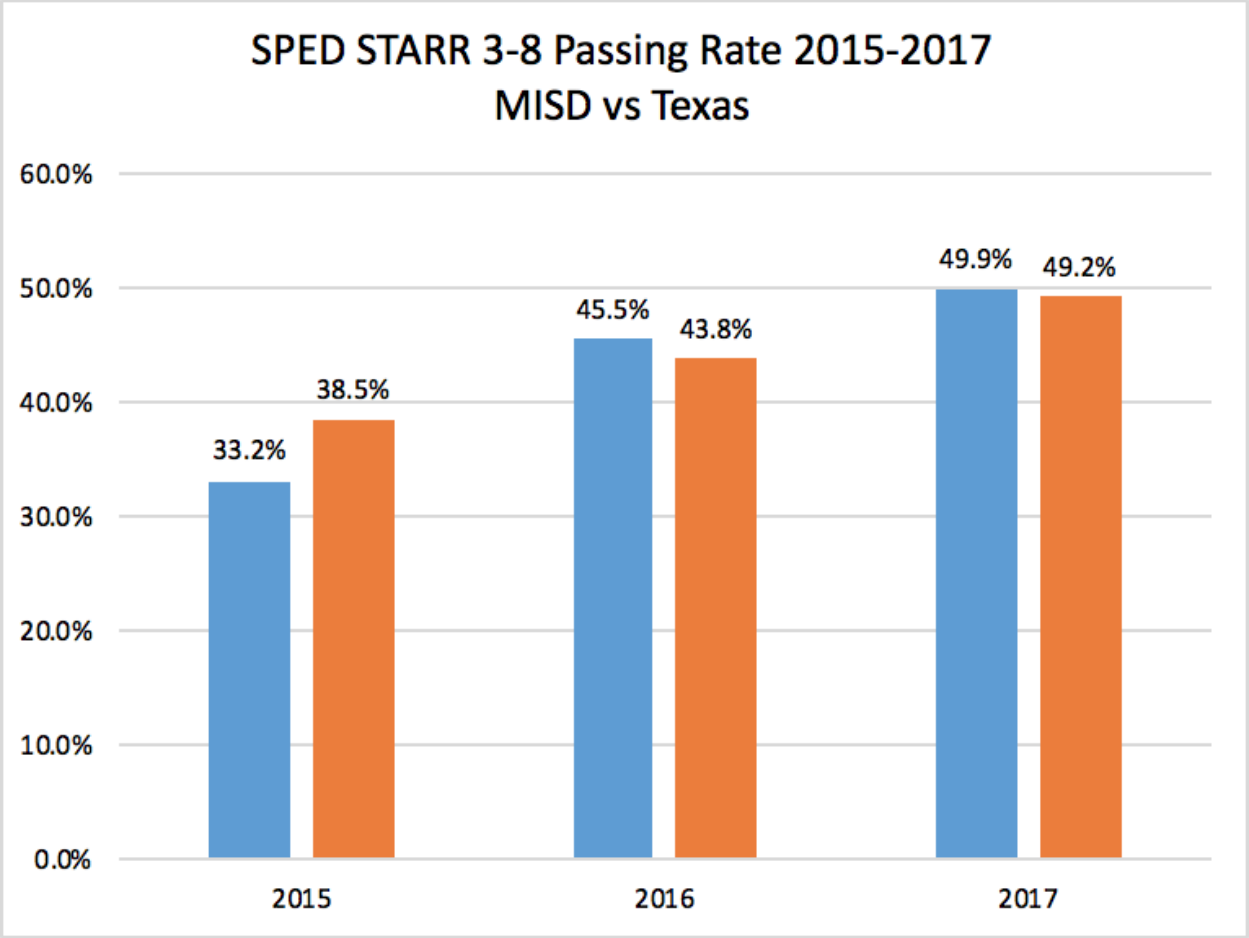
performance of special education students and their general education peers was of concern to district leadership. A concerted effort was made to shrink that gap, and the results to date have been encouraging. The charts below were taken from the 2017 PBMAS report and show a district rate of 49.9% passing rate on the SPED STARR. In 2016, the district passing rate was 45.5% and in 2015, the district passing rate was 33.2%, showing a clear upward progression in SPED STAAR achievement. ***Stepping Stones*** was adopted across MISD for the 2014-2015 school year, and the impact on the SPED students in particular is clear.

Exhibit 4



When we compare this dataset with the Texas performance numbers, we see that MISD lagged the rest of the state in 2015 but has pulled slightly ahead of the state in 2016 and 2017.

Exhibit 5



The passing rate percentages in Exhibit 4 are a bit misleading, because they include all SPED math scores, grades 3-8, and ***Stepping Stones*** has been adopted district-wide for grades preK-5. When we break down the test scores by grade level, a very clear pattern emerges.

Exhibit 6

2017 MISD SPED vs. State SPED

Grade/Subject	Approaches	State	Meets	State	Masters	State
Grade 3 Math	53%	43%	24%	20%	9%	9%
Grade 4 Math	38%	37%	14%	16%	7%	7%
Grade 5 Math March	56%	48%	15%	16%	7%	6%
Grade 6 Math	56%	38%	15%	10%	7%	3%
Grade 7 Math	32%	28%	14%	8%	7%	2%
Grade 8 Math March	25%	32%	5%	10%	2%	2%
Algebra	42%	42%	7%	10%	0%	3%

Did Not Meet State
One percentage from State
Met or Above State

While there are clearly some "red zones" where MISD did not achieve the same level of performance as the state, those lagging scores are concentrated in Grade 8 Math and Algebra. The delta between MISD and the state is even greater if we remove the grades not covered by the ***Stepping Stones*** curriculum. One exception is Grade 4 Math (Meets), which falls 2 percentage points below the state's performance numbers.

Another important point to note is the Grade 6 and Grade 7 math scores, which are uniformly outpacing the state. These students represent the first MISD intermediate and junior high school students who were exposed to the ***Stepping Stones*** curriculum. The Grade 8 Algebra students from 2017 were never exposed to ***Stepping Stones***. MISD is enthusiastically looking forward to seeing the impact on Algebra preparedness in the SPED population over the coming two years when additional students begin the ***Stepping Stones*** coursework.

The data table (labeled Exhibit 7) below represents MISD's performance on the SPED YAE (Year-After-Exit) STARR 3-8. The district achieved a rate of 84.9%, leading to a 2017 Indicator Performance Level of 0, the highest possible rating.

Exhibit 7

SPED YAE STARR 3-8	2017 District Rate	2017 Numerator Passed	2017 Denominator Tested	2016 Numerator Passed	2016 Denominator Tested	2015 Numerator Passed	2015 Denominator Tested
Mathematics	84.9	45	53	28	38	35	50

Question 3: What is the impact of *Stepping Stones* on other student subgroups, like economically disadvantaged students or bilingual/ESL learners?

MISD offers a transitional bilingual education program from pre-kindergarten to the fifth grade. In this program, students are instructed first in Spanish and once skills are learned and students have mastered the cognitive abilities in their native language, skills are then transferred to the English language.

With this model, students will typically progress from an 85% Spanish/15% English instruction in pre-kindergarten to a 40% Spanish/60% English model in fourth grade. MISD's English as a Second Language (ESL) program is from pre-kindergarten to twelfth grade. In this program, students receive 100% of their instruction in English. ESL teachers provide modifications and work first with students on their oral and listening skills and then move to reading and writing skills to develop the cognitive skills necessary to be successful. Classes are usually self-contained, but some classes may be a pullout.

MISD's economically disadvantaged students participate in the federal Free/Reduced Lunch Program, but academically they placed where they will do best—in Bilingual Education, Special Education, or General Education.

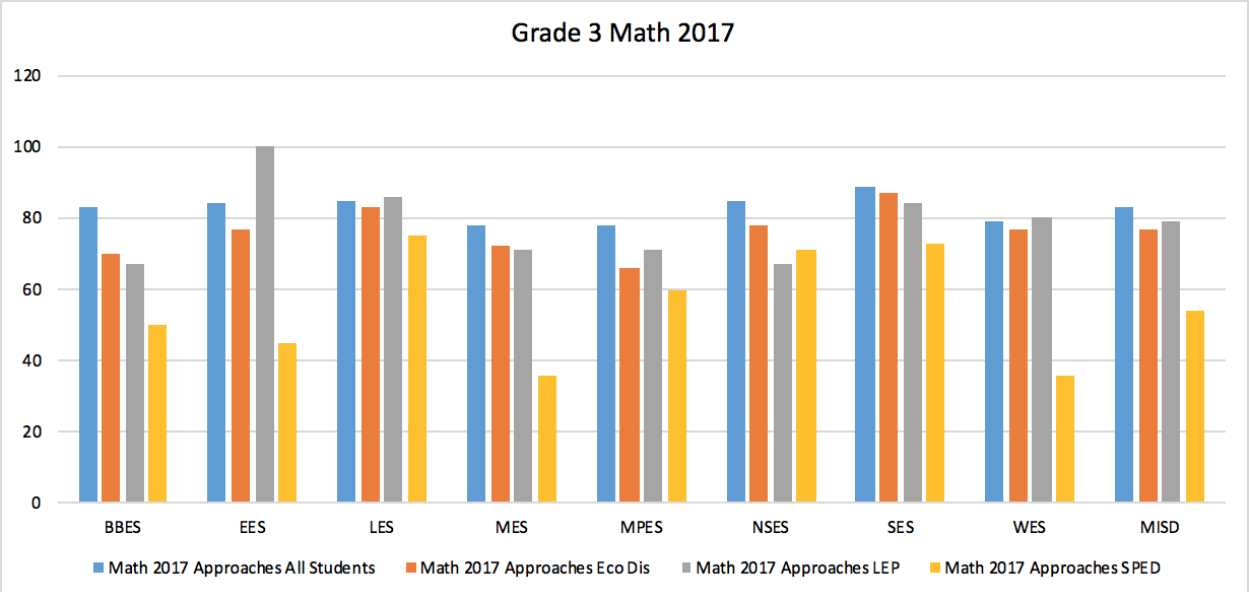
To answer this question, we examined additional data from PMBAS. The answers were encouraging.

In the charts marked Exhibits 8, 9, and 10 below, we identify four separate groups, which have been differentiated by color for ease of use:

Blue: All Students
Orange: Economically Disadvantaged
Grey: Limited English Proficiency
Yellow: Special Education

If "All Students" establishes a baseline for that school, we can see in Exhibit 8, that in Grade 3 there is relative parity with economic disadvantaged and limited English proficiency learners across the district elementary schools. In one case, at Ellisor Elementary School (EES) the 'LEP' students outpaced the 'All Students' category.

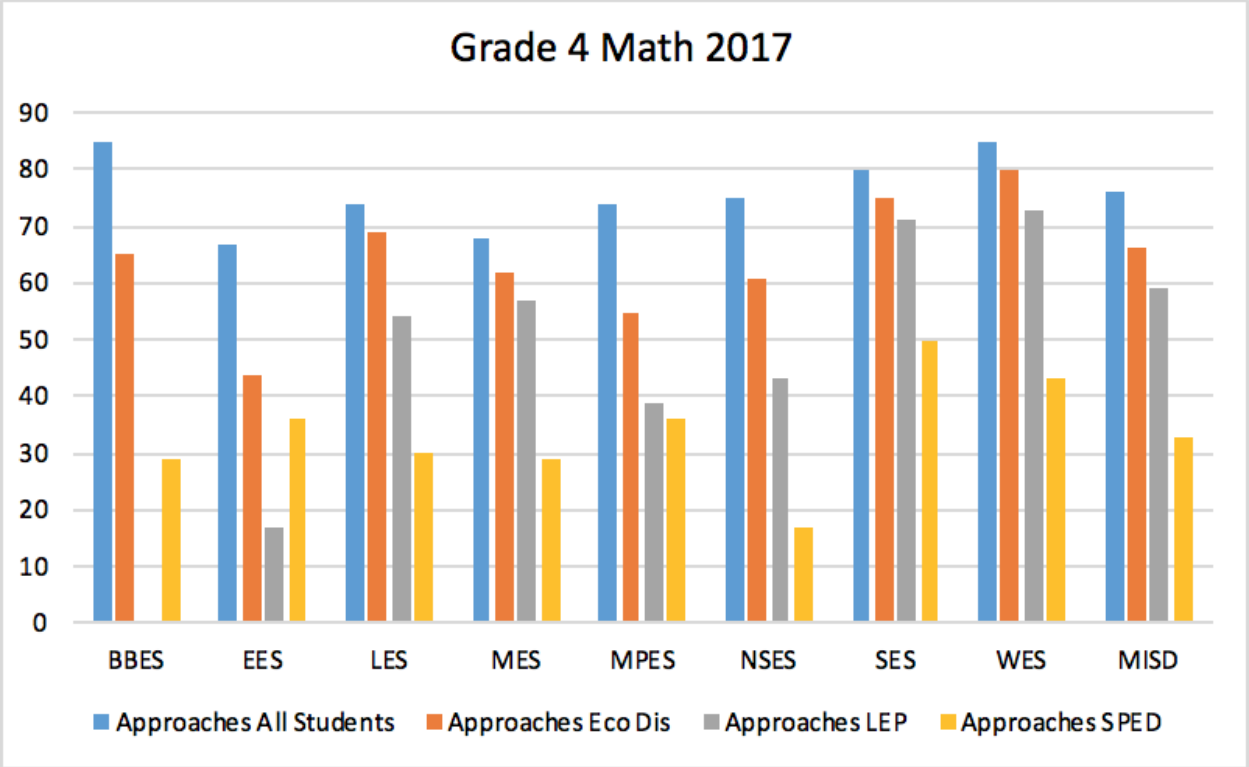
Exhibit 8



In Grade 4, however, we can readily see that the 'All Students' category is outperforming the subgroups. The economically disadvantaged students perform well but not as consistently well as the 'All Students'

category. In some locations (like EES, MPES, and NSES), the LEP learners are significantly underperforming 'All Students'. Note that in grade four, the native language/English ratio is 40/60 and for the first time these students are spending more time learning in their second language (English) than their first.

Exhibit 9



In Grade 5, shown in Exhibit 10, the LEP numbers rebound, and the economically disadvantaged numbers are less volatile overall. We also see one or more subgroups outpacing the 'All Students' category in several locations. It's important to note that the 2017 fifth grade student has been participating in the ***Stepping Stones*** program since the second grade, which can have a cumulative, positive impact on current testing.

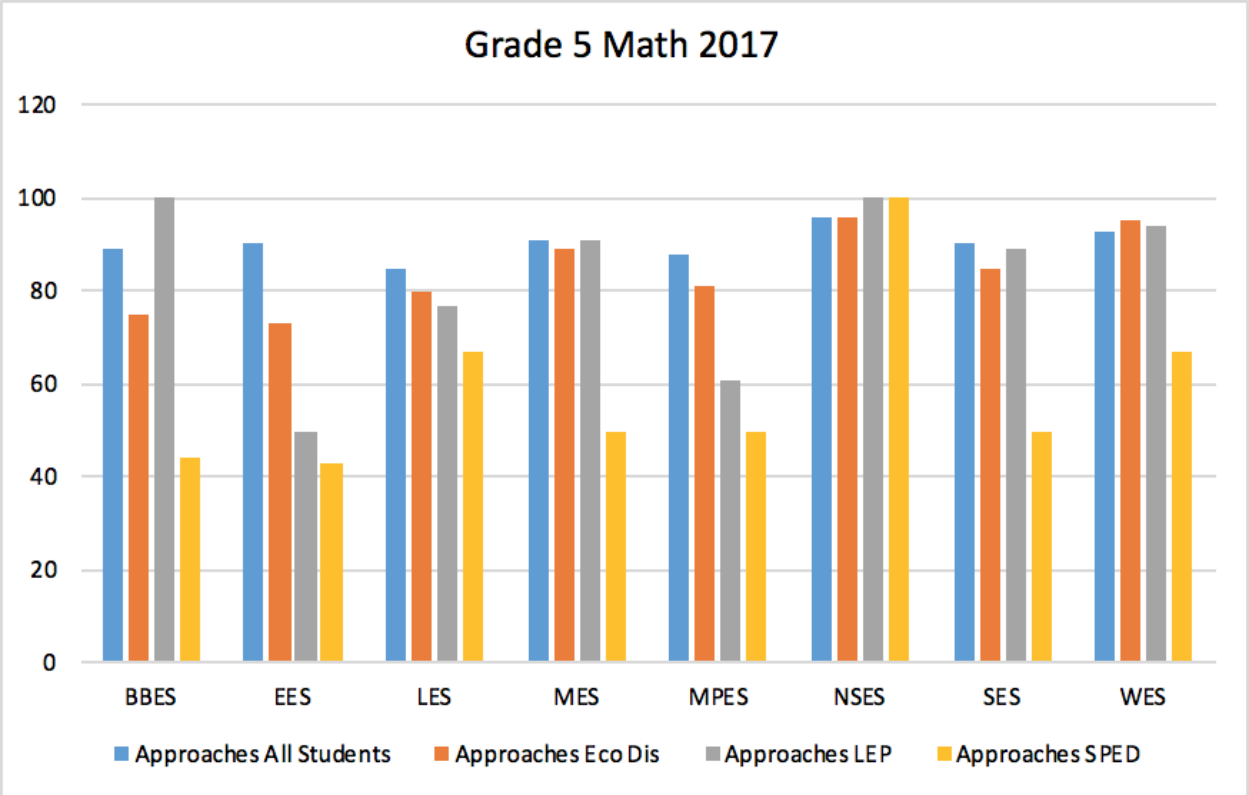
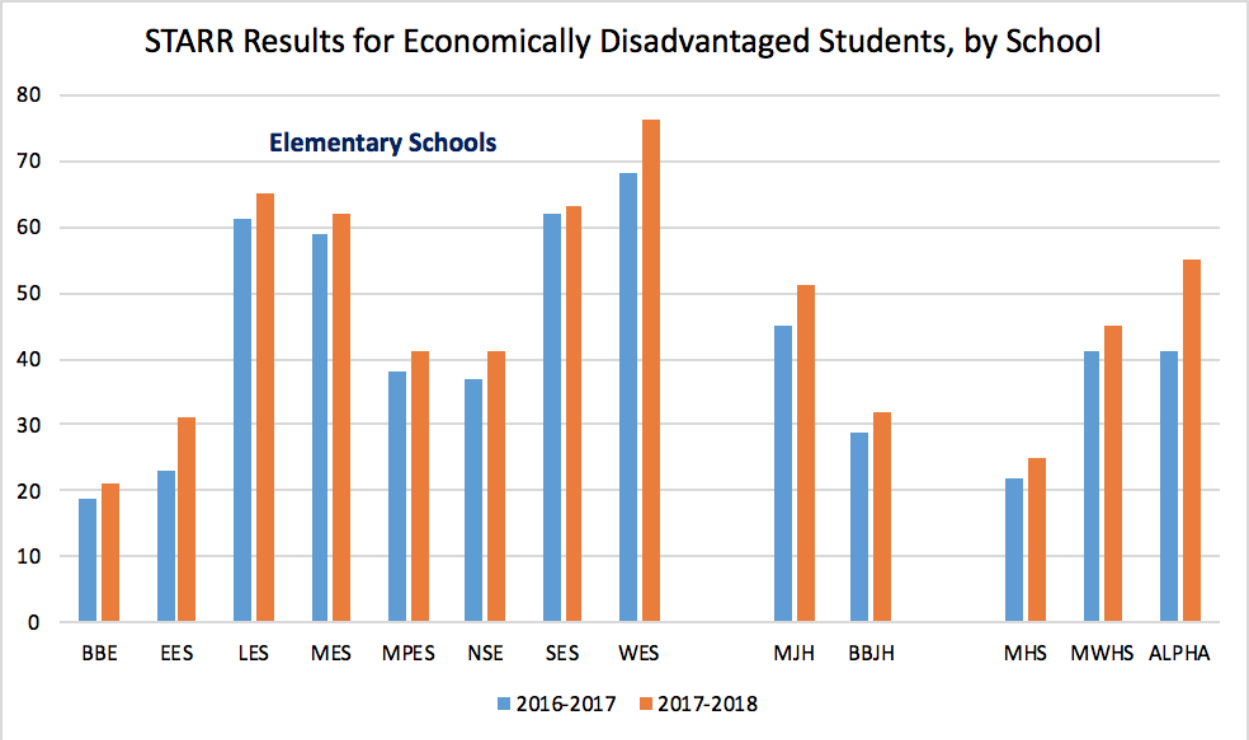


Exhibit 11 below shows the number of Economically Disadvantaged Students meeting math goals has increased at every school in the district. In fact, the elementary schools with the highest amount of student mobility (EES and WES) saw the greatest gain year over year.

Finally, as the most recent STARR reports indicate, MISD should be very proud their commitment to their most vulnerable students is resulting in true academic achievement and is paying off in a very visible way.

Exhibit 11



CONCLUSION

ORIGO Education's ***Stepping Stones*** was developed specifically as a core math program for a typical elementary school (K–5). This program was implemented district-wide in Magnolia Independent School District beginning in the 2014-2015 school year, and the results are strong among all populations, from general education, to special education, to other vulnerable subgroups.

While a number of factors can impact the successful implementation of a new program like ***Stepping Stones*** (student mobility, wealth disparities, language barriers, learning disabilities), it is our belief that the most important indicator of success is an openness to change, fidelity to the program, and a culture shift that has teachers and students alike excited about math. A core curriculum that underscores the importance of conceptual understanding of math requires more than just a new book. Teachers need

rich tools like those offered in **Stepping Stones** to break out of the past methods. They need ongoing professional development and support to ensure fidelity across classrooms, campuses, and districts. Fidelity to the teaching model will help all students, regardless of mathematical preparation or English-language mastery, be better prepared for annual state assessments and ongoing progress in mathematics.

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