MEMORANDUM October 5, 2015

TO: Board Members

FROM: Terry B. Grier, Ed.D.
Superintendent of Schools

SUBJECT: **PREKINDERGARTEN EDUCATION PROGRAM: A PERFORMANCE COMPARISON OF EARLY CHILDHOOD CENTERS AND SCHOOL-BASED PROGRAMS, 2014–2015**

CONTACT: Carla Stevens, (713) 556-6700

The purpose of this evaluation was to assess the impact of two HISD prekindergarten class models on students' performance on the 2014–2015 IOWA and Logramos English language Arts (ELA) and mathematics subtests.

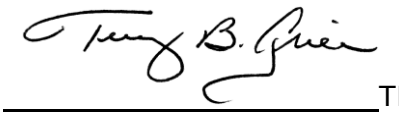
Key findings include:

- There were no statistically significant differences in the mean standard scores on both 2014–2015 kindergarten IOWA ELA and mathematics subtests between students who attended Early Childhood Centers and their peers in school-based programs.

- At the student group level, the results show that the performance of Early Childhood Center students and school-based program students on both 2014–2015 kindergarten IOWA ELA and mathematics subtests were comparable in the following student groups (ethnicity, gender, limited English proficiency (LEP), and at-risk), except for non-economically disadvantaged and special education students.

- Students who attended Early Childhood Centers performed better than their peers in school-based programs on the kindergarten Logramos ELA and mathematics subtests.

Should you have any questions or require any further information, please contact Carla Stevens in the Department of Research and Accountability, at 713-556-6700.



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HOUSTON INDEPENDENT SCHOOL DISTRICT

RESEARCH

Educational Program Report

PREKINDERGARTEN EDUCATION PROGRAM: A PERFORMANCE COMPARISON OF THE EARLY CHILDHOOD CENTERS AND SCHOOL-BASED PROGRAMS, 2014-2015

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www.HoustonISD.org

PREKINDERGARTEN EDUCATION PROGRAM: A PERFORMANCE COMPARISON OF THE EARLY CHILDHOOD CENTERS AND SCHOOL-BASED PROGRAMS, 2014–2015

Executive Summary

Program Description

Houston Independent School District (HISD) has provided prekindergarten classes for Houston area four-year old students since the 1985–1986 academic year. The focus of the program is on lifelong learning to enhance the physical, emotional, and social wellbeing of the whole child and provide the foundational skills required for career and college readiness.

There are two main HISD prekindergarten program models: Early Childhood Centers and school-based programs. The vision of the HISD Early Childhood Centers initiative is to serve as a model for the district by providing a comprehensive state-of-the-art preschool program. The primary focus of the program is to develop academic readiness and to meet the developmental needs of preschool-age children. The district's Rebuild HISD Construction and Renovation Program included plans for a number of Early Childhood Centers that would become beacons for the community schools. Currently, there are five Early Childhood Centers, which only provide prekindergarten education to students: Fonwood, Armandina Farias, Gabriela Mistral, Martin Luther King, Jr. (MLK), and Ninfa Laurenzo.

The HISD school-based prekindergarten programs were initiated in 1984 (T.E.C 29.1532) when House Bill 72 established the Texas prekindergarten program requiring school districts to provide half-day education-based programs to four-year-old children. The purpose of this initiative was to develop skills necessary for success in the regular public school curriculum, including language, mathematics, and social skills (Texas Education Code 29.1532). Currently, HISD offers full-day school-based prekindergarten programs to all students within the attendance boundaries. To be eligible for participation in the non-tuition program, students should be: a) four years old on or before September 1 of the school year; b) live in the HISD attendance boundary; and meet at least one of the following criteria:

- homeless;
- unable to speak or understand English;
- economically-disadvantaged;
- 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 active duty;
- has 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;
- meet any eligibility criteria for Head Start, not only those who meet the low-income eligibility criteria for Head Start.

The purpose of this evaluation was to compare the academic performance of students who attended one of the five Early Childhood Centers with students who attended the school-based prekindergarten programs in 2013–2014. The evaluation focused on the following research questions:

- How did students who attended Early Childhood Centers perform on the 2014–2015 kindergarten IOWA and Logramos ELA subtests compared with their grade-level peers who attended school-based prekindergarten programs?
- How did students who attended Early Childhood Centers perform on the 2014–2015 kindergarten IOWA and Logramos mathematics subtests compared with their grade-level peers who attended school-based prekindergarten programs?
- Did the effects of Early Childhood Centers and school-based prekindergarten programs in students' kindergarten ELA performance vary by student groups?
- Did the effects of Early Childhood Centers and school-based prekindergarten programs in students' kindergarten mathematics performance vary by student groups?
- What were the 2014–2015 kindergarten performance differences among the five ECCs: Fonwood, Armandina Farias, Gabriela Mistral, Martin Luther King, Jr. (MLK), and Ninfa Laurenzo on the 2014–2015 IOWA and Logramos tests?

Highlights

- Effect size indicated that there were no differences in the mean standard scores on both 2014–2015 kindergarten IOWA ELA and mathematics subtests between students who attended Early Childhood Centers and their peers in school-based programs.

- The analysis showed the performance of Early Childhood Center students and school-based program students on both 2014–2015 kindergarten IOWA ELA and mathematics subtests were comparable in the following student groups (ethnicity, gender, limited English proficiency (LEP), and at-risk), except for non-economically disadvantaged and special education students.

- When compared to students in school-based programs, students who attended Early Childhood Centers performed better than their peers on the kindergarten Logramos ELA and mathematics subtests.

Recommendations

- HISD should include measures of early scholastic success outside what is available in administrative data (e.g. test scores). The research shows that social-emotional skills are important factors of early scholastic success. A broader definition of success of early childhood education may include social-emotional skill sets such as cooperation, taking directions, self-management, and getting along with others.

- Various class models were used in early childhood programs. Future evaluations should explore the unique components of each class model to determine which factors are more effective for prekindergarten education for students.

Administrative Response

Over the past year, the Early Childhood Department provided both Early Childhood Centers and school-based pre-k programs with professional support in child development and learning. A variety of professional training opportunities by the department include the use of appropriate curricula and teaching practices that promote social, emotional, physical, language, and cognitive development. The Early Childhood Department offered classroom management courses, literacy, mathematics, and science workshops, coaching, curriculum and assessment trainings. School leaders and teachers were guided to utilize ongoing, systematic, formal and informal assessments to tailor their instruction and respond to each child's strengths and needs. In addition, the department capitalized on five Early Childhood Centers as exemplars for best practices in prekindergarten. School-based programs were encouraged to visit these centers as a means to enrich teacher efficacy and serve as dynamic classroom models that enable students to take charge of their learning. As a result, student gains for this school year reflected no significant difference between the academic performance of Early Childhood Centers and school-based pre-k programs.

Introduction

Research studies have found that high quality early childhood centers promote students' school-readiness, enhance students' cognitive development, and reduce the risk of students' having ELA difficulties as they progress through school (Butin & Woolums, 2009). Students from economically-disadvantaged backgrounds in particular gain the most benefits from these programs (Brooks-Gunn, 2003; Currie, 2001; Gormley, Gayer, Phillips, Dawson, 2005; Magnuson, Rhum, and Waldfogel, 2007). Research has shown that children's social and behavioral skills are connected to their early academic success (Vitaro et al. 1999; Wentzel and Asher 1995).

Early childhood centers (ECCs) have increasingly become necessary in the lives of American parents given the growth of women in the workforce and the increase in amount of hours that parents spend at work (see Butin & Woolums, 2009). Another contributing factor of why the number of early childhood centers has risen is brain research highlighting the integral role that early childhood education can have in promoting the healthy development of children (Center on the Developing Child at Harvard University, 2010). Educators understand that early childhood centers play an important role in a child's school-readiness, early childhood centers within schools, also known as school-based programs, are also a growing trend. Currently, in the Texas Gulf Coast region, over a third of children between the ages of zero to five attend either an early childhood center or some other form of regulated early childhood education (Collaborative for Children, 2012).

Methods

Data Collection and Analysis

- The sample in this evaluation is kindergarten students who completed prekindergarten education in 2013–2014 in the Houston Independent School District (HISD), and entered kindergarten in 2014–2015 in HISD. To ensure Early Childhood Center students and school-based prekindergarten program students have similar kindergarten educational experience, school-based program students and Early Childhood Center students in this evaluation were enrolled in the same elementary schools in the kindergarten year. Moreover, only students who completed their prekindergarten education, and had 2014–2015 kindergarten IOWA or Logramos test scores were included in this evaluation. Consequently, the sample size was 1,355 students from HISD Early Childhood Centers, and 12,342 students from HISD school-based programs.
- The English Language Arts (ELA) and mathematics test scores in this evaluation were the 2014–2015 IOWA and Logramos ELA and mathematics subtests.
- Both IOWA and Logramos are norm-referenced assessments, and were administered in December of students' kindergarten year. In order to compare students' scores from subgroups, the standard score were used for all subtests in this evaluation.
- Effect size was used to quantify the size of the performance difference between Early Childhood Center and school-based program students. Borman and D'Agostino (1996) suggested that the average effect size associated with Title I programs is d = 0.15. Kulik, Kulik, and Bangert (1984), suggested that the average effect size in achievement test score is 0.32. Therefore, d = 0.15 was considered as small-modest, d = 0.3 was considered as modest-large, and d = 0.5 was considered as large in this report.

- In this evaluation, analyses were conducted to examine the achievement differences on ELA and mathematics subtests between student groups. The following characteristics were explored in determining which student demographics were related to their ELA and mathematics performance. These student characteristics included ethnicity, gender, economically-disadvantaged, special education placement, limited English proficiency (LEP), and at-risk status.
- Data aggregated across Early Childhood Centers and school-based programs are presented in **Appendix A** tables (p. 16-20). Students' demographic and test data by specific Early Childhood Centers (ECCs) are presented in **Appendix B** tables (p. 21-25).

Data Limitations

- The Early Childhood Center and school-based program students were nonequivalent groups due to differences in kindergarten education experiences because only school effect was controlled in this evaluation, rather than other factors, such as teacher effect and classroom effect.

- Only student outcome data were used to assess the impact of the two class models on student academic performance, thus, the nature and the quality of the models were not considered in the analyses. Therefore, the results of this evaluation may not be generalized to indicate overall effectiveness of the models.

Results

What were the demographic characteristics of Early Childhood Center students and school-based prekindergarten program students?

- The demographic characteristics of students who attended Early Childhood Centers and those who attended school-based programs were similar with respect to gender and at-risk status in 2014–2015 (**Appendix A-Table 1,** p. 16). Notably, 70.6% of the students in Early Childhood Centers were Hispanic, 89.4% were economically-disadvantaged, 4.9% were in special education, 53.0% were LEP, and 98.0% were at-risk students. These proportions of Hispanic, economically-disadvantaged, special education placement, LEP, and at-risk students were lower in the sample of students who attended school-based programs although still relatively high (Appendix A-Table 1, p. 16).

How did students who attended Early Childhood Centers perform on the 2014–2015 kindergarten IOWA and Logramos ELA subtests compared with their grade-level peers who attended school-based prekindergarten programs?

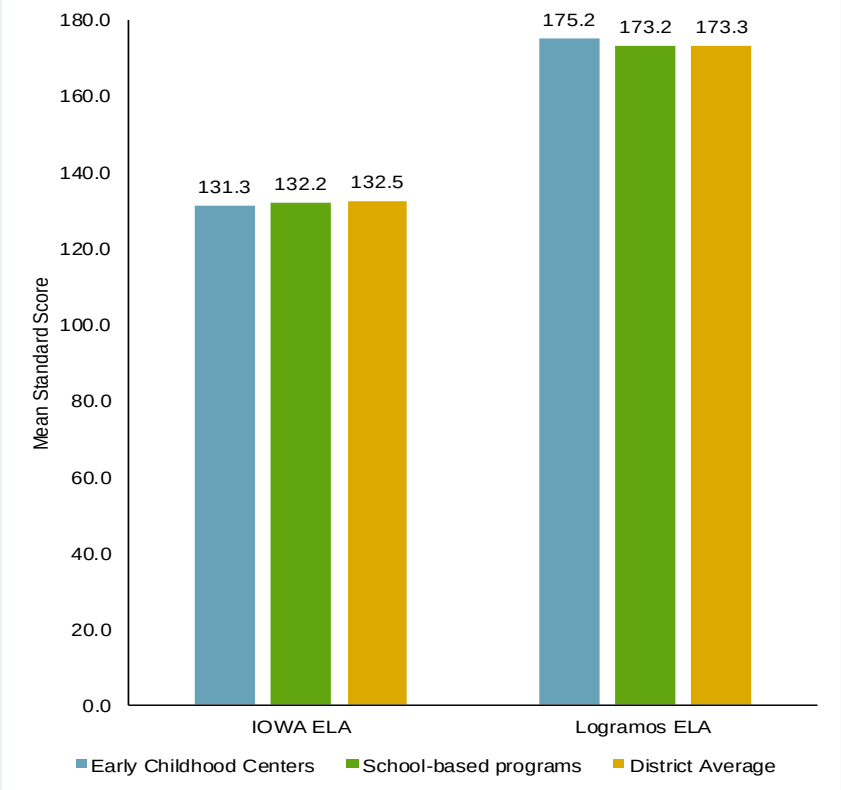
- Students who attended Early Childhood Centers (M = 131.3) obtained lower mean standard scores than their peers who attended school-based programs (M = 132.2) on the 2014–2015 kindergarten IOWA ELA subtest with an effect size -0.09. The effect size indicated that the magnitude of the mean score difference was negligible. (**Appendix A-Table 2,** p. 17).

- On the Logramos ELA subtest, Early Childhood Center students (M = 175.2) obtained higher mean standard scores than their peers who attended school-based programs (M = 173.2) with an effect

size 0.14. The effect size indicated that the magnitude of the mean score difference was small. (**Appendix A-Table 3**, p. 18).

- Both Early Childhood Center students and school-based program students obtained comparable mean standard score as the district's mean standard score on the 2014–2015 kindergarten IOWA ELA subtest. On the Logramos ELA subtest, the Early Childhood Center students obtained a higher mean standard score than that of the district, while the school-based program students obtained a comparable mean standard score as that of the district **(Figure 1)**.

Figure 1. Mean Standard Scores on the 2014–2015 Kindergarten IOWA and Logramos ELA Subtests for Early Childhood Center and School-based Program Students



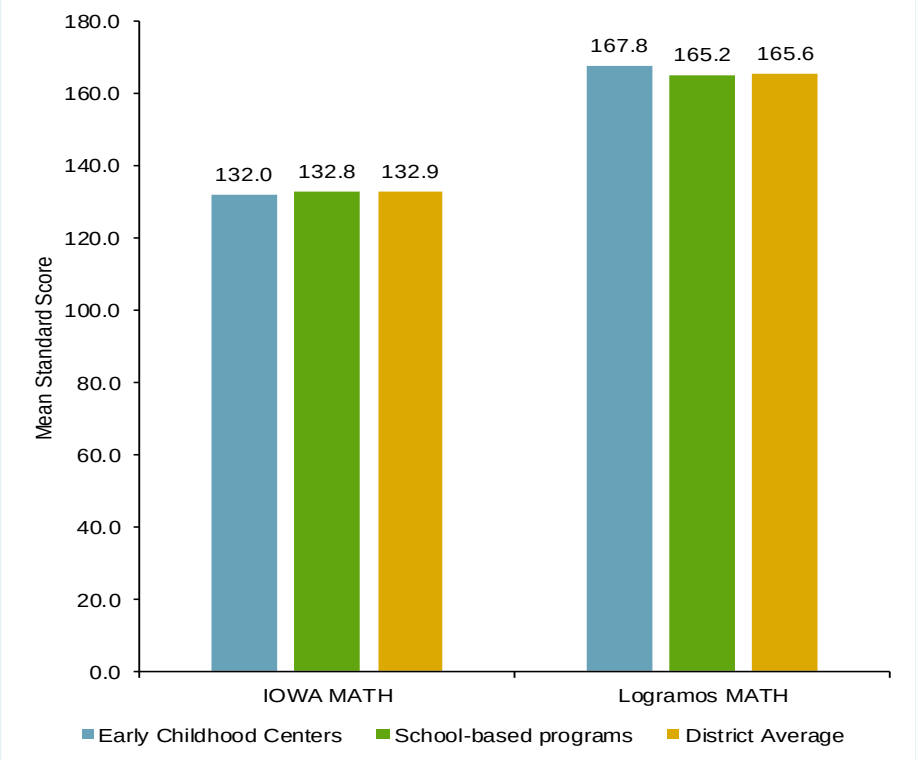
How did students who attended Early Childhood Centers perform on the 2014–2015 kindergarten IOWA and Logramos mathematics subtests compared with their grade-level peers who attended school-based prekindergarten programs?

- **Figure 2** shows that the performance of students who attended Early Childhood Centers (M = 132.0) obtained a comparable mean standard score as their peers who attended school-based programs (M = 132.8) as well as the district's mean standard score (M = 132.9) on the 2014–2015 kindergarten IOWA mathematics subtest.

- On the 2014–2015 kindergarten Logramos mathematics subtest, Early Childhood Center students (M = 167.8) performed better than their counterparts who attended school-based programs (M = 165.2) as well as higher than the district's mean standard score (M = 165.6) (Figure 2).

- **Appendix A-Table 4 and 5 (**p. 19 & 20**)** shows that the mean standard score differences on the 2014–2015 kindergarten IOWA mathematics subtests between Early Childhood Center and school-based program students were negligible with effect size -0.08. On the 2014–2015 kindergarten Logramos mathematics subtests, the mean standard score difference between the two groups was small with effect size 0.19.

Figure 2. Mean Standard Scores of Students on the 2014–2015 Kindergarten IOWA and Logramos Mathematics Subtests for Early Childhood Center Students and School-based Program Students



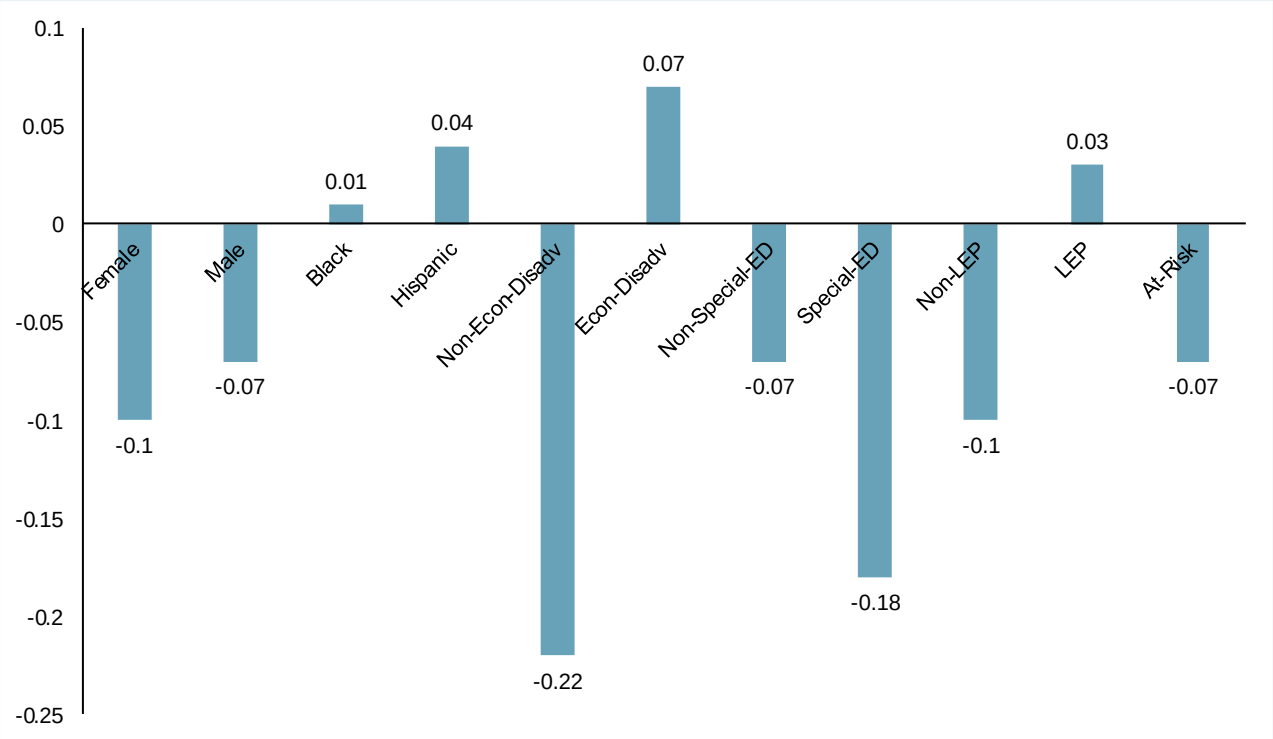
Did the effects of Early Childhood Centers and school-based prekindergarten programs in students' kindergarten ELA performance vary by student groups?

- Appendix A-Table 2 (p. 17) shows that the 2014–2015 kindergarten IOWA ELA mean standard scores of Early Childhood Center and school-based program students were similar within each student group, except non-economically-disadvantaged students and special education students.

- When compared with their peers in school-based programs, non-economically-disadvantaged students in Early Childhood Centers (M = 134.0) scored lower than their counterparts (M = 136.3), whereas, the special education students in Early Childhood Centers (M = 125.3) also scored lower than their counterparts (M = 126.9) on the 2014–2015 kindergarten IOWA ELA subtest (Appendix A-Table 2, p. 17). The corresponding effect sizes for the mean score difference between school-based students and Early Childhood Center for non-economically-disadvantaged and special education students were -0.22 and -0.18 respectively. The effect size indicated that the magnitude of the mean score difference was small (**Figure 3**).

- The effect sizes for other student groups were negligible (d < 0.15) when Early Childhood Center students were compared with students who attended school-based programs (Figure 3).

Figure 3. Effect Size of Early Childhood Center Students vs. School-based Program Students on the 2014–2015 Kindergarten IOWA ELA Subtest



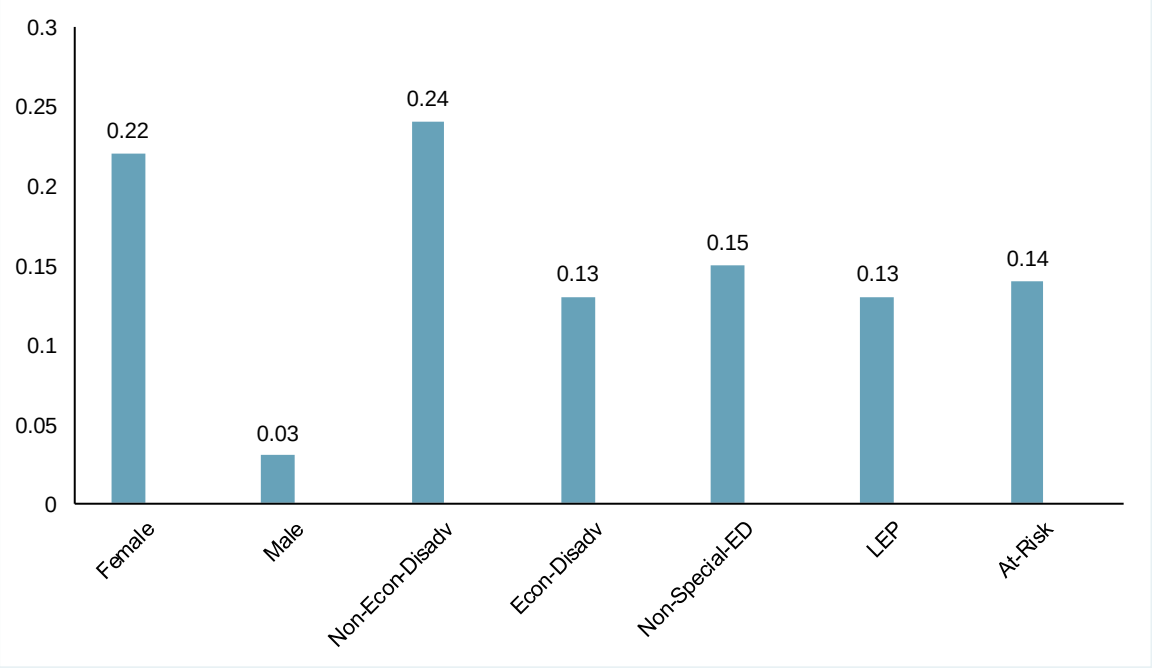
Note. Defined d = 0.15 as small-modest, d = 0.3 as modest-large, d = 0.5 as large. Positive numbers are to the advantage of the ECCs; negative numbers are to the advantage of the school-based programs.

- Appendix A-Table 3 (p. 18) shows that the 2014–2015 kindergarten Logramos ELA mean standard scores of Early Childhood Center and school-based program students were similar within each student group, except female, non-economically-disadvantaged, and non-special education students.

- When compared with their peers in school-based programs, the female students in Early Childhood Centers (M = 177.7) scored higher than their counterparts (M = 174.6), whereas, the non-economically-disadvantaged students in Early Childhood Centers (M = 175.7) also scored higher than their counterparts (M = 172.2) on the 2014–2015 kindergarten Logramos ELA subtest (Appendix A-Table 3, p. 18). The corresponding effect sizes for the mean score difference between school-based and Early Childhood Center for female and non-economically-disadvantaged students were 0.22 and 0.24, respectively. The effect size indicated that the magnitude of the mean score difference was between small and modest (**Figure 4**). When compared with their peers in school-based programs, the non-special education students in Early Childhood Centers (M = 175.7) scored higher than their counterparts (M = 173.5) with a small effect size 0.15 on the 2014–2015 kindergarten Logramos ELA subtest (Appendix A-Table 3, p. 18).

- The effect sizes for other student groups were negligible (d < 0.15) when Early Childhood Center students were compared with students who attended school-based programs (Figure 4).

Figure 4. Effect Size of Early Childhood Center Students vs. School-based Program Students on the 2014–2015 Kindergarten Logramos ELA Subtest



Note. Defined d = 0.15 as small-modest, d = 0.3 as modest-large, d = 0.5 as large. Positive numbers are to the advantage of the ECCs; negative numbers are to the advantage of the school-based programs.

Did the effects of Early Childhood Centers and school-based prekindergarten programs in students' kindergarten mathematics performance vary by student groups?

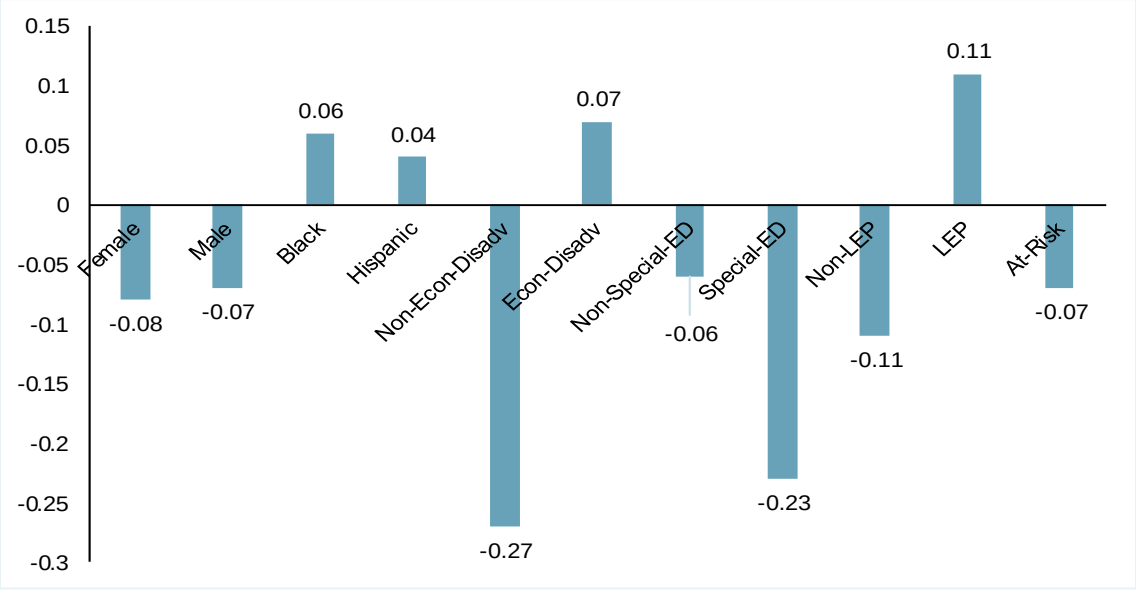
- In the student group analysis, Appendix A-Table 4 (p. 19) shows that the 2014–2015 kindergarten IOWA mathematics mean standard scores of Early Childhood Center and school-based program students were similar within each student group, except for non-economically-disadvantaged and special education students.

- When compared with their peers in school-based programs, non-economically-disadvantaged students in Early Childhood Centers (M = 133.7) scored lower than their counterparts (M = 136.5) on the 2014–2015 kindergarten IOWA mathematics subtest (Appendix A-Table 4, p. 19). The corresponding effect size for the mean score difference for the non-economically-disadvantaged students between school-based students and Early Childhood Center was -0.27, which indicated that the magnitude of the mean difference was between small to modest.

- When compared with their peers in school-based programs, special education students in Early Childhood Centers (M = 125.8) obtained lower mean standard scores than their peers in school-based programs (M = 127.9) on the 2014–2015 kindergarten IOWA mathematics subtest (Appendix A-Table 4, p. 19). The corresponding effect size for the mean score difference between school-based and Early Childhood Center special education students was -0.23. The effect size indicated that the magnitude of the mean difference was between small to modest.

- The effect sizes for other student groups were negligible (d < 0.15), which indicated that students of these student groups from these two class models performed similar on the 2014–2015 kindergarten IOWA mathematics subtest (**Figure 5**).

Figure 5. Effect Size of Early Childhood Center Students vs. School-based Program Students on the 2014–2015 Kindergarten IOWA Mathematics Subtest

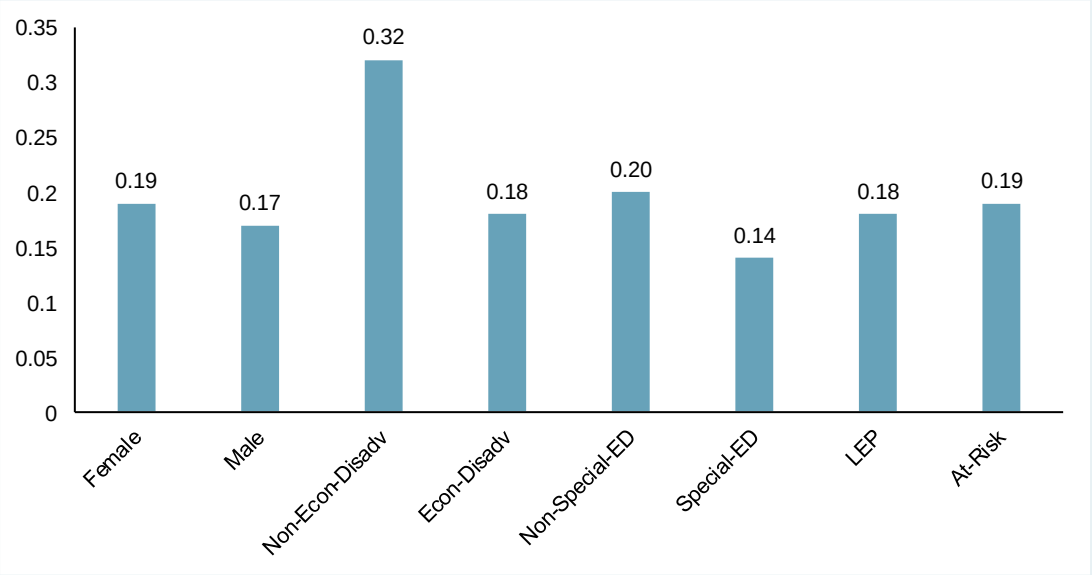


Note. Defined d = 0.15 as small-modest, d = 0.3 as modest-large, d = 0.5 as large. Positive numbers are to the advantage of the ECCs; negative numbers are to the advantage of the school-based programs.

- Appendix A-Table 5 (p. 20) shows that the 2014–2015 kindergarten Logramos mathematics mean standard scores of Early Childhood Center and school-based program students were different within each student group.

- **Figure 6** shows that the effect size within each student group ranges from small to modest when Early Childhood Center students were compared with their school-based program peers on the 2014–2015 Logramos mathematics subtests.

Figure 6. Effect Size of Early Childhood Center Students vs. School-based Program Students on the 2014–2015 Kindergarten Logramos Mathematics Subtest



Note. Defined d = 0.15 as small-modest, d = 0.3 as modest-large, d = 0.5 as large. Positive numbers are to the advantage of the ECCs; negative numbers are to the advantage of the school-based programs.

What were the demographic characteristics of the five Early Childhood Center students (Fonwood, Armandina Farias, Gabriela Mistral, Martin Luther King, Jr. (MLK), and Ninfa Laurenzo)?

- **Appendix B-Table 6** (p. 21) presents a breakdown of the demographic characteristics of students who were enrolled in each of the five ECCs in 2013–2014.

- Students attending three of the five ECCs were predominantly Hispanic. Hispanic student enrollment was 94.9% in Farias, 89.1% in Mistral, and 98.8% in Laurenzo. Hispanic student enrollment in MLK was 49.8%, with almost half of the students being African-American (48.2%). The Hispanic and African-American enrollment in Fonwood was 39.2% and 59.3%, respectively.

- MLK (82.6%) had the lowest percent of economically-disadvantaged students.

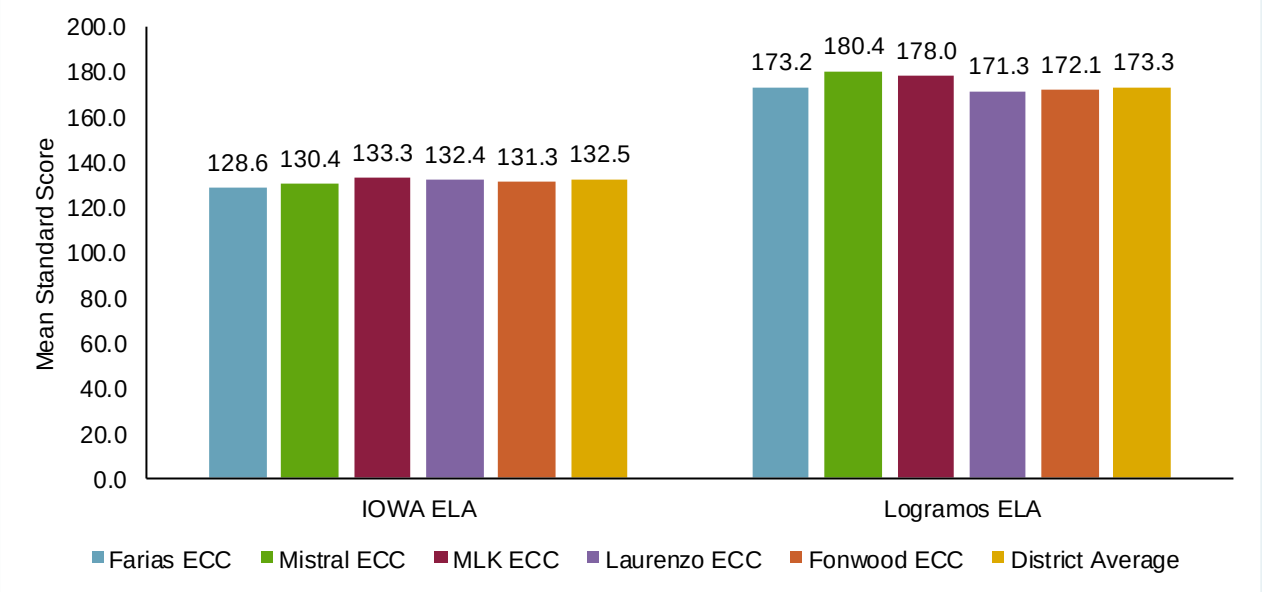
- Mistral (88.6%) had the highest percent of students who were limited English proficient (LEP). Over half of the students attending Farias (65.5%) and Laurenzo (59.4%) were LEP. MLK and Fonwood had the lower percentage of LEP students at 31.8% and 33.2%, respectively, compared to the other three ECCs.

- Over 95% of students attending these five ECCS were at-risk.

What were the 2014–2015 kindergarten performance differences among the five ECCs: Fonwood, Armandina Farias, Gabriela Mistral, Martin Luther King, Jr. (MLK), and Ninfa Laurenzo on the 2014–2015 IOWA and Logramos subtests?

IOWA and Logramos ELA subtests

Figure 7. Mean Standard Scores on the 2014–2015 Kindergarten IOWA and Logramos ELA Subtests by Early Childhood Center and School District

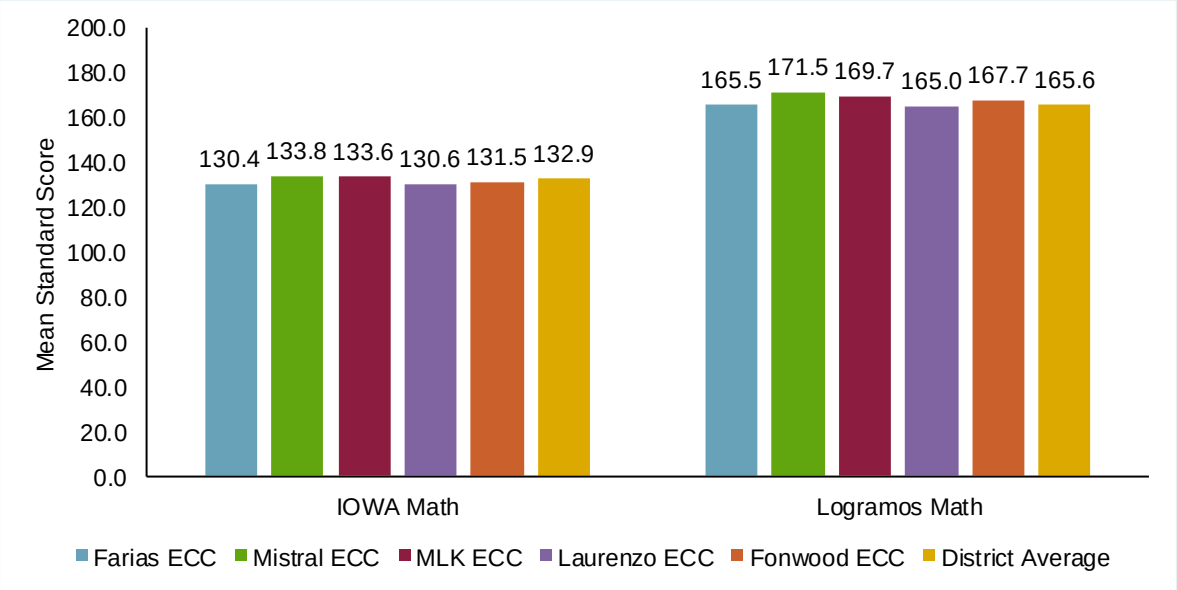


- IOWA and Logramos ELA mean standard scores for students who attended one of the five ECCs in 2013–2014 are displayed in **Figure 7**. **Appendix B-Table 7** and **8** (p. 22 & 23) present the number of students who took the IOWA and Logramos ELA subtests in 2014–2015, and the means and standard deviations of the standard scores by ethnicity, gender, economically-disadvantaged, special education placement, LEP, and at-risk status.
- Students who attended Laurenzo (M = 132.4) and Fonwood (M = 131.3) obtained comparable mean standard scores on the 2014–2015 kindergarten IOWA ELA subtest (Appendix B-Table 7, p. 22).

- Students who attended MLK (M = 133.3) had the highest mean standard score, while students who attended Farias (M = 128.6) had the lowest mean standard scores on the 2014–2015 kindergarten IOWA ELA subtest (Appendix B-Table 7, p. 22).
- Students who attended Farias (M = 173.2) and Fonwood (M = 172.1) obtained comparable mean standard scores on the 2014–2015 kindergarten Logramos ELA subtest (Appendix B-Table 8, p. 23).
- Students who attended Mistral (M = 180.4) had the highest mean standard score, while students who attended Laurenzo (M = 171.3) had the lowest mean standard score on the 2014–2015 kindergarten Logramos ELA subtest (Appendix B-Table 8, p. 23).
- The students who attended MLK obtained a higher mean standard score than the district's mean standard score, and students at other ECCs on the 2014–2015 kindergarten IOWA ELA subtest (Figure 7, p. 12).
- The students who attended Mistral and MLK ECC obtained a higher mean standard score than the district's mean standard score on the 2014–2015 kindergarten Logramos ELA subtest (Figure 7, p. 12).

IOWA and Logramos mathematics subtests

Figure 8. Mean Standard Scores on the 2014–2015 Kindergarten IOWA and Logramos Mathematics Subtests by Early Childhood Center and School District



- IOWA and Logramos mathematic mean standard scores for students who attended one of the five ECCs in 2013–2014 are displayed in **Figure 8**. **Appendix B-Table 9** and **10** (p. 24 & 25) present the number of students who took the IOWA and Logramos mathematics subtests in 2014–2015, and the means and standard deviations of the standard scores by ethnicity, gender, economically-disadvantaged, special education placement, LEP, and at-risk status.

- Students who attended Mistral (M = 133.8) and MLK (M = 133.6) obtained a slightly higher mean standard score than the district's mean standard scores on the 2014–2015 kindergarten IOWA mathematics subtest (Appendix B-Table 9, p. 24; Figure 8, p. 13).
- Students who attended Mistral (M = 171.5) obtained the highest mean standard score, while students who attended Laurenzo (M = 165.0) and Farias (M = 165.5) obtained lower mean standard scores on the 2014–2015 kindergarten Logramos mathematics subtest than the district average (Appendix B-Table 10, p. 25).
- Three ECCs (Mistral, MLK and Fonwood) obtained a higher mean standard score than the district's mean standard score on the 2014–2015 kindergarten Logramos mathematics subtest (Figure 8, p. 13).

Discussion

The focus of both Early Childhood Center and school-based programs is to develop academic readiness and to meet the developmental needs of preschool-aged children. Although Early Childhood Centers and school-based prekindergarten programs have different school settings, these two class models use the same curriculum. The results of this evaluation showed that the impact of these two prekindergarten class models on students' performance on the 2014–2015 kindergarten IOWA and Logramos ELA and mathematics subtests were similar. Even though students' performance on the Logramos mathematics and ELA were different overall, and within some student groups, the effect size indicated that the mean standard score differences were small.

There were several limitations in this evaluation. First, it is important to note that students' kindergarten test data were used to evaluate the impact of these two class models considering their prekindergarten experience. Although analyses were conducted to control for school differences in their kindergarten education experience, the Early Childhood Center and school-based program students were still nonequivalent groups due to the differences in other aspects of their prekindergarten education experience, such as teacher and classroom differences. Moreover, only student test data were available to assess the impact of these two class models on students' academic performance, and data on the nature and the quality of these two models were not considered in the analyses. Therefore, the results of this evaluation may not be generalized to overall effectiveness of Early Childhood Center and school-based programs. Finally, the results in this report should be interpreted with caution because it was the first time the district administrated IOWA and Logramos.

Many benefits of early childhood education are unmeasured through test scores. Over the past few decades, research has shown that children's social and behavioral skills are connected to their early academic success (Vitaro et al. 1999; Wentzel and Asher 1995). In the future, HISD should aim to include measures of success other than test scores. A broader definition of early scholastic success, such as social emotional learning measures, consistent with theories found in the literature and an inclusion of class models characteristics in future evaluations will allow for more extensive analyses of the impact of these two class models.

References

Borman, G.D., & D'Agostino, J.V. (1996). Title I and student achievement: A meta-analysis of federal evaluation results. *Educational Evaluation and Policy Analysis*, 18, 309–326.

Brooks-Gunn, J. (2003). Do you believe in magic? What we can expect from early childhood intervention programs? *SRCD Social Policy Report, 17*, 3-14.

Butin, D. & Woolums, J. (2009) Early Childhood Centers. National Clearinghouse for Educational Facilities. http://www.ncef.org/pubs/earlychild.pdf.

Center on the Developing Child at Harvard University (2010). The Foundations of Lifelong Health Are Built in Early Childhood. http://www.developingchild.harvard.edu.

Collaborative for Children (2012). Importance of Developing an Early Childhood Education "System" in the Houston Region. Powerpoint lecture presented at Houston Independent School District SPERS Conference, Houston, TX.

Gormley, W. T., Gayer, T., Phillips, D., & Dawson, B. (2005). The Effects of Universal Pre-K on Cognitive Development. *Developmental Psychology, 41*(6), 872-884.

Currie, J. (2001). Early childhood intervention programs: What do we know? *Journal of Economic Perspectives, 15*, 213-238.

Kulik, J.A., Kulik, C.C. and Bangert, R.L. (1984) 'Effects of practice on aptitude and achievement test scores.' American Education

Magnuson, K. A., Ruhm, C., & Waldfogel, J. (2007). Does prekindergarten improve school preparation and performance?. *Economics of Education Review, 26*(1), 33-51.

Vitaro, F., M. Brendgen, and R. Tremblay. (1999). Prevention of School Dropout Through the Reduction of Disruptive Behaviors and School Failure in Elementary School. *Journal of School Psychology, 37 (2),* 205-226.

Wentzel, K., and S. Asher. (1995). The Academic Lives of Neglected, Rejected, Popular, and Controversial Children. *Child Development, 66 (3*), 756-763.

Apendix A

Table 1. Demographic Characteristics of Early Childhood Center Students and School-based Program Students in 2014–2015

		Early Childhood Centers (n = 1,355)		School-based Program (n = 12,342)	
Demographic Characteristic		**n**	**%**	**n**	**%**
Gender	Female	709	52.3%	6,157	49.9%
	Male	646	47.7%	6,185	50.1%
Ethnicity	Asian	10	.7%	456	3.7%
	African-American	369	27.2%	2,603	21.1%
	Hispanic	956	70.6%	8,130	65.9%
	White	13	1.0%	991	8.0%
	Other	7	.5%	162	1.3%
Economically-Disadvantaged	No	143	10.6%	2,788	22.6%
	Yes	1,212	89.4%	9,554	77.4%
Special Education	No	1,288	95.1%	12,018	97.4%
	Yes	67	4.9%	324	2.6%
Limited English Proficient (LEP)	No	637	47.0%	6,582	53.3%
	Yes	718	53.0%	5,760	46.7%
At-Risk	No	27	2.0%	459	3.7%
	Yes	1,328	98.0%	11,883	96.3%

Note. 1. School-based program students were enrolled in the same elementary schools as the Early Childhood Center students in 2013–2014. 2. The demographic information used in this evaluation was based on student information at the time that the student enrolled in kindergarten.

Table 2. Performance of Early Childhood Center Students and School-based Program Students on the 2014–2015 Kindergarten IOWA ELA Subtests by Student Groups

		Early Childhood Center			School-based Program				
Student Group		**Mean**	**SD**	**n**	**Mean**	**SD**	**n**	**Mean Difference**	**Effect Size (d)**
Overall Sample		131.3	9.3	723	132.2	9.9	7,384	-0.9	-0.09
Gender	Female	131.9	8.8	369	132.9	9.7	3,658	-1.0	-0.10
	Male	130.7	9.7	354	131.4	10.1	3,726	-0.7	-0.07
Ethnicity	Asian	134.1	7.8	9	135.6	11.6	444	--	--
	African-American	132.3	9.3	352	132.2	9.5	2,437	0.1	0.01
	Hispanic	130.2	9.2	345	129.8	8.7	3,394	0.4	0.04
	White	132.5	9.5	11	137.8	10.7	953	--	--
	Other	134.2	6.8	6	138.6	10.7	156	--	--
Economically-disadvantaged	No	134.0	9.1	104	136.3	10.7	2,333	-2.3	-0.22
	Yes	130.9	9.2	619	130.3	8.9	5,051	0.6	0.07
Special Education	No	131.6	9.3	688	132.3	9.9	7,200	-0.7	-0.07
	Yes	125.3	6.6	35	126.9	9.1	184	-1.6	-0.18
Limited English Proficient (LEP)	No	131.9	9.4	603	132.9	9.9	6,206	-1.0	-0.10
	Yes	128.4	7.6	120	128.1	9.1	1,178	0.3	0.03
At-Risk	No	135.3	8.3	26	137.1	11.7	427	--	--
	Yes	131.2	9.3	697	131.9	9.7	6,957	-0.7	-0.07

Note. 1.) * Denotes fewer than 5 students; 2.) Effect size and mean difference were not reported when n < 30, and were denoted by "--".

Table 3. Performance of Early Childhood Center Students and School-based Program Students on the 2014–2015 Kindergarten Logramos ELA Subtests by Student Groups

		Early Childhood Center			School-based Program				
Student Group		**Mean**	**SD**	**n**	**Mean**	**SD**	**n**	**Mean Difference**	**Effect Size (d)**
Overall Sample		175.2	15.1	595	173.2	14.4	4,501	2.0	0.14
Gender	Female	177.7	14.6	322	174.6	14.3	2,298	3.1	0.22
	Male	172.2	15.2	273	171.7	14.4	2,203	0.4	0.03
Economically-disadvantaged	No	175.7	15.4	34	172.2	14.5	369	3.5	0.24
	Yes	175.1	15.1	561	173.3	14.4	4,132	1.9	0.13
Special Education	No	175.7	15.2	567	173.5	14.3	4,388	2.2	0.15
	Yes	165.4	10.7	28	162.5	13.3	113	--	--
Limited English Proficient (LEP)	No	179.3	7.9	6	170.4	13.0	95	--	--
	Yes	175.1	15.2	589	173.3	14.4	4,406	1.9	0.13
At-Risk	No	*	*	*	173.8	16.3	9	--	--
	Yes	175.2	15.1	595	173.2	14.4	4,492	2.0	0.14

Note. 1.) * Denotes fewer than 5 students; 2.) Effect size and mean difference were not reported when n < 30, and were denoted by "--".

Table 4. Performance of Early Childhood Center Students and School-based Program Students on the 2014–2015 Kindergarten IOWA Mathematics Subtests by Student Groups

		Early Childhood Center			School-based Program				
Student Group		**Mean**	**SD**	**n**	**Mean**	**SD**	**n**	**Mean Difference**	**Effect Size (d)**
Overall Sample		132.0	9.2	748	132.8	9.9	7,588	-0.8	-0.08
Gender	Female	132.3	8.7	381	133.1	9.8	3,744	-0.8	-0.08
	Male	131.8	9.7	367	132.5	10.0	3,844	-0.7	-0.07
Ethnicity	Asian	136.8	8.4	10	137.9	11.1	453	--	--
	African-American	132.2	9.3	364	131.6	9.3	2,545	0.6	0.06
	Hispanic	131.6	9.2	356	131.3	9.0	3,466	0.4	0.04
	White	132.4	6.3	12	137.9	10.8	965	--	--
	Other	136.5	6.7	6	138.5	10.6	159	--	--
Economically-disadvantaged	No	133.7	9.3	109	136.5	10.5	2,378	-2.8	-0.27
	Yes	131.7	9.1	639	131.1	9.1	5,210	0.7	0.07
Special Education	No	132.4	9.2	711	132.9	9.9	7,396	-0.6	-0.06
	Yes	125.8	6.8	37	127.9	9.7	192	-2.1	-0.23
Limited English Proficient (LEP)	No	132.1	9.4	627	133.2	9.9	6,381	-1.1	-0.11
	Yes	131.6	8.1	121	130.5	9.7	1,207	1.0	0.11
At-Risk	No	135.1	7.5	26	136.2	11.1	439	--	--
	Yes	131.9	9.2	722	132.6	9.8	7,149	-0.7	-0.07

Note. 1.) * Denotes fewer than 5 students; 2.) Effect size and mean difference were not reported when n < 30, and were denoted by "--".

Table 5. Performance of Early Childhood Center Students and School-based Program Students on the 2014–2015 Kindergarten Logramos Mathematics Subtests by Student Groups

		Early Childhood Center			School-based Program				
Student Group		**Mean**	**SD**	**n**	**Mean**	**SD**	**n**	**Mean Difference**	**Effect Size (d)**
Overall Sample		167.8	13.7	594	165.2	14.0	4,595	2.6	0.19
Gender	Female	168.8	13.8	324	166.1	13.6	2,342	2.6	0.19
	Male	166.7	13.5	270	164.3	14.2	2,253	2.4	0.17
Economically-disadvantaged	No	169.6	11.4	33	165.1	14.7	378	4.6	0.32
	Yes	167.7	13.8	561	165.2	13.9	4,217	2.5	0.18
Special Education	No	168.3	13.7	566	165.4	13.8	4,475	2.8	0.20
	Yes	159.0	11.0	28	156.8	16.7	120	2.2	0.14
Limited English Proficient (LEP)	No	169.5	10.9	6	163.3	12.9	98	--	--
	Yes	167.8	13.7	588	165.3	14.0	4,497	2.6	0.18
At-Risk	No	*	*	*	166.7	15.7	10	--	--
	Yes	167.8	13.7	594	165.2	14.0	4,585	2.6	0.19

Note. 1.) * Denotes fewer than 5 students; 2.) Effect size and mean difference were not reported when n < 30, and were denoted by "--".

Appendix B

Table 6. Demographic Characteristics of Four Early Childhood Center Students Enrolled in 2013–2014

		Farias ECC (n = 336)		Mistral ECC (n = 220)		MLK ECC (n = 305)		Laurenzo ECC (n = 160)		Fonwood ECC (n = 334)		Total (n = 1,355)	
Student Group		**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**N**	**%**
Gender	Female	167	49.7	115	52.3	159	52.1	88	55.0	180	53.9	709	52.3
	Male	169	50.3	105	47.7	146	47.9	72	45.0	154	46.1	646	47.7
Ethnicity	Asian	*	*	7	3.2	*	*	*	*	*	*	10	0.7
	African-American	13	3.9	9	4.1	147	48.2	*	*	198	59.3	369	27.2
	Hispanic	319	94.9	196	89.1	152	49.8	158	98.8	131	39.2	956	70.6
	White	*	*	7	3.2	*	*	*	*	*	*	13	1.0
	Other	*	*	*	*	*	*	*	*	*	*	7	0.5
Economically-Disadvantaged	No	30	8.9	22	10.0	53	17.4	14	8.8	24	7.2	143	10.6
	Yes	306	91.1	198	90.0	252	82.6	146	91.3	310	92.8	1212	89.4
Special Education	No	299	89.0	219	99.5	296	97.0	153	95.6	321	96.1	1,288	95.1
	Yes	37	11.0	*	*	9	3.0	7	4.4	13	3.9	67	4.9
Limited English Proficient (LEP)	No	116	34.5	25	11.4	208	68.2	65	40.6	223	66.8	637	47.0
	Yes	220	65.5	195	88.6	97	31.8	95	59.4	111	33.2	718	53.0
At-Risk	No	*	*	*	*	*	*	*	*	16	4.8	27	2.0
	Yes	333	99.1	217	98.6	301	98.7	159	99.4	318	95.2	1,328	98.0

Note. * Denotes fewer than 5 students.

Table 7. Performance of Early Childhood Center Students on the 2014–2015 Kindergarten IOWA ELA Subtest

		Farias ECC			Mistral ECC			MLK ECC			Laurenzo ECC			Fonwood ECC		
Student Group		**Mean**	**SD**	**n**	**Mean**	**SD**	**n**	**Mean**	**SD**	**n**	**Mean**	**SD**	**n**	**Mean**	**SD**	**n**
	Total	128.6	8.1	143	130.4	9.0	76	133.3	9.5	198	132.4	12.0	71	131.3	8.4	235
Gender	Female	129.8	8.1	59	131.6	9.5	46	133.0	8.8	96	133.6	12.1	40	131.6	7.6	128
	Male	127.8	8.1	84	128.5	8.0	30	133.5	10.1	102	130.8	12.0	31	130.9	9.4	107
Ethnicity	Asian	*	*	*	133.2	8.2	6	*	*	*	*	*	*	*	*	*
	African-American	124.4	7.6	11	132.9	12.6	9	133.4	9.7	139	*	*	*	131.9	8.7	192
	Hispanic	128.9	8.0	129	128.8	7.9	54	132.8	9.3	53	132.3	12.1	70	128.9	7.0	39
	White	*	*	*	136.7	10.2	6	*	*	*	*	*	*	*	*	*
	Other	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Economically-Disadvantaged	No	128.9	6.2	17	135.3	8.1	17	135.7	9.7	43	139.1	9.2	10	130.2	8.3	17
	Yes	128.6	8.3	126	129.0	8.8	59	132.6	9.3	155	131.3	12.1	61	131.4	8.5	218
Special Education	No	129.2	8.1	126	130.4	9.0	76	133.5	9.4	193	132.7	12.2	68	131.5	8.5	225
	Yes	124.5	7.0	17	*	*	*	123.6	6.2	5	*	*	*	127.6	7.0	10
Limited English Proficient (LEP)	No	128.6	8.1	143	130.4	9.0	76	133.3	9.5	198	132.4	12.0	71	131.3	8.4	235
	Yes	129.8	8.1	59	131.6	9.5	46	133.0	8.8	96	133.6	12.1	40	131.6	7.6	128
At-Risk	No	127.8	8.1	84	128.5	8.0	30	133.5	10.1	102	130.8	12.0	31	130.9	9.4	107
	Yes	*	*	*	133.2	8.2	6	*	*	*	*	*	*	*	*	*

Note. * Denotes fewer than 5 students.

Table 8. Performance of Early Childhood Center Students on the 2014–2015 Kindergarten Logramos ELA Subtest

		Farias ECC			Mistral ECC			MLK ECC			Laurenzo ECC			Fonwood ECC		
Student Group		**Mean**	**SD**	**n**	**Mean**	**SD**	**n**	**Mean**	**SD**	**n**	**Mean**	**SD**	**n**	**Mean**	**SD**	**n**
	Total	173.2	14.2	189	180.4	16.2	137	178.0	14.5	93	171.3	13.8	83	172.1	14.6	93
Gender	Female	175.6	12.9	105	183.7	16.6	66	180.4	12.7	55	174.4	14.6	45	174.5	15.0	51
	Male	170.2	15.3	84	177.4	15.4	71	174.5	16.4	38	167.7	12.1	38	169.1	13.7	42
Economically-Disadvantaged	No	175.6	13.0	13	188.0	14.9	5	175.1	17.0	8	*	*	*	164.6	17.8	5
	Yes	173.0	14.4	176	180.1	16.2	132	178.3	14.4	85	171.2	14.0	80	172.5	14.4	88
Special Education	No	174.1	14.3	169	180.5	16.3	136	178.4	14.4	91	171.5	13.8	80	172.3	14.7	91
	Yes	165.6	11.0	20	*	*	*	*	*	*	*	*	*	*	*	*
Limited English Proficient (LEP)	No	179.8	8.8	5	*	*	*	*	*	*	*	*	*	*	*	*
	Yes	173.0	14.3	184	180.4	16.2	137	178.0	14.6	92	171.3	13.8	83	172.1	14.6	93
At-Risk	No	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	Yes	173.2	14.2	189	180.4	16.2	137	178.0	14.5	93	171.3	13.8	83	172.1	14.6	93

Note. * Denotes fewer than 5 students.

Table 9. Performance of Early Childhood Center Students on the 2014–2015 Kindergarten IOWA Mathematics Subtest

		Farias ECC			Mistral ECC			MLK ECC			Laurenzo ECC			Fonwood ECC		
Student Group		**Mean**	**SD**	**n**	**Mean**	**SD**	**n**	**Mean**	**SD**	**n**	**Mean**	**SD**	**n**	**Mean**	**SD**	**n**
	Total	130.4	8.7	144	133.8	8.0	78	133.6	8.8	209	130.6	10.9	76	131.5	9.3	241
Gender	Female	130.5	9.4	60	134.0	7.5	46	133.0	8.8	96	130.5	9.9	43	132.1	8.7	129
	Male	130.3	8.2	84	133.5	8.8	32	133.5	10.1	102	130.8	12.3	33	130.8	9.9	112
Ethnicity	Asian	*	*	*	134.7	8.8	7	*	*	*	*	*	*	*	*	*
	African American	127.2	10.4	12	134.9	10.1	9	133.1	8.6	145	*	*	*	131.7	9.5	197
	Hispanic	130.5	8.5	129	133.3	7.9	54	134.6	9.5	58	130.5	11.0	75	130.7	8.3	40
	White	*	*	*	134.3	6.5	7	*	*	*	*	*	*	*	*	*
	Other	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Economically-Disadvantaged	No	131.1	8.7	17	137.7	8.5	17	134.7	9.3	45	133.9	8.7	11	130.1	9.8	19
	Yes	130.3	8.7	127	132.7	7.6	61	133.3	8.7	164	130.0	11.2	65	131.7	9.2	222
Special Education	No	131.0	8.5	127	133.8	8.0	78	133.8	8.9	203	130.8	11.1	73	131.8	9.3	230
	Yes	125.5	8.7	17	*	*	*	126.2	4.7	6	*	*	*	125.9	5.4	11
Limited English Proficient (LEP)	No	131.1	8.8	110	134.0	7.6	25	133.6	8.9	205	130.8	11.7	64	131.4	9.4	223
	Yes	128.2	8.0	34	133.7	8.2	53	*	*	*	129.8	5.8	12	132.6	8.1	18
At-Risk	No	*	*	*	*	*	*	*	*	*	*	*	*	134.0	6.1	16
	Yes	130.3	8.8	141	133.4	7.8	75	133.7	8.9	206	130.3	10.7	75	131.4	9.4	225

Note. * Denotes fewer than 5 students.

Table 10. Performance of Early Childhood Center Students on the 2014–2015 Kindergarten Logramos Mathematics Subtest

		Farias ECC			Mistral ECC			MLK ECC			Laurenzo ECC			Fonwood ECC		
Student Group		**Mean**	**SD**	**n**	**Mean**	**SD**	**n**	**Mean**	**SD**	**n**	**Mean**	**SD**	**n**	**Mean**	**SD**	**n**
	Total	165.5	11.7	191	171.5	14.6	139	169.7	12.7	91	165.0	13.4	80	167.7	15.9	93
Gender	Female	166.9	12.1	107	171.7	14.1	68	170.6	11.8	55	166.8	15.5	43	168.3	16.9	51
	Male	163.8	11.1	84	171.4	15.2	71	168.3	14.0	36	162.8	10.2	37	166.8	14.7	42
Economically-Disadvantaged	No	173.0	9.9	13	170.0	8.8	5	173.9	15.0	7	*	*	*	157.4	7.5	5
	Yes	165.0	11.7	178	171.6	14.8	134	169.3	12.5	84	165.0	13.6	77	168.2	16.0	88
Special Education	No	166.4	11.6	171	171.6	14.6	138	169.8	12.8	89	165.4	13.1	77	167.7	16.0	91
	Yes	158.5	10.4	20	*	*	*	*	*	*	*	*	*	*	*	*
Limited English Proficient (LEP)	No	172.2	9.7	5	*	*	*	*	*	*	*	*	*	167.7	15.9	93
	Yes	165.4	11.7	186	171.5	14.6	139	169.8	12.7	90	165.0	13.4	80	167.7	15.9	93
At-Risk	No	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	Yes	165.5	11.7	191	171.5	14.6	139	169.7	12.7	91	165.0	13.4	80	167.7	15.9	93

Note. * Denotes fewer than 5 students.