

MEMORANDUM

July 18, 2017

TO: Lance Menster
Officer, Elementary Curriculum and Development

FROM: Carla Stevens
Assistant Superintendent, Research and Accountability

SUBJECT: **EFFECTS OF HISD PREKINDERGARTEN PROGRAMS ON KINDERGARTEN STUDENTS' ACADEMIC ACHIEVEMENT, 2016-2017**

This evaluation compares the academic achievement of kindergarten students who were previously enrolled in an HISD prekindergarten program (Pre-K) to their non-HISD Pre-K peers on the 2016–2017 Iowa Assessments and Logramos 3rd Edition Norm Reference Tests (NRT).

Key findings include:

- HISD Pre-K students who took the Logramos language arts and mathematics subtests achieved higher mean standard scores than those of their non-HISD Pre-K peers.
- Students who attended an HISD Pre-K program for two consecutive years achieved mean standard scores on the Iowa and Logramos language arts and mathematics subtests that either met or exceeded district averages. These students also scored higher on the Logramos mathematics and language arts subtests compared to peers who attended only one year of HISD Pre-K.
- With respect to demographic characteristics, positive effects were observed for HISD Pre-K students who were identified as Black, economically disadvantaged, or at-risk on both the Iowa language arts and Iowa mathematics subtests. Positive effects were also seen on the Logramos language arts subtest for students identified as Hispanic, economically disadvantaged, limited English proficient (LEP) and at-risk, as well as those categorized as not eligible for special education programs. On the Logramos mathematics subtests, positive effects were seen for all groups, with the exception of students identified as non-Limited English Proficient (LEP).

Further distribution of this report is at your discretion. Should you have any further questions, please contact me at 713-556-6700.

 CJS

Attachment

cc: Rachele Vincent
Janice Dingayan



RESEARCH

Educational Program Report

**EFFECTS OF HISD PREKINDERGARTEN
PROGRAMS ON KINDERGARTEN
STUDENTS' ACADEMIC ACHIEVEMENT
2016-2017**



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EFFECTS OF HISD PREKINDERGARTEN PROGRAMS ON KINDERGARTEN STUDENTS' ACADEMIC ACHIEVEMENT, 2016–2017

Executive Summary

In compliance with the Texas Education Code § 29.153, the Houston Independent School District (HISD) has provided free prekindergarten (Pre-K) classes for eligible Houston-area four-year old students since the 1985–1986 school year. Children are enrolled into either one of four HISD prekindergarten program models: (1) an early childhood center (ECC), (2) a school-based program, (3) an HISD/Head Start program, or (4) a Montessori program. With the exception of HISD Montessori prekindergarten programs, the district uses the *Frog Street Pre-K (FSPK)* curriculum. *Frog Street Pre-K* focuses on the physical, social, emotional, cognitive, and language development of preschool-age children (Schiller, n.d.). Presently, HISD operates 155 school-based programs or ECC campuses that provide instruction for young children.

This report describes how well HISD prekindergarten programs are preparing young children to be school ready. Specifically, this report compared the academic achievement of kindergarten students who were HISD prekindergarten “alumni” (those enrolled in an HISD prekindergarten program during a previous school year or years) to their peers who did not attend HISD prekindergarten. Mean standard scores included in this report were retrieved from the Riverside Iowa Assessments and Logramos 3 language arts (LA) and mathematics subtests for kindergarten students.

Highlights

- During the 2015–2016 school year, 14,664 students attended an HISD prekindergarten program; the lowest prekindergarten student enrollment the district has experienced in ten years.
- HISD Pre-K alumni who were administered the Logramos language arts and mathematics subtests achieved mean standard scores that were higher than those of their non-HISD Pre-K peers. In contrast, non-HISD Pre-K students achieved higher mean standard scores on the Iowa language arts and mathematics subtests than those of their HISD Pre-K peers.
- Students who attended an HISD Pre-K program for two consecutive years achieved mean standard scores on the Iowa and Logramos language arts and mathematics subtests that either met or exceeded district averages. These students also scored higher on the Logramos mathematics and language arts subtests compared to peers who attended only one year of HISD Pre-K.
- With respect to demographic characteristics, positive effects were observed for HISD Pre-K students who were identified as Black, economically disadvantaged, or at-risk on both the Iowa language arts and Iowa mathematics subtests. Positive effects were also seen on the Logramos language arts subtest for students identified as Hispanic, economically disadvantaged, limited English proficient (LEP) and at-risk, as well as those categorized as not eligible for special education programs. On the Logramos mathematics subtests, positive effects were seen for all groups, with the exception of students identified as non-Limited English Proficient (LEP).

- Conversely, small negative effects were observed on the Iowa language arts subtest for HISD Pre-K students who were identified as white, non-economically disadvantaged, and special education-eligible, and a moderate negative effect was shown for those identified as not at risk. The Iowa mathematics subtest showed small negative effects for students identified as white, non-economically disadvantaged, special education eligible, and not at risk.

Recommendations

- Findings from this report suggest that HISD prekindergarten programs are having a measurable and positive impact in preparing Black, economically-disadvantaged, and at-risk students, as well as students who are assessed in Spanish (via the Logramos language arts and mathematics subtests), to be school ready. Expansion of these efforts tailored to meet the needs of other subpopulations may include (a) HISD prekindergarten students who for the past two years have achieved lower academic outcomes on the Iowa language arts and mathematics subtests than their non-HISD Pre-K peers, (b) improving strategies to target young Black children and other underrepresented subpopulations for enrollment in an HISD prekindergarten program, and (c) examining pedagogical practices and special services to determine if these educational supports are of high-quality and responsive to individual student's needs and abilities.
- To improve understanding about the variations in academic achievement among different subpopulations, the Early Childhood Department may consider designing and conducting a comprehensive, fidelity of implementation study to determine the extent to which HISD prekindergarten programs are being delivered as intended. Only by understanding and measuring whether an intervention has been implemented with fidelity can education stakeholders gain a better understanding of *how and why* an intervention may or may not work, and the extent to which children's academic achievement can be improved (Carroll, Patterson, Wood, Booth, Rick, & Balain, 2007).
- To improve understanding about the academic achievement among students identified as eligible for special education services who may also receive prekindergarten instruction, the Early Childhood Department may consider examining outcomes for students coded as 'EE' in addition to students coded as 'PK' in PEIMS student databases.
- The Early Childhood Department is currently expanding assessment efforts to include social and emotional development and may consider the inclusion of other methods to measure foundational learning experiences and the skills of the 'whole' child. While a focus on accountability is important, primary emphasis should be placed on using assessments as a means to determine the progress, successes, and needs of each individual child to ensure they receive optimal learning experiences.

Introduction

In compliance with the Texas Education Code § 29.153, the Houston Independent School District (HISD) has provided free prekindergarten classes for eligible Houston area four-year old students since the 1985–1986 school year. Children are enrolled into either one of four HISD prekindergarten program models: (1) an early childhood center (ECC), (2) a school-based program, (3) an HISD and Head Start collaborative program, or (4) a Montessori program. Home language surveys are administered to either a parent or guardian in order to place students in a linguistically-appropriate HISD prekindergarten classroom (i.e., Transitional Bilingual, English as a Second Language, English, or Dual Language). With the exception of HISD Montessori prekindergarten programs, the district uses the *Frog Street Pre-K (FSPK)* curriculum. Frog Street Pre-K focuses on the physical, social, emotional, cognitive, and language development of preschool age children (Schiller, n.d.). Implementation of this curriculum forms the basis for children’s future academic success. Presently, the HISD operates 155 campuses that provide instruction for young children (Houston Independent School District [HISD], 2016a).

Currently, HISD offers full-day prekindergarten programs to all eligible students within the attendance boundaries. To be eligible for participation in a free prekindergarten program for the 2016–2017 report year, a child must (1) be four years old on or before September 1; (2) live within the HISD attendance boundary; (3) have an updated immunization record in accordance to state policy for students; and (4) meet at least one of the following criteria:

- (a) Be homeless;
- (b) Be unable to speak or understand English;
- (c) Be economically disadvantaged;
- (d) Be the child of an active-duty member of the U.S. military or one who has been killed, injured, or missing in action while on duty;
- (e) Be or have been in the conservatorship of the Department of Family and Protective Services following an adversary hearing held as provided by Section 262.201. Family code; or
- (f) Be able to meet any eligibility criteria for Head Start, including, but not exclusive to, the low-income eligibility criteria.

Children who meet the above criteria, as determined by the Texas Legislature, are judged to be the most at-risk for school failure, and therefore need more assistance to become school ready. Additionally, HISD also offers prekindergarten classes to children who do not meet the above eligibility requirements on a tuition basis. If space is available at a given school, children seeking tuition-based attendance can be enrolled into an HISD prekindergarten program only after all students eligible for free pre-K have been enrolled. A campus can also enroll up to five three-year-old children after all eligible four-year olds have been enrolled, if space is available.

Literature Review

Research suggests that children who enter kindergarten with skill deficits in language, reading and mathematics tend to continually fall further behind same-age peers rather than catching up over the course of their school careers (Aber, Burnley, Cohen, Featherman, Phillips, Raudenbush, & Rowan as cited in the National Association for the Education of Young Children [NAEYC], 2009). Inequities in school readiness and academic achievement are more prevalent among vulnerable and disadvantaged populations, including girls, children with disabilities, children of color, and children from low-income households (National Research Council [NRC], 2009; United Nations Children’s Fund [UNICEF], 2012). This was substantiated by findings in the *Houston Independent School District State of Texas Assessments of Academic Readiness (STAAR) Performance, Grades 3–8 Spring 2016* report that indicated the achievement gap typically widened among African American, Hispanic, and White students in reading and mathematics across grade levels (Houston Independent School District [HISD], 2016b, p. 7). Furthermore, Magnuson and Waldfogel found evidence that suggested achievement disparities in mathematics were related to ‘differences in mathematics learning experiences before school entry, and fewer meaningful pedagogical experiences once children of color entered school’ (cited in NRC, 2009, p. 100). Public preschools that serve higher percentages of economically-disadvantaged children tend ‘to provide fewer learning opportunities and supports for [literacy and] mathematical development than ones serving their more affluent peers’ (Clements and Sarama, 2008 as cited in NRC, 2009, p. 98). The negative indicators associated with young children from disadvantaged backgrounds (e.g., at risk, poor access to resources, low income, limited parent education) can adversely alter their cognitive, socio-emotional, and physical developmental trajectories (Evans & Kim, 2013). Without high-quality comprehensive interventions, associations among these variables may affect children with disadvantaged backgrounds throughout their lifetime, thus perpetuating the impacts of negative indicators across generations.

Early childhood education researchers have found that young children who are at greater risk for school failure are more likely to succeed in school if they attend well-planned, high-quality early childhood programs (Baumgartner, 2017, National Association of the Education of Young Children & National Association of Early Childhood Specialists in State Departments of Education [NAEYC & NAECS/SDE], 2003; National Research Council [NRC], 2001). High-quality prekindergarten programs enhance children’s cognitive development and improve their academic achievement, particularly for students from disadvantaged backgrounds (Baumgartner, 2017; Brooks-Gunn, 2003; Currie, 2000; Gormley, Gayer, Phillips, & Dawson, 2005; Magnuson, Ruhm, & Waldfogel, 2007; Shager, Schindler, Magnuson, Duncan, Yoshikawa, & Hart, 2013). Review of the literature concurs that the beneficial effects of early childhood interventions are typically much larger for more disadvantaged youth (Currie, 2000; Magnuson et al., 2007).

However, findings from previous research regarding the effectiveness of early childhood programs have varied considerably from negative or no effects, to substantial short- and long-term effects on young children’s school readiness and achievement outcomes (Baumgartner, 2017; Del Grosso, Akers, Esposito, & Paulsell, 2014; U.S. Advisory Committee on Head Start Research and Evaluation, 2012; Zhai, Brooks-Gunn, & Waldfogel, 2011). Reasons contributing to the divergence in findings regarding early childhood programs’ true impact on young children’s school readiness include (a) selection bias (U.S. Advisory Committee on Head Start Research and Evaluation, 2012; Gormley et al., 2005); (b) differences in research methodologies and scope (Del Grosso et al., 2014); and (c) variations in reliability and validity of psychometric measures.

Scope of the Evaluation

The purpose of this report was to inform HISD stakeholders about the impact of prekindergarten enrollment on kindergarten students' achievement levels in language arts (LA) and mathematics. This report uses a non-experimental research design to answer the following research questions:

1. What was the enrollment trend of HISD prekindergarten students over the last ten years? What was the ten-year trend in the percent of kindergarten students who were HISD prekindergarten alumni?
2. What were the demographic characteristics of HISD kindergarten students based on their prekindergarten alumni status? Were there any differences in demographic characteristics when years of prekindergarten enrollment (one year of enrollment versus two years) were taken into account?
3. What differences in academic achievement existed between kindergarten students by prekindergarten alumni status and subtest type?
4. What differences in academic achievement existed between kindergarten students by prekindergarten alumni status and years of prekindergarten enrollment?
5. What were the effects of HISD prekindergarten alumni status on kindergarten students' academic achievement when student demographic characteristics were taken into account?
6. What were the effects of HISD prekindergarten alumni status on kindergarten students' academic achievement when years of prekindergarten enrollment were taken into account?

Methods

Data Collection

- Data collection for Houston Independent School District kindergarteners who were previously enrolled in an HISD prekindergarten program was done in three phases. The first phase identified all prekindergarten (coded 'PK') and kindergarten (coded 'KG') students who attended HISD during the 2014–2015, 2015–2016 and 2016–2017 school years, respectively. This information was retrieved from the Public Education Information Management System (PEIMS) 2014–2015, 2015–2016 and 2016–2017 HISD student databases.
- Although students coded as 'EE' ('early education') may have also enrolled in an HISD prekindergarten classroom during the targeted time period, only statistics for students who were identified as 'PK' were included in this report. This methodological distinction is based on the fact that the PEIMS 'EE' designation refers to preschool-age children targeted for any of a continuum of special needs interventions which may or may not comport with district prekindergarten curricula.
- The second phase of data collection consisted of merging the databases together, with the PEIMS 2016–2017 student database serving as the base file.
- The last phase of the data collection process merged the PEIMS 2014–2017 student data with the

Riverside Iowa Assessments and Logramos 3 2016–2017 HISD student databases. This process matched students' demographic data in PEIMS with their test scores in the assessment files.

Measures

- The academic achievement of HISD kindergarten students was measured using the Riverside Iowa Assessments and Logramos 3rd Edition Norm Reference Tests (NRT). During the 2016–2017 school year, all HISD kindergarten students who were not previously identified as gifted and talented were administered either the Iowa or Logramos 3 in the month of December.
- The Iowa is designed to provide a thorough assessment of a student's progress in skills and standards that are essential to successful learning (Houston Independent School District [HISD], 2015a), however, some changes were observed in this year's Iowa tests and testing practice compared to those from previous years. Specifically, there was a change in the test form used across HISD schools (students were administered Form F rather than the standard Form E utilized in previous testing cycles), while a concurrent policy change exempted students from participating in Iowa or Logramos testing during their kindergarten year if they had already been identified as eligible for HISD Gifted and Talented Education (G/T) programs.
- The Logramos 3 parallels the scope and sequence of the Iowa as it measures the academic achievement of Spanish-speaking students, however, this assessment should not be interpreted as a direct translation of the Iowa.
- The primary academic outcome measures of interest for this report included language arts (LA) and mathematics subtests mean standard scores from the Iowa and Logramos assessments. The Iowa language arts standard score is a composite score computed from students' achievement on the reading, language, and vocabulary subtests (Iowa Testing Programs [ITP], 2012). The Logramos language arts standard score is a composite score computed for student's achievement on the reading and language subtests (Aparicio & Nikolov, n.d.).

Statistical Analyses

- Descriptive statistics (i.e., counts, percentage, mean standard scores, standard deviations) were computed to compare kindergarteners' academic achievement in language arts and mathematics between two samples: those who previously attended an HISD prekindergarten program (HISD prekindergarten "alumni") and those who did not.
- Additional examination of scores provided information regarding differences in standardized test performance across demographic groups. The demographic characteristics of HISD kindergarten students used for this report were collected from the PEIMS 2016–2017 HISD student database, and included gender, race and ethnicity, economic status, qualification for special education services, and/or characterization as either limited English proficient (LEP) or at-risk. HISD defines at-risk students as individuals who have an increased likelihood of dropping out of school.
- Mean standard scores, standard deviations, and counts for students based on demographic characteristics, academic achievement, and prekindergarten alumni status were computed.
- Effect sizes were also computed to measure the magnitude of HISD prekindergarten programs on kindergarten academic achievement using Hedges' *g*. Hedge's *g* is a standard deviation–based measure used to compute the effect size for groups with different sample sizes. Hedge's *g* follows

similar criteria to Cohen's *d* for determining the strength of an intervention with an effect size of 0.2 = small effect, 0.5 = moderate effect, and 0.8 = large effect.

Limitations

- Comparison groups were not matched by prior academic achievement levels because students within each of these groups were not administered the same assessments in the previous grades. Controlling for academic achievement levels prior to kindergarten would have helped explain some of the variance in academic outcomes among students.
- PEIMS data are a 'snapshot' of students who were enrolled by the last Friday in October of each school year in HISD (Texas Education Agency [TEA], 2016). Students present for the 'snapshot' may not have been actively enrolled in an HISD prekindergarten program the entire year. In contrast, students who were not present during the 'snapshot' may have actually enrolled later into a program, but were not identified as having attended HISD prekindergarten during the 2014–2015 and 2015–2016 school years.
- The information in this report was collected for HISD prekindergarten students identified as 'PK' only in the PEIMS student databases. As such, one cannot assume kindergarten students who enrolled in HISD during the 2016–2017 school year did not receive an early childhood education in a different school district, a daycare, a private school setting, or their own home. Further, the population of students identified as receiving prekindergarten instruction may be an underestimate as HISD students coded as 'EE' during 2014–2015 and 2015–2016 school years may have also received instruction from the Pre-K curriculum.
- Mean academic scores retrieved for prekindergarten students eligible for special education services may not truly reflect their 2016–2017 academic outcomes as some such students were coded as 'EE' during the 2014–2015 and 2015–2016 school years, and thus excluded from this analysis.
- A randomized, experimental research design was not conducted to evaluate the effects of HISD prekindergarten program intervention on students' academic achievement. As such, findings regarding the magnitude of the effect of HISD prekindergarten programs on students' academic achievement may be biased.
- The information in this report was primarily examined in the context of assessment outcomes, demographic characteristics, and prekindergarten program type. Because no components of the prekindergarten programs were included in this report, causal inferences in reference to program attributes and impact were not made.

Results

What was the enrollment trend of HISD prekindergarten students over the last ten years? What was the ten-year trend in the percent of kindergarten students who were HISD prekindergarten alumni?

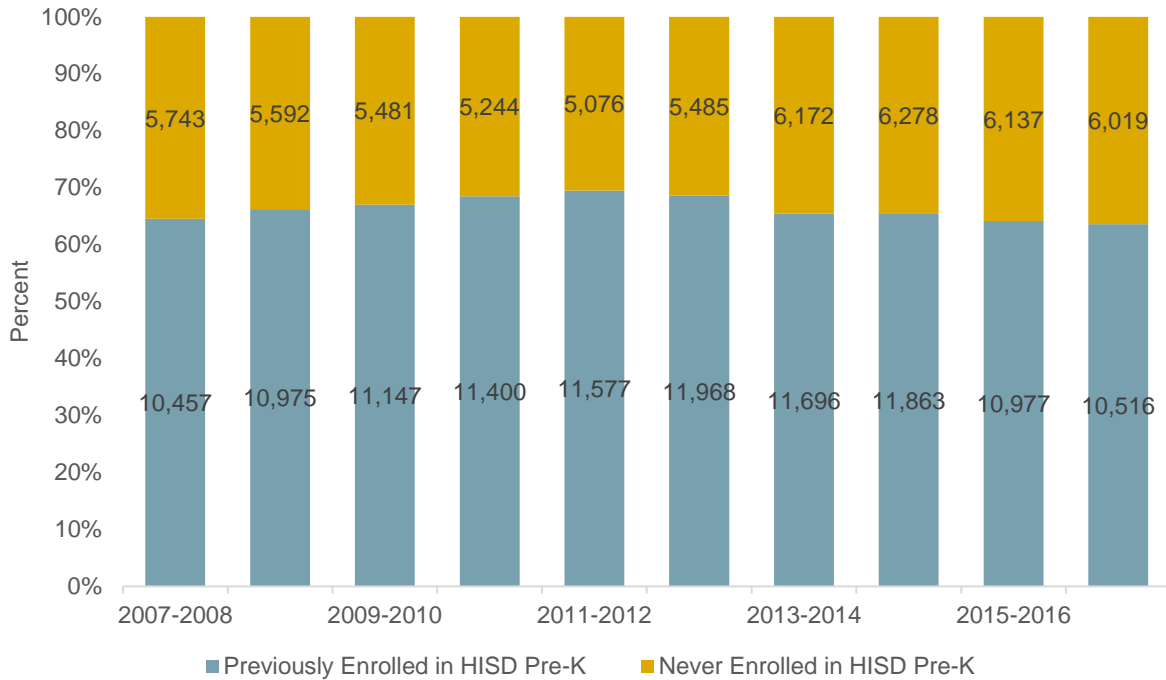
Figure 1. HISD Prekindergarten Enrollment Trends by School Year: 2007–2017



Source: PEIMS 2007–2008 to 2016–2017 HISD student databases.

- Figure 1** presents the prekindergarten enrollment trend of HISD students from the 2007–2008 through the 2016–2017 school years. Results show 14,664 students enrolled into prekindergarten during 2016–2017; a small drop ($\leq 1\%$) from 14,804 students the previous year. The current report year indicates a declining trend in HISD prekindergarten enrollment from a ten-year high of 16,786 in 2010–2011.

Figure 2. Kindergarten Enrollment Trends by HISD Prekindergarten Alumni Status and School Year: 2007–2017



Source: PEIMS 2007–2008 to 2016–2017 HISD student databases.

- **Figure 2** depicts the percentage of HISD kindergarten students by school year who had previously attended an HISD prekindergarten program. Percentages of kindergarteners who were HISD prekindergarten alumni ranged from a high of 69.5% (2011–2012) to a low of 63.6% (2016–2017) of the total kindergarten populations for each respective school year.
- At least seven out of ten students (71%) who attended prekindergarten in 2015–2016 went on to enroll in an HISD kindergarten the following school year (n = 10,516 of 14,804).
- The percentage of 2016–2017 kindergarten students who were HISD prekindergarten alumni was 63.6% (n = 10,516 of 16,535), a 0.5 percentage point reduction from the kindergarten population reported for the 2015–2016 school year (64.1%).
- Roughly 7.1% of kindergarten students (n = 1,178 of 16,535) attended HISD prekindergarten in both the 2014–2015 and 2015–2016 school years (data not shown).

What were the demographic characteristics of HISD kindergarten students based on their prekindergarten alumni status? Were there any differences in demographic characteristics when years of prekindergarten enrollment were taken into account?

Table 1. Demographic Characteristics of HISD Kindergarten Students by Prekindergarten Alumni Status: 2016–2017

Demographic Characteristics	HISD Pre-K		Non-HISD Pre-K		Total kindergarten population		
	n	%	n	%	n	%	
Overall Sample	10,516	100.0	6,019	100.0	16,535	100.0	
Gender	Female	5,230	49.7	2,817	46.8	8,047	48.7
	Male	5,286	50.3	3,202	53.2	8,488	51.3
Race & Ethnicity	Asian	304	2.9	478	7.9	782	4.7
	Black	2,328	22.1	1,517	25.2	3,845	23.3
	Hispanic	7,453	70.9	2,667	44.3	10,120	61.2
	White	334	3.2	1,182	19.6	1,516	9.2
	Other	97	0.9	175	2.9	272	1.6
Economically disadvantaged	No	1,276	12.1	2,388	39.7	3,664	22.2
	Yes	9,240	87.9	3,631	60.3	12,871	77.8
Special Education eligible	No	10,106	96.1	5,728	95.2	15,834	95.7
	Yes	410	3.9	291	4.8	701	4.2
Limited English Proficient (LEP)	No	4,909	46.7	4,324	71.8	9,233	55.8
	Yes	5,607	53.3	1,695	28.2	7,302	44.2
At risk	No	158	1.5	2,409	40.0	2,567	15.5
	Yes	10,358	98.5	3,610	60.0	13,968	84.5

Source: PEIMS 2015–2016 to 2016–2017 HISD student databases

- Results shown in **Table 1** indicate that the demographic characteristics of HISD and non-HISD prekindergarten alumni were relatively similar with respect to gender and special education eligibility status. Similar trends were also noted among students identified as Black.
- An overrepresentation of students characterized as either Hispanic (70.9%), economically disadvantaged (87.9%), limited English proficient (LEP, 53.3%), and at risk (98.5%) was identified among HISD prekindergarten alumni when compared to students who had not attended an HISD prekindergarten program and to the total kindergarten population. These findings align with the district prekindergarten eligibility criteria.
- An underrepresentation of students characterized as either Asian (2.9%), White (3.2%), non-economically disadvantaged (12.1%), non-LEP (46.7%), and not labeled at risk (1.5%) was identified among kindergarteners who were HISD prekindergarten alumni.

- One notable change in the 2016–2017 kindergarten cohort concerns the significant rise in the percentage of students coded as at risk of dropping out. Whereas only 62.9 percent of last year’s (2015–1016) kindergarten students were considered at risk (Houston Independent School District [HISD], 2016c), the percentage of students so-categorized in the present year jumped to 84.5% (an increase of 21.6 percentage points). This demographic change was most apparent in kindergarten students who were HISD pre-K alumni: 98.5% of these students were coded “at risk” versus 68.9% of comparable students in the previous year’s cohort (an increase of 29.6 percentage points). However, the percentage of at risk kindergarten students who had *not* enrolled in HISD pre-K the previous year also increased by 7.8 percentage points.

Table 2. Demographic Characteristics of Kindergarten Students by HISD Prekindergarten Alumni Status and Years of Prekindergarten Enrollment

Demographic Characteristics	HISD Pre-K (One year only)		HISD Pre-K (Two years)		Total prekindergarten population		
	n	%	n	%	n	%	
Overall Sample	9,338	100.0	1,178	100.0	10,516	100.0	
Gender	Female	4,647	49.8	583	49.5	5,230	49.7
	Male	4,691	50.2	595	50.5	5,286	50.3
Race & Ethnicity	Asian	290	3.1	12	1.0	302	2.9
	Black	2,019	21.6	317	26.9	2,336	22.2
	Hispanic	6,663	71.4	798	67.7	7,461	70.9
	White	296	3.2	44	3.7	340	3.2
	Other	70	0.7	7	0.6	77	0.7
Economically disadvantaged	No	1,131	12.1	145	12.3	1,131	10.8
	Yes	8,207	87.9	1,033	87.7	9,385	89.2
Special Education eligible	No	8,999	96.4	1,107	94.0	10,130	96.3
	Yes	339	3.6	71	6.0	386	3.7
Limited English Proficient (LEP)	No	4,339	46.5	570	48.4	4,995	47.5
	Yes	4,999	53.5	608	51.6	5,521	52.5
At Risk	No	244	2.6	29	2.5	418	4.0
	Yes	9,094	97.4	1,149	97.5	10,098	96.0

Source: PEIMS 2014–2015 to 2016–2017 HISD student databases.

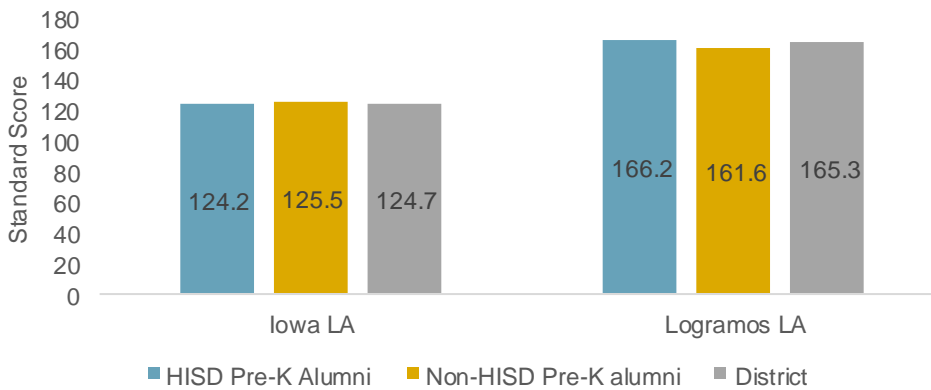
- Results shown in **Table 2** indicate that the percentage of kindergarten students who enrolled in an HISD prekindergarten program for one year and for two years were relatively similar with respect to gender and socioeconomic status.
- An overrepresentation of students characterized as Black (26.9%) was identified among kindergarteners who attended an HISD prekindergarten program during both the 2014–2015 and 2015–

2016 school years when compared to students who had attended only one year of HISD prekindergarten, and when compared to the total kindergarten population.

- An underrepresentation of students characterized as Hispanic (67.7%) or not special education eligible (94.0%) was identified among kindergarteners who attended an HISD prekindergarten program during the 2014–2015 and 2015–2016 school years when compared to their respective peers who attended Pre-K for only one year.

What differences in academic achievement existed between kindergarten students by prekindergarten alumni status and subtest type?

Figure 3. Mean Standard Scores on the 2016–2017 Iowa and Logramos Language Arts Subtests for HISD Kindergarten Students by Prekindergarten Alumni Status



Source: PEIMS 2014–2015 to 2016–2017 HISD student databases and Iowa and Logramos 2016–2017 kindergarten student databases.
 Note: Mean standard score differences between groups of less than 1.0 were determined comparable.

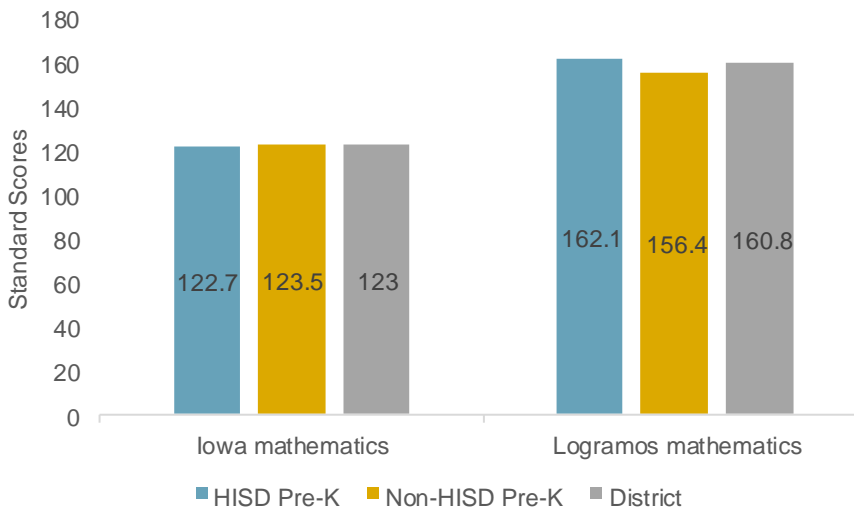
Iowa Language Arts Results

- **Figure 3** shows that kindergarten students who were HISD prekindergarten alumni achieved a mean standard score on the Iowa language arts subtests ($M = 124.2$) that was lower than that of their peers who had not attended an HISD prekindergarten program ($M = 125.5$), but comparable to that of the district as a whole ($M = 124.7$).
- Language arts scores for both HISD Pre-K and non-Pre-K groups were also lower for the current academic year than those for the 2015–2016 academic year at 130.1 and 131.9, respectively (Houston Independent School District [HISD], 2016c. Data not shown). This decrease may be due to substitutions in both the test form employed and to changes in overall HISD district testing policy with regard to the exclusion from testing of children flagged as ‘gifted and talented’ (see page 6).

Logramos Language Arts Results

- Figure 3 shows that students who were HISD prekindergarten alumni achieved a mean standard score on the Logramos language arts subtests that was higher ($M = 166.2$) both than that of the non-prekindergarten alumni group ($M = 161.6$) and that of the district as a whole ($M = 165.3$).
- As with Iowa language arts scores, both Pre-K and non-Pre-K groups saw a slight decrease in Logramos language test scores compared to those from the 2015–2016 school year, which averaged 172.4 for the HISD Pre-K subpopulation and 167.6 for the non-Pre-K students (Houston Independent School District [HISD], 2016c. Data not shown). This difference may be a whole or partial outcome of aforementioned changes in testing practice (see page 6).

Figure 4. Mean Standard Scores on the 2016–2017 Iowa and Logramos Mathematics Subtests for HISD Kindergarten Students by Prekindergarten Alumni Status



Source: PEIMS 2014–2015 to 2016–2017 HISD student databases and Iowa and Logramos 2016–2017 kindergarten student databases.
 Note: Mean standard score differences between groups of less than 1.0 were determined comparable.

Iowa Mathematics Results

- **Figure 4** shows that kindergarten students who were enrolled in an HISD prekindergarten program the previous year achieved a mean standard score on the Iowa mathematics subtest ($M = 122.7$) that was comparable to those of their peers who had not attended HISD prekindergarten ($M = 123.5$), and to the district as a whole ($M = 123.0$).
- Relative declines in total test scores compared to the previous year are also apparent in the Iowa mathematics subtest, which averaged 130.9 for the HISD Pre-K alumni and 131.5 for the non-Pre-K group during the 2015–2016 academic year (Houston Independent School District [HISD], 2016c. Data not shown). See discussion of changes in test practice (page 6).

Logramos Mathematics Results

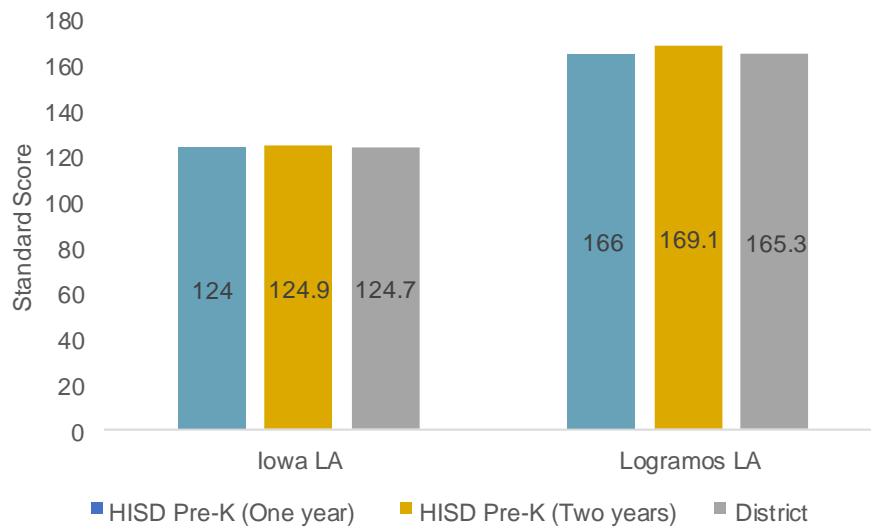
- Figure 4 shows that kindergarten students who were enrolled in an HISD prekindergarten program the previous year achieved a mean standard score on the Logramos mathematics subtest ($M = 162.1$) that

was higher than that of their peers who had not attended HISD prekindergarten ($M = 156.4$), and higher than the district average ($M = 160.8$).

- Logramos mathematics scores likewise saw a small decline compared to the previous year's scores of 164.1 for HISD Pre-K alumni and 159.1 for the non-Pre-K group (Houston Independent School District [HISD], 2016c. Data not shown). See discussion of changes in test practice (page 6).

What differences in academic achievement existed between kindergarten students by prekindergarten alumni status and years of prekindergarten enrollment?

Figure 5. Mean Standard Scores on the 2016–2017 Iowa and Logramos Language Arts Subtests for HISD Kindergarten Students by Years of Prekindergarten Enrollment



Source: PEIMS 2014–2015 to 2016–2017 HISD student databases and Iowa and Logramos 2016–2017 kindergarten student databases.
 Note: Mean standard score differences between groups of less than 1.0 were determined comparable.

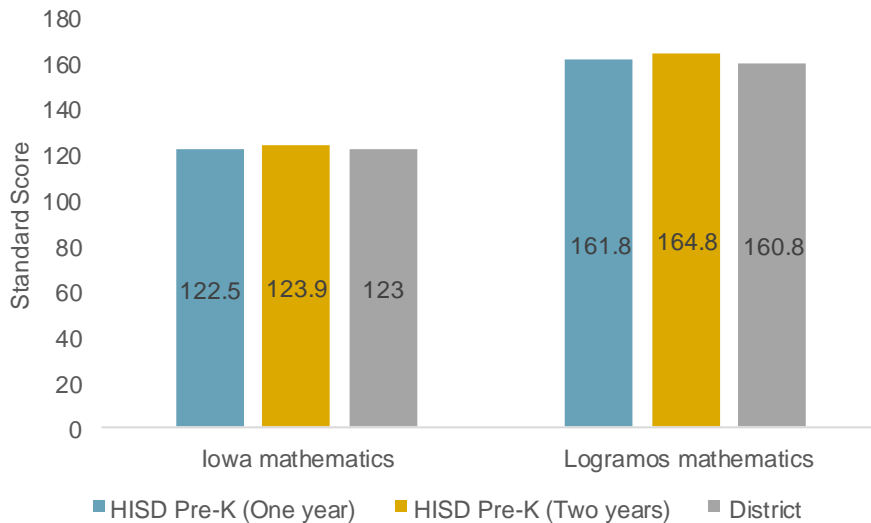
Iowa ELA Results

- Figure 5** shows that kindergarten students who were enrolled in an HISD prekindergarten program for two consecutive years achieved a mean standard score on the Iowa language arts subtests ($M = 124.9$) that was higher than that of their peers who attended HISD Pre-K for one year ($M = 124.0$), and comparable to the district average ($M = 124.7$).

Logramos Language Arts Results

- Figure 5 shows that students who were enrolled in an HISD prekindergarten program for two consecutive years achieved a mean standard score on the Logramos language arts subtests ($M = 169.1$) that was higher both than that of their peers who attended HISD Pre-K for only one year ($M = 166.0$), and higher than the district average ($M = 165.3$).

Figure 6. Mean Standard Scores on the 2016–2017 Iowa and Logramos Mathematics Subtests for HISD Kindergarten Students by Years of Prekindergarten Enrollment



Source: PEIMS 2014–2015 to 2016–2017 HISD student databases and Iowa and Logramos 2016–2017 kindergarten student databases.

Iowa Mathematics Results

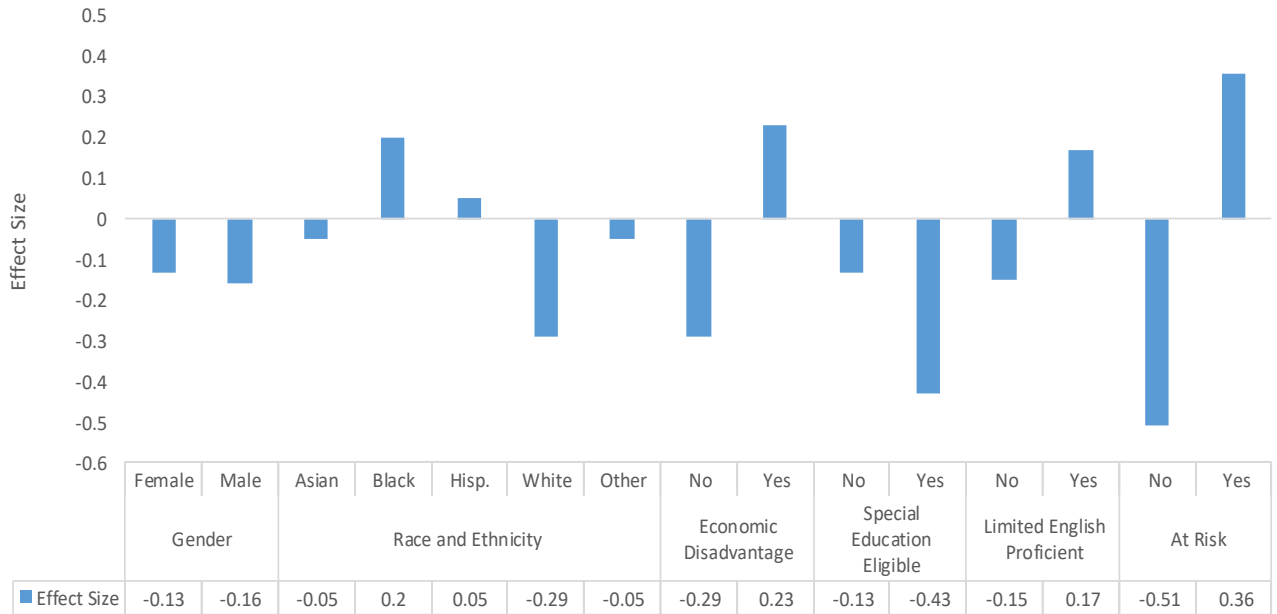
- **Figure 6** shows that students who were enrolled in an HISD prekindergarten program for two consecutive years achieved a mean standard score on the Iowa mathematics subtest ($M = 123.9$) that was higher both than that of their peers who attended an HISD prekindergarten program for one year only ($M = 122.5$), and higher than the district average ($M = 123.0$).

Logramos Mathematics Results

- **Figure 6** shows that students who were enrolled in an HISD prekindergarten program for two consecutive years achieved a mean standard score on the Logramos mathematics subtest ($M = 164.8$) that was both higher than that of their peers who attended an HISD prekindergarten program for one year only ($M = 161.8$) and higher than the district average ($M = 160.8$).

What were the effects of HISD prekindergarten alumni status on kindergarten students' academic achievement when student demographic characteristics were taken into account?

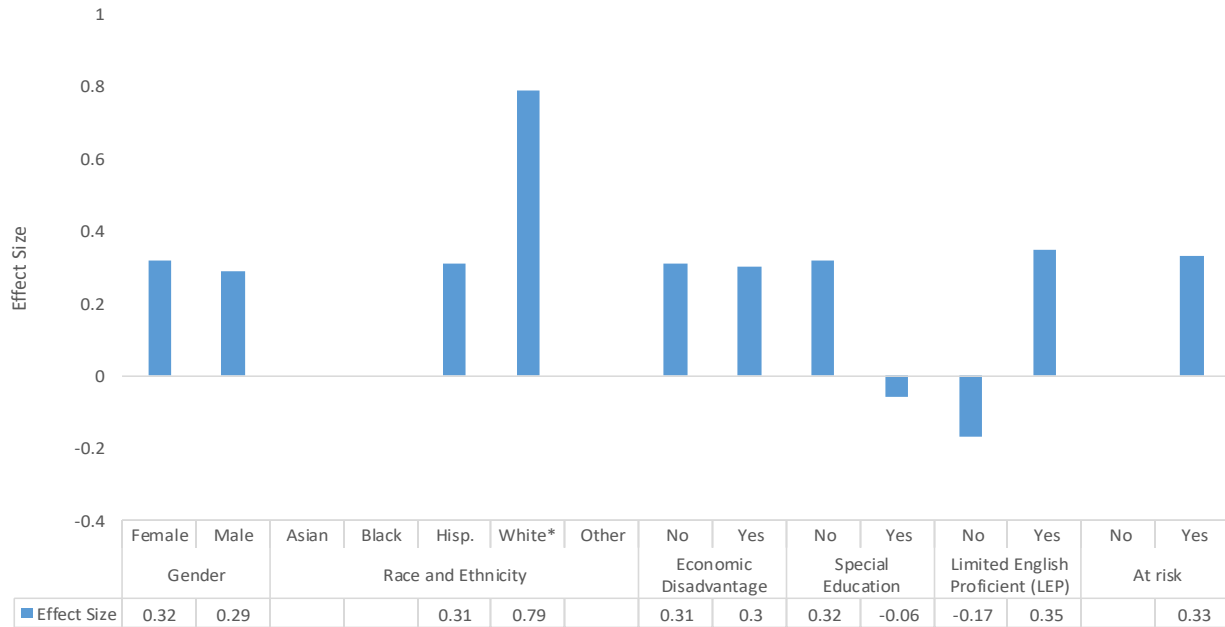
Figure 7. Effect of HISD Prekindergarten Programs on Kindergarten Students' Achievement on the 2016–2017 Iowa English Language Arts Subtests by Student Demographic Characteristics



Source: PEIMS 2015–2016 to 2016–2017 HISD student databases and Iowa kindergarten student databases.
 Note: Effect size criteria indicates 0.2 = small effect, 0.5 = moderate effect, and 0.8 = large effect.

- **Figure 7** (see **Appendix A, Table 1**) shows small positive effects were observed for students administered the Iowa language arts subtests who were identified as Black (.20), economically disadvantaged (.23), or at risk (.36). Effect sizes that failed to reach the 0.20 or –0.20 benchmark were considered negligible.
- Small negative effects on scores were noted for students who were identified as White (–0.29), not economically disadvantaged (–0.29), and eligible for special education services (–0.43). A moderate negative effect was noted for students identified as not at risk (–0.51).
- An overall sample population effect size of –0.15 indicated that HISD prekindergarten programs had a negligible effect on Iowa language arts subtest scores.

Figure 8. Effect of HISD Prekindergarten Programs on Kindergarten Students’ Achievement on the 2016–2017 Logramos Language Arts Subtests by Student Demographic Characteristics



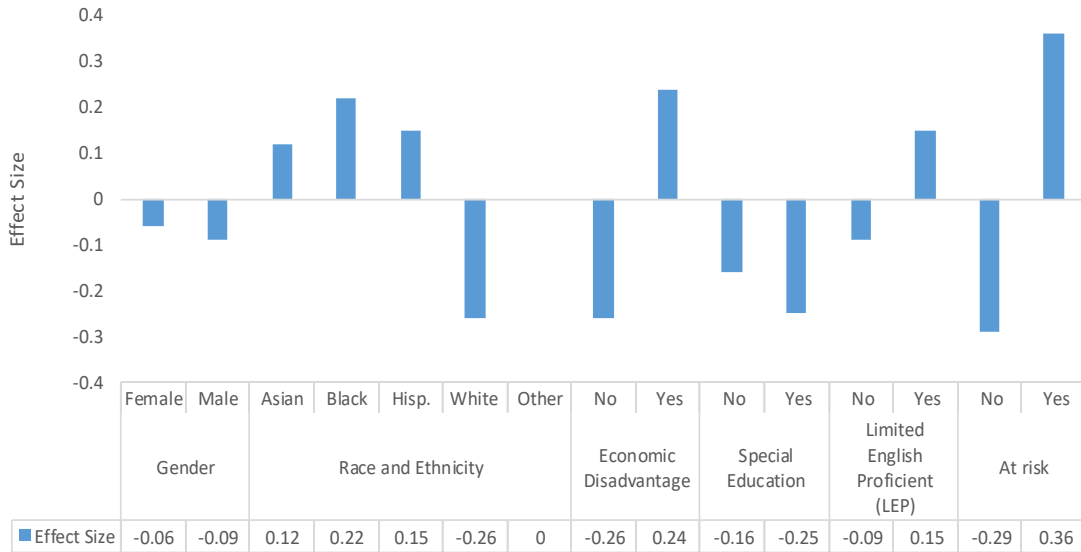
Source: PEIMS 2015–2016 to 2016–2017 HISD student databases and Logramos 2016–2017 kindergarten student databases.

Note: Effect size criteria indicates 0.2 = small effect, 0.5 = moderate effect, and 0.8 = large effect.

Note: * denotes sample size of n < 30 were used to compute effect size. As such, caution should be used when interpreting results.

- **Figure 8** (see **Appendix A, Table 2**) shows small positive effects were observed for students on the Logramos language arts subtests regardless of gender and economic status. Additionally, small positive effects were observed among students who were identified as Hispanic (0.31), not eligible for special education services (0.32), LEP (0.35), and/or at risk (0.33).
- A moderate to large positive effect was observed for White students who were administered the Logramos language arts subtests (0.79*). However, due to small sample sizes of White Logramos language arts test-takers who either attended an HISD prekindergarten program (n = 17) or did not attend (n = 5), caution should be exercised regarding the interpretation of HISD prekindergarten programs’ effects on this student population’s academic achievement.
- With the exception of male and economically disadvantaged students, the positive effects of HISD prekindergarten alumni status on Logramos language arts scores were typically greater than the overall sample population effect size of 0.30.

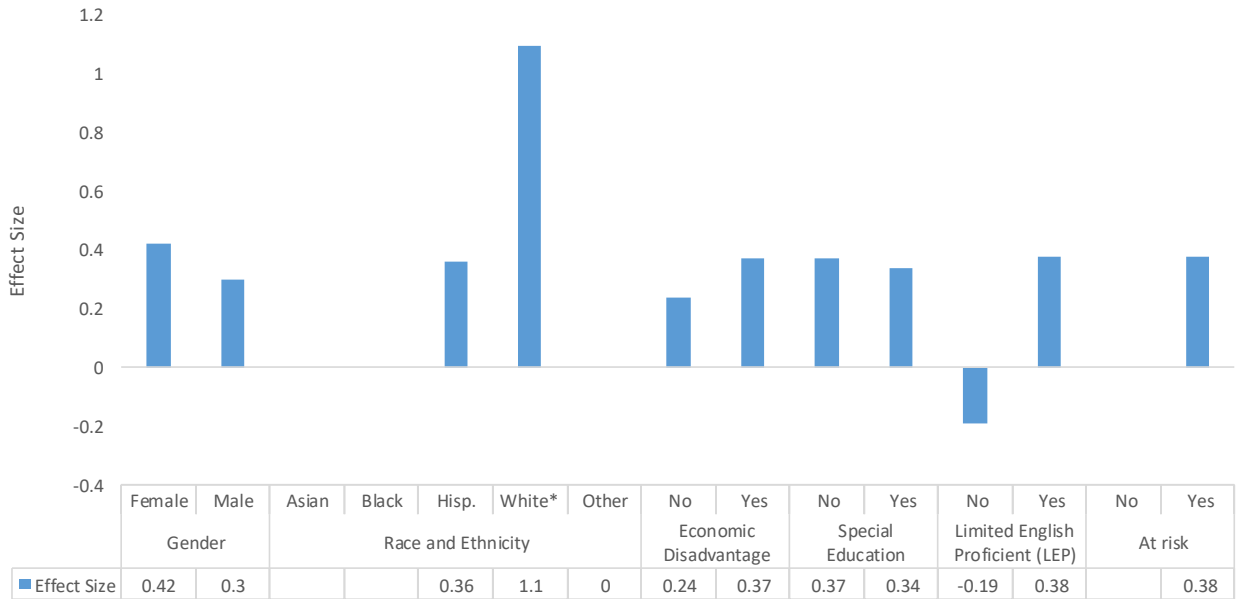
Figure 9. Effect of HISD Prekindergarten Programs on Kindergarten Students’ Achievement on the 2016–2017 Iowa Mathematics Subtest by Student Demographic Characteristics



Source: PEIMS 2015–2016 to 2015–2016 HISD student databases and Iowa 2016–2017 kindergarten student databases.
 Note: Effect size criteria indicates 0.2 = small effect, 0.5 = moderate effect, and 0.8 = large effect.

- **Figure 9** (see **Appendix A, Table 3**) shows small positive effects were observed for students administered the Iowa mathematics subtest who were identified as Black (0.22), economically disadvantaged (0.24) and/or at risk (0.36). Effect sizes that failed to reach the 0.20 or –0.20 benchmark were considered negligible.
- Small negative effects occurred among students identified as White (–0.26), eligible for special education services (–0.25), and/or students who were not identified as at risk (–0.29).
- An overall sample population effect size of –0.07 indicated that HISD prekindergarten programs had a negligible effect on Iowa mathematics subtest scores.

Figure 10. Effect of HISD Prekindergarten Programs on Kindergarten Students' Achievement on the 2016–2017 Logramos Mathematics Subtest by Student Demographic Characteristics

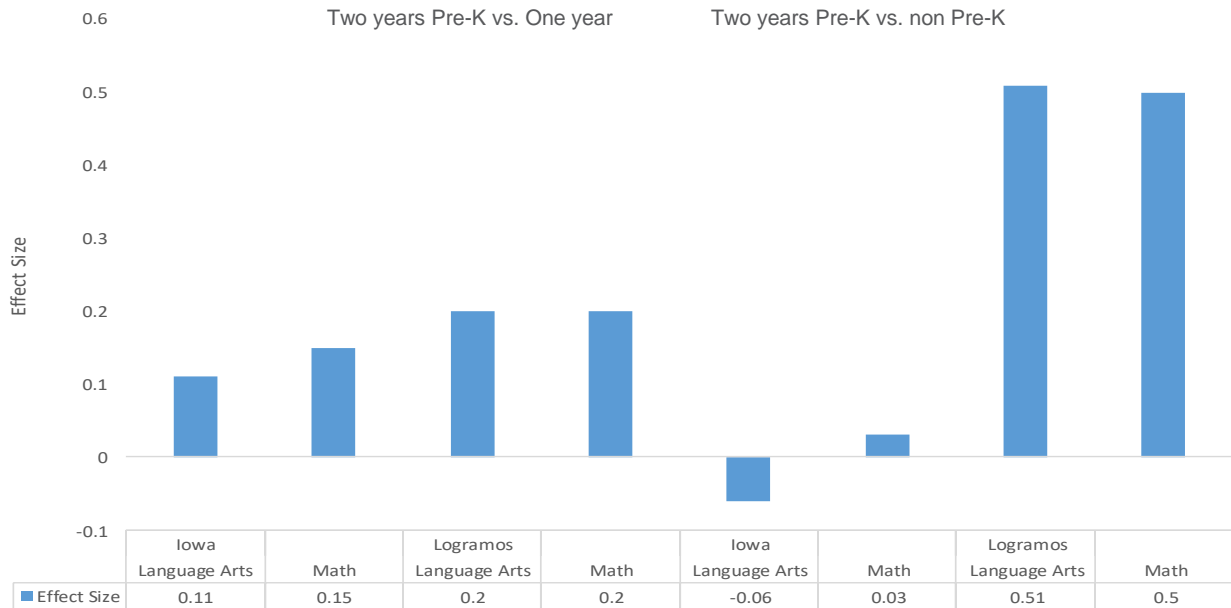


Source: PEIMS 2015–2016 to 2016–2017 HISD student databases and Logramos 2016–2017 kindergarten student databases.
 Note: Effect size criteria indicates 0.2 = small effect, 0.5 = moderate effect, and 0.8 = large effect.
 Note: * denotes sample size of n < 30 were used to compute effect size. As such, caution should be used when interpreting results.

- **Figure 10** (see **Appendix A, Table 4**) shows small positive effects were observed for students on the Logramos mathematics subtest regardless of gender, economic status, or special education eligibility. Additionally, small positive effects were observed to occur among students who were identified as Hispanic (0.36), LEP (0.38), and/or at risk (0.38).
- A moderate to large positive effect was observed for White students who were administered the Logramos mathematics subtests (1.1*). However, due to small sample sizes of White Logramos math test-takers who were either HISD prekindergarten alumni (n = 20) or not (n = 6), caution should be exercised regarding the interpretation of the effect of prekindergarten on this student population's academic achievement.
- With the exception of male students, the positive effects HISD prekindergarten programs had on student subpopulations' achievement on the Logramos mathematics was typically greater than, or comparable to, the overall sample population effect size of 0.36. Only one group (non-LEP students) saw a negative effect on test scores, but at –0.19 that effect was considered negligible.

What were the effects of HISD prekindergarten alumni status on kindergarten students' academic achievement when years of enrollment were taken into account?

Figure 11. Effect of HISD Prekindergarten Programs on Kindergarten Students' Achievement on the 2016–2017 Iowa and Logramos Language Arts and Mathematics Assessments Based on Years of Enrollment



Source: PEIMS 2014–2015 to 2016–2017 HISD student databases and Logramos 2016–2017 kindergarten student databases.

Note: Effect size criteria indicates 0.2 = small effect, 0.5 = moderate effect, and 0.8 = large effect.

- **Figure 11 and Appendix B, Table 1** show moderate positive effects were observed for students who enrolled for two consecutive years (2014–2015 and 2015–2016) in an HISD prekindergarten program on the Logramos language arts (0.5) and mathematics (0.5) subtests when compared to peers who had not attended an HISD Pre-K program.
- HISD prekindergarten programs were observed to have negligible positive effects on the Iowa language arts and mathematics scores when students who were enrolled for two consecutive years (2014–2015 and 2015–2016) in HISD Pre-K were compared to peers who only attended one year of HISD Pre-K. However, small positive effects were shown on both the Logramos language arts (0.2) and Logramos mathematics subtests (0.2) for students who enrolled for two years in an HISD Pre-K program versus those who enrolled for only one year.

Discussion

“An effective system of early childhood education [supports the] reciprocal relationship among curriculum, child assessment, and program evaluation” (NAEYC & NAECS/SDE, 2003, p. 1). The prekindergarten program is a complex subsystem of early childhood education that is situated within the walls of an elementary school, and charged with making and implementing decisions to promote the equitable development, learning, and school readiness of all children. Each child-whatever her or his abilities and differences- should be respected and taken into careful consideration in order for her or him to be included in prekindergarten to the fullest extent with the highest expectations (NAEYC & NAECS/SDE, 2003). For this report, descriptive statistical analyses and effect size computations were used to examine relationships between students’ academic achievement and prekindergarten program enrollment status. Specifically, variables were analyzed to determine the mean academic achievement of kindergarten students who had either enrolled or did not enroll in an HISD prekindergarten program during previous school years.

Findings from this study indicated that during the 2016–2017 school year, HISD had the lowest student enrollment into prekindergarten programs in ten years. The enrollment trend shows a steady increase in students enrolling into HISD Pre-K from the 2007–2008 to 2011–2012 school years, with declining totals thereafter. Coincidentally, decreases in HISD prekindergarten student enrollment also occurred not long after Pre-K through twelfth grades “took a substantial hit in 2011 when the Texas Legislature cut \$4 billion from formula funding and \$1.3 billion from educational grant programs outside of formula funding” (Villanueva, 2016).

Results from this study also revealed that students who were enrolled in a 2014–2015 or 2015–2016 HISD prekindergarten program were usually identified as economically disadvantaged, LEP, and/or at risk for dropping out of school. These findings were substantiated by prior evidence presented in the *District and School Profiles 2014–2015* report that indicated the majority of students enrolled in the district qualified for free or reduced lunch (71.6 %) and were at risk of dropping out (71.6%; Houston Independent School District [HISD], 2015b, p. 17). Overrepresentation of these demographic subpopulations (see Table 1, pg. 10) was expected as these students were targeted to receive a free prekindergarten education in HISD. Interestingly, underrepresentation of Asian and White students in general were also observed in this study (see Table 2, page 12).

Implications

With respect to academic achievement, the majority of 2016–2017 HISD kindergarten students who were HISD prekindergarten alumni achieved higher mean standard scores and experienced more positive effects on the Logramos language arts and mathematics subtests than their peers who were administered the Iowa language arts and mathematics subtests. Similar academic outcomes were also observed in the *Prekindergarten Education Program: Effects of HISD Prekindergarten on Kindergarten Performance, 2015–2016* report (Houston Independent School District [HISD], 2016c). The number of years of prekindergarten enrollment also appears to be related to school readiness for students who were administered the Logramos language arts and mathematics subtests (see Figure 11, see also Baumgartner, 2017). These findings highlight noteworthy efforts made by the Early Childhood Department to prepare students who take the Logramos language arts and mathematics tests to be school ready. An explanation for this phenomenon may be due, in part, to the cultural responsiveness of HISD prekindergarten programs and the HISD district’s support of diverse linguistic programs. Prekindergarten students who are placed in the ‘best fit’ program that supports their English-language and literacy development and provides responsive, individualized accommodations are more likely to succeed in school (National Research Council [NRC], 2007).

As such, one implication from this study is that the Early Childhood Department may consider expanding their efforts to create sustainable, high-quality programs to meet the needs of students who take the Iowa language arts and mathematics subtests. Subpopulations who would benefit from these efforts include

students who endemically have lower achievement levels on the Iowa Assessments (e.g., young Black students, students eligible for special education services), or underrepresented subpopulations in HISD prekindergarten classrooms. These efforts may include: (a) improving strategies that target these student subgroups for enrollment in prekindergarten to improve their school readiness, and reduce achievement gaps; and (b) examining current pedagogical practices to determine whether they are culturally sensitive and respond positively to individual students' needs and abilities, making improvements where needed.

With regards to students who are eligible for the district's special education services, the Early Childhood Department and Research & Accountability may also consider, prior to examining the academic outcomes of these students, determining *when* these students were flagged to receive special services to support their Pre-K education experiences. The variability in when students received services and what type and quality of services may influence the academic outcomes of these children once they reach kindergarten. The Early Childhood Department may also consider including students coded as 'EE' in subsequent reports, as PEIMS database records indicated the majority of these students were flagged eligible for special education services prior to the 2016–2017 school year.

Empirical evidence serves as the cornerstone for reform efforts in education. Education stakeholders “cannot expect reform efforts in education to have significant effects without research-based knowledge to guide them” (National Research Council [NRC], 2002, p.1). A third implication emerging from this report's findings is that the Early Childhood Department may consider conducting an implementation fidelity study grounded in best practices in early education to determine to what degree HISD prekindergarten programs are being delivered as intended to improve school readiness and to close the achievement gap among young children (NAEYC & NAECS/SDE, 2003). Only by understanding and measuring whether an intervention has been implemented with fidelity can education stakeholders gain a better understanding of *how and why* an intervention works (or doesn't), and the extent to which children's school readiness can be improved (Carroll et al., 2007). Examining district-, school- and classroom-level variables associated with students' academic success (e.g., district policies, administrators' support, teacher quality, school and classroom culture), will be necessary in order to determine which variables have the strongest impact on learning experiences and school readiness outcomes both across the district and within the context of demographic subpopulations.

A fourth implication from this report is that the Early Childhood Department may consider expanding student measures it uses to assess foundational learning experiences that are crucial to the school readiness of children. The Early Childhood Department, supported by funds from the House Bill 4 High Quality Prekindergarten grant, is currently in the process of expanding efforts to assess students' progress and needs by including measures of social and emotional development. While focus on accountability is important, primary emphasis should be placed on using assessments as a means to determine progress, successes, and needs of each individual child to ensure they receive optimal learning experiences (NAEYC & NAECS/SDE, 2003).

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Appendix A

Table 1. Academic Achievement of Kindergarten Students on the 2016–2017 Iowa English Language Arts Subtests Based on HISD Prekindergarten Alumni Status and Demographic Characteristics

Demographic Characteristics	HISD Pre-K			Non-HISD Pre-K			Mean Difference	Effect Size	
	Mean	SD	n	Mean	SD	n			
Overall Sample	124.2	8.2	5,435	125.5	9.9	3,658	-1.3	-0.15	
Gender	Female	124.8	8.3	2,711	126.0	9.9	1,748	-1.2	-0.13
	Male	123.5	8.1	2,724	124.9	9.8	1,910	-1.4	-0.16
Race & Ethnicity	Asian	125.7	9.4	201	126.2	10.4	303	-0.5	-0.05
	Black	124.8	8.3	2,074	123.1	8.4	1,227	1.7	0.20
	Hispanic	123.1	7.7	2,839	122.7	8.8	1,152	0.4	0.05
	White	128.7	9.4	265	131.6	10.0	840	-2.9	-0.29
	Other	129.1	9.8	56	129.6	10.1	136	-0.5	-0.05
Economically disadvantaged	No	127.6	9.4	826	130.4	9.7	1,584	-2.8	-0.29
	Yes	123.5	7.8	4,609	121.7	8.2	2,074	1.8	0.23
Special Education eligible	No	124.3	8.2	5,288	125.5	9.9	3,603	-1.2	-0.13
	Yes	118.8	7.5	147	122.3	9.3	55	-3.5	-0.43
Limited English Proficient (LEP)	No	124.9	8.1	4,305	126.2	9.8	3,196	-1.3	-0.15
	Yes	121.4	8.0	1,130	120.0	8.8	462	1.4	0.17
At risk	No	125.9	8.0	94	130.7	9.5	1,637	-4.8	-0.51
	Yes	124.1	8.2	5,341	121.2	7.9	2,021	2.9	0.36

Source: PEIMS 2015–2016 to 2016–2017 HISD student databases and Iowa 2016–2017 kindergarten student databases.

Note: Effect size criteria indicates 0.2 = small effect, 0.5 = moderate effect, and 0.8 = large effect.

Table 2. Academic Achievement of Kindergarten Students on the 2016–2017 Logramos Language Arts Subtests Based on HISD Prekindergarten Alumni Status and Demographic Characteristics

Demographic Characteristics	HISD Pre-K			Non-HISD Pre-K			Mean Difference	Effect Size	
	Mean	SD	N	Mean	SD	n			
Overall Sample	166.2	15.3	4,197	161.6	14.4	1,085	4.6	0.30	
Gender	Female	167.7	14.9	2,112	163.0	14.1	514	4.7	0.32
	Male	164.8	15.6	2,085	160.3	14.5	571	4.5	0.29
Race & Ethnicity	Asian	–	–	0	–	–	0	–	–
	Black	*	*	3	*	*	1	–	–
	Hispanic	166.3	15.3	4,172	161.6	14.4	1,077	4.7	0.31
	White	161.7	11.6	20	152.8	7.4	6	8.9	0.79
	Other	*	*	2	*	*	1	*	*
Economically disadvantaged	No	166.2	16.3	246	161.6	14.2	110	4.6	0.31
	Yes	166.2	15.2	3,951	161.6	14.4	975	4.6	0.30
Special Education eligible	No	166.5	15.2	4095	161.7	14.4	1,071	4.8	0.32
	Yes	155.0	14.5	102	154.1	9.1	14	0.9	–0.06
Limited English Proficient (LEP)	No	159.6	15.4	53	162.4	17.4	75	–2.8	–0.17
	Yes	166.3	15.3	4,144	161.6	14.1	1,010	4.7	0.35
At risk	No	*	*	1	168.9	18.2	39	–	–
	Yes	166.2	15.3	4,197	161.3	14.1	1,046	4.9	0.33

Source: PEIMS 2015–2016 to 2016–2017 HISD student databases and Logramos 2016–2017 kindergarten student databases.

Note: Effect size criteria indicates 0.2 = small effect, 0.5 = moderate effect, and 0.8 = large effect.

Note: Caution should be used when interpreting effect size results that were computed with sample sizes of $n < 30$.

‘*’ denotes fewer than five students tested.

‘–’ denotes not data available for students.

Table 3. Academic Achievement of Kindergarten Students on the 2016–2017 Iowa Mathematics Subtest Based on HISD Prekindergarten Alumni Status and Demographic Characteristics

Demographic Characteristics		HISD Pre-K			Non-HISD Pre-K			Mean Difference	Effect Size
		Mean	SD	N	Mean	SD	n		
Overall Sample		122.7	9.6	5,562	123.5	11.6	3,740	–0.8	–0.07
Gender	Female	123.0	9.6	2,772	123.6	11.5	1,786	–0.6	–0.06
	Male	122.4	9.7	2,790	123.4	11.7	1,954	–1.0	–0.09
Race & Ethnicity	Asian	125.6	11.7	205	127.1	12.6	303	–1.5	0.12
	Black	122.4	9.6	2,147	120.2	10.2	1,282	2.2	0.22
	Hispanic	122.2	9.2	2,884	120.8	10.4	1,175	1.4	0.15
	White	127.3	10.9	271	130.2	11.4	845	–2.9	–0.26
	Other	128.2	10.1	55	128.2	11.9	135	0.0	0.0
Economically disadvantaged	No	126.4	10.6	834	129.2	11.1	1,602	–2.8	–0.26
	Yes	122.0	9.3	4,728	119.2	10.1	2,138	2.8	0.24
Special Education eligible	No	122.9	9.3	5,416	123.6	11.6	3,682	–0.7	–0.16
	Yes	116.4	9.3	156	118.8	10.7	58	–2.4	–0.25
Limited English Proficient (LEP)	No	123.1	9.6	4,412	124.0	11.5	3,274	–0.9	–0.09
	Yes	121.3	9.8	1,150	119.7	11.7	466	1.6	0.15
At Risk	No	125.8	9.4	99	129.0	11.1	1,660	–3.2	–0.29
	Yes	122.6	9.6	5,463	119.1	10.1	2,080	3.5	0.36

Source: PEIMS 2015–2016 to 2016–2017 HISD student databases and Iowa 2016–2017 kindergarten student databases.

Note: Effect size criteria indicates 0.2 = small effect, 0.5 = moderate effect, and 0.8 = large effect.

Table 4. Academic Achievement of Kindergarten Students on the 2016–2017 Logramos Mathematics Subtest Based on HISD Prekindergarten Alumni Status and Demographic Characteristics

Demographic Characteristics	HISD Pre-K			Non-HISD Pre-K			Mean Difference	Effect Size	
	Mean	SD	N	Mean	SD	n			
Overall Sample	162.1	15.4	4,227	156.4	16.5	1,119	5.7	0.36	
Gender	Female	163.0	15.0	2,124	156.6	15.9	530	6.4	0.42
	Male	161.0	15.7	2,103	156.2	17.0	589	4.8	0.30
Race & Ethnicity	Asian	–	–	0	–	–	0	–	–
	Black	*	*	4	–	–	1	–	–
	Hispanic	162.1	15.4	4,201	156.4	16.5	1,111	5.7	0.36
	White	162.6	12.4	20	146.8	18.5	6	15.8	1.1
	Other	*	*	2	*	*	1	*	*
Economically disadvantaged	No	161.4	16.9	247	157.2	17.9	115	4.2	0.24
	Yes	162.1	15.3	3,980	156.3	16.3	1,004	5.8	0.37
Special Education eligible	No	162.2	15.3	4,123	156.5	16.5	1,105	5.7	0.37
	Yes	154.4	16.4	104	148.8	15.0	14	5.6	0.34
Limited English Proficient (LEP)	No	155.4	15.9	54	158.7	18.7	78	–3.3	–0.19
	Yes	162.1	15.4	4,173	156.2	16.3	1,041	5.9	0.38
At risk	No	*	*	1	163.0	18.2	41	*	*
	Yes	162.1	15.4	4,226	156.1	16.4	1,078	6.0	0.38

Source: PEIMS 2015–2016 to 2016–2017 HISD student databases and Iowa and Logramos 2016–2017 kindergarten student databases.

Note: Effect size criteria indicates 0.2 = small effect, 0.5 = moderate effect, and 0.8 = large effect.

Note: Caution should be used when interpreting effect size results that were computed with sample sizes of $n < 30$.

*' denotes fewer than five students tested.

'–' denotes not data available for students.

Appendix B

Table 1. Academic Achievement of Kindergarten Students on the 2016–2017 Iowa and Logramos Language Arts and Mathematics Subtests Based on HISD Prekindergarten Alumni Status and Years of Attendance

		HISD Pre-K (Two years)			HISD Pre-K (One year only)			Mean Difference	Effect Size
Assessment		Mean	SD	n	Mean	SD	n		
Two years HISD Pre-K vs. One year HISD Pre-K	Iowa language arts	124.9	8.4	693	124.0	8.2	4,742	0.9	0.11
	Iowa mathematics	123.9	10.3	707	122.5	9.5	4,855	1.4	0.15
	Logramos language arts	169.1	15.8	385	166.0	15.2	3,812	3.1	0.20
	Logramos mathematics	164.8	17.1	387	161.8	15.2	3,840	3.0	0.20
		HISD Pre-K (Two years)			Non-HISD Pre-K				
Two years HISD Pre-K vs. Non- HISD Pre-K	Iowa language arts	124.9	8.4	693	125.5	9.9	3,658	-0.6	-0.06
	Iowa mathematics	123.9	10.3	707	123.5	11.6	3,740	0.4	0.03
	Logramos language arts	169.1	15.8	385	161.6	14.4	1,085	7.5	0.51
	Logramos mathematics	164.8	17.1	387	156.4	16.5	1,119	8.4	0.50

Source. PEIMS 2015–2016 to 2016–2017 HISD student databases and Iowa and Logramos 2016–2017 kindergarten student databases.

Note. Effect size criteria indicates 0.2 = small effect, 0.5 = moderate effect, and 0.8 = large effect.