Westat®

Improving Lives Through Research®

An Exploration of Pre-K 4 SA Education Centers Post Pandemic

Authors:
Emily Diaz, Ph.D.
Lauren Decker-Woodrow, Ph.D.
Eishi Adachi, Ph.D.

Report Submitted to:

Early Childhood Education Municipal Development Corporation

Prepared by:

Westat
An Employee-Owned Research Corporation®
1600 Research Boulevard
Rockville, Maryland 20850-3129
(301) 251-1500

This publication was prepared by Westat under a Professional Services Agreement for the Program Assessment for Pre K 4 SA program with the San Antonio Early Childhood Education Municipal Development Corporation, a Texas Municipal Development (City of San Antonio). The content of the publication does not necessarily reflect the views or policies of the San Antonio Early Childhood Education Municipal Development Corporation, nor does mention of trade names, commercial products, or organizations imply endorsement by the City of San Antonio.

All photos are for illustrative purposes only. Any person depicted in the photos is a model.

Table of Contents

Chapter

Appendixes

Table of Contents

List of Tables

List of Figures

Executive Summary

Pre-K 4 SA served more than 1,500 children during its ninth year of implementation. The Year 9 evaluation of Pre-K 4 SA sought to address research questions regarding attendance, classroom quality, and kindergarten readiness during the pre-K year.

Pre-K 4 SA served slightly more girls (52.3%) than boys (47.7%) during Year 9. Most Pre-K 4 SA children were Hispanic (68.0%), with the remaining children reported as Black (9.8%), Asian (9.0%), White (8.6%), and other ethnicities (4.6%). Approximately 72 (72.3%) percent of children attended Pre-K 4 SA free of charge, 15.8 percent did so on scholarship, and 11.9 percent were tuition-paying children. Of those children who attended Pre-K 4 SA without charge, 74.7 percent did so based on income eligibility.

The average attendance rate for Pre-K 4 SA children was 82.6 percent, which increased slightly to 85.3 percent when children who withdrew were excluded. This is lower than in previous years and is not surprising as similar trends have been evidenced across the nation post-pandemic.

The Early Childhood Education Municipal Development Corporation contracted with Westat, a large, employee-owned global research firm, to conduct an independent evaluation of the Pre-K 4 SA program. This report is the first in a series of reports documenting results of the Pre-K 4 SA initiative during the 2021-22 school year.

Westat conducted classroom observations using the Classroom Assessment Scoring System (CLASS) to assess the quality of teacher-child interactions in Pre-K 4 SA classrooms. Overall, teachers were observed to display high levels of Emotional Support and Classroom Organization. Instructional Support was, on average, at the low end of the midrange. There were no significant between-center differences indicating classroom experiences of similar quality were offered across Pre-K 4 SA centers.

Kindergarten readiness outcomes for Pre-K 4 SA children (measured using Teaching Strategies' GOLD assessment) were compared from fall to spring for six outcomes: Cognitive, Literacy, Mathematics, Oral Language, Physical, and Social-Emotional. The results showed significant growth for Pre-K 4 SA children on all six outcomes. Significant differences in outcomes were seen based on center attended, child characteristics, Pre-K 4 SA attendance, and initial entry.

Early literacy and numeracy results suggested most children were not performing at their age level of understanding at the end of the year. This aligns with trends across the nation indicating children have experienced unfinished learning and accelerated learning is needed in order for children to perform at their age level beyond the pandemic.

Taken together, results from the Year 9 evaluation suggest children are benefiting from participation in Pre-K 4 SA. Specifically, the Year 9 evaluation results indicate Pre-K 4 SA is providing high-quality instructional environments for more than 1,500 predominantly low-income children from across San Antonio.

Limitations of the evaluation include the lack of a control group for comparison to a more similar group of children, data from a direct child assessment for a single timepoint (no information on where children were at the beginning of the year for some outcomes), as well as reliance on teacher-reported measures of child outcomes in some instances.

Introduction

Improving children's kindergarten readiness and narrowing achievement gaps by providing high-quality early education has and will continue to receive considerable attention throughout the United States (Barnett, 2011; Campbell, Ramey, Pungello, Sparling, & Miller-Johnson, 2002; Heckman, Moon, Pinto, Savelyev, & Yavitz, 2010; Hill, Gormley, & Adelstein, 2015; Reynolds, Temple, White, Ou, & Robertson, 2011; Rolnick & Grunewald, 2003).

To understand how the pandemic has influenced early childhood education, the National Institute for Early Education Research (NIEER) conducted a nationwide survey. They found children ages three to five years old experienced instruction losses and decreased in their social-emotional development and well-being (NIEER, 2021). Some of the reasons noted for these losses include children not attending preschool, attending remotely, or in a hybrid fashion, parent at-home support such as book reading having declined, and preschool programs struggling to provide meals to eligible children. Other evidence of national long-term reading and mathematics trend scores in the National Assessment of Education Progress indicate the pandemic has interrupted student learning in later grades as well and suggests the need for accelerated learning (Socol, 2022). Therefore, given these challenges it is imperative to understand how early childhood initiatives are supporting children, as the nation began to move beyond the pandemic in the 2021-22 school year.

The Early Childhood Education Municipal Development Corporation contracted with Westat, a large, employee-owned global research firm, to conduct an independent evaluation of the Pre-K 4 SA program. Over the previous 8 years, the evaluation has consistently explored who participates in Pre-K 4 SA, attendance in the program, teacher-child instructional quality, and kindergarten readiness outcomes. The purpose of the current report is to present Year 9 evaluation findings for the program. Investigations included (1) information on child attendance and classroom quality and (2) outcome analysis results from the Teaching Strategies GOLD assessment, which is the primary outcome of interest at the end of the pre-K year and (3) information of children's early literacy and numeracy. This report is the first in a series of reports documenting results of the Pre-K 4 SA initiative during the 2021-22 school year.

Research Questions

The Year 9 (2021-22) evaluation of Pre-K 4 SA addressed the following four main research questions:

1. What were the reported levels of child attendance during the pre-K year?
   - **A.** In what ways have attendance rates changed since the COVID-19 pandemic?
2. What was the observed teacher-child interaction quality in a random sample of Pre-K 4 SA classrooms in Year 9?
3. Do Pre-K 4 SA children demonstrate significant growth on GOLD outcomes over the pre-K year?
   - **A.** Do gains in GOLD outcomes vary significantly by center, amount/level of teacher-child interaction quality, child demographics, or attendance?
4. What proportion of Pre-K 4 SA children from a random sample performed at or above their age level in early literacy and early numeracy at the end of the school year?

Evaluation Sample and Methods

In this section, demographic characteristics for the sample are provided for children served during the 2021-22 school year as well as a brief discussion of the methods used.

Pre-K 4 SA Year 9 Sample

Data were provided for 1,585 children in Year 9. Pre-K 4 SA served slightly more girls (52.3%) than boys (47.7%). Of those more than 1,500 children, the majority represented three districts: Northside Independent School District (ISD), North East ISD, and San Antonio ISD.[1] In addition, 11.9 percent of children paid tuition and 19.8 percent received scholarships (both types of eligibility criteria). All other children attended at no cost because they were affiliated with a partner district.

The average age of attending children on the first day of school (August 16, 2021) was 4.45 years.[2] The majority of Pre-K 4 SA children were Hispanic (68.0%), with the remaining children reported as Black (9.8%), Asian (9.0%), White (8.6%), and other ethnicities (4.6%). Out of all children enrolled (tuition, scholarship, and free attending),

Table 1 | Children who attended Pre-K 4 SA, by district

District name	Number of children	Percentage of total children
Northside	509	32.1
North East	212	13.4
San Antonio	170	10.7
Edgewood	81	5.1
East Central	35	2.2
Harlandale	33	2.1
Southwest	30	1.9
South San	12	0.8
Scholarship[a]	**314**	**19.8**
Tuition	**189**	**11.9**
Total	**1,585**	**100.0**

[a] An additional 64 of the 314 scholarship children also met the income eligibility criteria (noted as economic disadvantage).

Note: Children counted by district attend the program at no cost.

[1] These same three districts were also the majority representation in Years 1–8 (2013–14 to 2020-21).

[2] This average includes all children in the sample regardless of start date.

59.8 percent were considered economically disadvantaged. Of the children who attended free of charge, this number rose to 74.7 percent. It is important to note an additional 20.4 percent (n=64) of the 314 scholarship children also met income eligibility criteria (noted as economic disadvantage); however, they were not in an attendance zone of a partner school district. Table 2 includes the percentage of children, by eligibility, who attended Pre-K 4 SA at no cost.

Methods

All four research questions were addressed by analyzing existing Pre-K 4 SA databases, as well as results from classroom observations and direct child assessments. To address the descriptive question about attendance, data collected by Pre-K 4 SA were submitted to Westat and descriptively analyzed. To address the descriptive and inferential questions pertaining to classroom quality, Westat and its partners collected and analyzed data from the Classroom Assessment Scoring System (CLASS) for a random subset of Pre-K 4 SA classrooms (Pianta, La Paro, & Hamre, 2008). CLASS is an observational system that assesses classroom practices in preschool by measuring the interactions between children and adults. Observations in the Year 9 evaluation consisted of five 20-minute cycles[3], followed by 10-minute coding periods.

The third research question was addressed through inferential tests of differences, which were conducted on the Pre-K 4 SA administered Teaching Strategies GOLD assessment outcomes. GOLD is a teacher-reported measure that collects information on children's progress on 36 objectives, three times throughout the year, across six main categories: Cognitive, Literacy, Oral Language, Mathematics, Physical, and Social-Emotional. In addition, inferential tests were conducted by center, child demographics, and child's attendance in Pre-K 4 SA, to determine if these factors were related to greater gains in GOLD outcomes for children.

The fourth research question was addressed through a descriptive analysis of a random sample of Pre-K 4 SA children in the spring, on the Woodcock Johnson assessment. Two direct assessments, early literacy (*Letter-Word*) and numeracy (*Applied Problems*), were administered to a random sample of children. These two assessments are subtests from the Woodcock-Johnson Test of Achievement-IV (Schrank, Mather, & McGrew, 2014) and matching subtests from the Batería III, Spanish assessment (Muñoz-Sandoval, Woodcock, McGrew, & Mather, 2005; see Appendix A for more detailed information). They were chosen because they are widely used in early childhood and complement the GOLD findings by providing additional insights from a different perspective: that of a trained assessor as compared to a teacher report (Bloom & Weiland, 2014; McCormick, 2022; Puma et al. 2010; Weiland, 2016). The GOLD findings provide an overall perspective and measure multiple aspects of early

Table 2 | Children who attended Pre-K 4 SA free of charge, by eligibility criteria

Eligibility criteria	Number of children	Percentage of total eligible children
Economic disadvantage	856	74.7
English language learner	244	21.3
Foster care/conservatorship	13	1.1
Homeless	0	0.0
Military	125	10.9

Note: Children could qualify in more than one category. The percentage of children who attended Pre-K 4 SA free of charge was 72 percent (n=1,146). This includes both those who attended a partner district and the 64 scholarship children with eligibility criteria. Therefore, children were removed from eligibility criteria counts in this table if they were identified as scholarship (not meeting the eligibility criteria) or tuition children.

[3]There was one observation in which one cycle was invalid. For this classroom, results are based on four 20-minute cycles.

literacy (e.g., phonological awareness, phonics, and word recognition) and numeracy (e.g., number concepts and operations, spatial relationships and shapes, and knowledge of patterns). *Letter-Word* findings are more nuanced and measure symbolic learning and identification of isolated letters and words while *Applied Problems* measures a child's ability to apply simple number concepts and solve math problems. Based on a nationally representative normative sample, *Letter-Word* and *Applied Problems* raw scores were converted into age equivalents[4] to determine what proportion of Pre-K 4 SA children were performing at or above their age level in early literacy and early numeracy. See Appendix A for more detailed information on the evaluation methodology, including detailed information pertaining to measures used.

Evaluation Results

Child Attendance in Pre-K 4 SA

Children began attending Pre-K 4 SA at different times. Most children (77.7%) began at the start of the academic year (August 16, 2021). The last date a child began attending Pre-K 4 SA was May 11, 2022.[5] Because of these varied dates, some children had the opportunity to attend more days than other children. In fact, the range of possible membership days was 1–175, with an average of 153 days. Average percentage attendance across all children was 82.6 percent. When considering children who attended Pre-K 4 SA through the year (i.e., who did not withdraw), the average number of membership days rose to 168 and the attendance percentage increased to 85.3 percent.

Over the course of the year, 253 children (16.0%) withdrew from Pre-K 4 SA. The earliest withdrawal occurred on August 17, 2021, and the latest on May 23, 2022. Nearly half (47.8%; n=121) of the withdrawals occurred before the end of December. We found no significant differences between children who did and did not withdraw in terms of gender (t (1, 1,547.37) = 1.28, p = .20) or children identified as economically disadvantaged (t (1, 358.31) = -1.23, p = .22)[6]. There was a significant difference with respect to eligibility to attend PreK 4 SA free of charge, on scholarship, or by paying tuition (F (2, 405.41) = 4.12, p = .02).[7] Children identified as attending based on paying tuition were less likely to withdraw from Pre-K 4 SA than children attending on scholarship. At the same time, children attending free of charge were more likely to withdraw from Pre-K 4 SA than children attending based on scholarship. We found a final difference with respect to race/ethnicity (F (4, 1,580) = 3.19, p = .001). Asian and Black children were significantly more likely to withdraw compared to other races/ethnicities. At the same time, Hispanic children were significantly less likely to withdraw compared to other races/ethnicities.

Attendance Rates Over Time

Prior to the pandemic, attendance rates had remained relatively stable and consistently remained between 91–94 percent. Table 3 displays attendance for all children who attended the

Table 3 | Pre-K 4 SA attendance over time

	Pre-Pandemic						Pandemic		
Enrollment status	**Year 1 2013-14**	**Year 2 2014-15**	**Year 3 2015-16**	**Year 4 2016-17**	**Year 5 2017-18**	**Year 6 2018-19**	**Year 7[a] 2019-20**	**Year 8 2020-21**	**Year 9 2021-22**
All enrolled children	92.3%	91.3%	92.5%	92.4%	91.0%	91.5%	91.0%	88.2%	82.6%
Children who did not withdraw	93.7%	92.5%	93.6%	93.6%	92.4%	92.6%	92.2%	90.4%	85.3%

[a] Attendance rates are based on data collected prior to the education centers closing in March 2020.

[4] The raw scores were converted into age equivalent values based on norms provided in the technical manual (McGrew, LaForte, & Schrank, 2014).

[5] Although some children did not begin attendance at Pre-K 4 SA until late spring, more than 96 percent of all children were in attendance by the end of the 2021 calendar year.

[6] Results from Levene's test of homogeneity of variances showed equal variances could not be assumed; therefore, separate variance t-tests were conducted.

[7] Results from Levene's test of homogeneity of variances showed equal variances could not be assumed; therefore, a Welch's analysis of variance (ANOVA) was conducted.

program as well as attendance for the subgroup of children who did not withdraw from the program. It is not surprising that attendance dropped below this range in recent years given the COVID-19 pandemic. Similar trends have been found based on the *National Survey of Public Education's Response to COVID-19*, which revealed elementary average attendance declined by 3 percent during the 2020-21 school year (Carminucci, Hodgman, Rickles, & Garet, 2021). Furthermore, recent evidence suggests rates of chronic absenteeism across the nation[8] have increased compared to typical school years prior to the pandemic (National Center for Education Statistics, 2022). Given the variability of data, there is no single result to quantify the increase; however, the highest results would suggest rates may have doubled or tripled as a result of the pandemic (Blad, 2022; Fortin, 2022). Therefore, the decreased attendance in the 2021-22 school year is not surprising given trends evidenced across the nation.

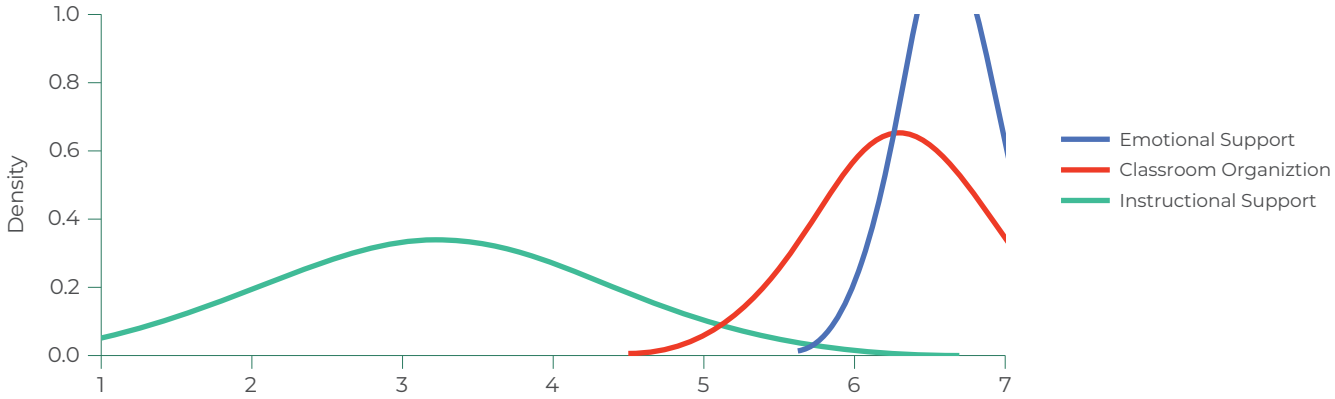
Pre-K 4 SA Teacher-Child Interaction Quality

A stratified random sample of Pre-K 4 SA classrooms (n=31)[9] were selected and observed using the Classroom Assessment Scoring System (CLASS; Pianta, La Paro, & Hamre, 2008) during Year 9. The classrooms were distributed across the four Pre-K 4 SA centers and language of instruction (i.e., English, English as a second language, and bilingual). The number of classrooms per center was either seven (West) or eight (East, North, and South).

Scores for the Emotional Support domain ranged from 5.90 to 7.00 (on a 1–7 scale), with most scores in the high range of Emotional Support (average score of 6.66), suggesting observed teacher-child interactions, in this domain, were most often rated as high-quality. Similarly, with an overall score in the high range, Classroom Organization domain scores ranged from 5.00 to 7.00, which suggests classrooms showed effective interactions regarding Classroom Organization (average score of 6.36). Finally, Instructional Support domain scores ranged from 1.13 to 5.53, with an average score at the low end of the middle range (3.24), which suggests in some observed interactions teachers provided support that extended children's thinking or asked questions that encouraged children to analyze and reason. Each of the Year 9 CLASS domain scores is represented visually in Figure 1.

Looking further into the average Emotional Support domain scores, approximately 6 percent of classrooms (n=2) were observed in the middle range, while 94 percent of classrooms observed provided high levels of Emotional Support (n=29). Twenty-six percent of classrooms (n=8) were observed providing middle-range Classroom Organization quality, while the remaining 74 percent (n=23) provided high levels of Classroom Organization. Finally, 45 percent of the classrooms (n=14) were observed providing low levels of Instructional Support, while 55 percent (n=17) provided mid-range levels of Instructional Support.

Figure 1 | Average classroom quality scores for Pre-K 4 SA Year 9



[8] Definitions of chronic absenteeism vary. One common definition is students who miss at least 10% of school days regardless of whether the absences are excusable (Blad, 2022).

[9] One classroom (3.1%) was found to have invalid data and was removed from analyses.

Table 4 | Average Year 9 Pre-K 4 SA CLASS scores

CLASS outcome	Average	Total range observed	Standard deviation
Emotional Support domain	6.66	5.90–7.00	0.34
Positive climate	6.82	6.20–7.00	0.27
Negative climate[a]	6.97	6.60–7.00	0.10
Teacher sensitivity	6.44	5.00–7.00	0.66
Regard for student perspectives	6.42	5.60–7.00	0.46
Classroom Organization domain	6.36	5.00–7.00	0.61
Behavior management	6.50	4.80–7.00	0.58
Productivity	6.58	5.00–7.00	0.64
Instructional learning formats	6.00	4.40–7.00	0.82
Instructional Support domain	3.24	1.13–5.53	1.17
Concept development	2.89	1.20–5.20	0.93
Quality of feedback	3.31	1.00–6.00	1.49
Language modeling	3.51	1.20–5.60	1.21

[a] Negative Climate is initially scored with lower values representing no or low negative climate. These scores are then reverse-coded to reflect the same direction (higher values are positive) as the other dimensions.

Table 4 provides average scores by each of the 10 dimensions and 3 domains.

Past research using the CLASS has often noted the low scores commonly seen in the Instructional Support domain (Early Childhood Learning & Knowledge Center, 2020; La Paro, Pianta, & Shuhlman, 2004; Locasale-Crouch et al., 2007; Mashburn et al., 2008). To place Pre-K 4 SA CLASS scores in context, the Office of Head Start found in their 2019-20 annual review[10], average scores across the United States and the top 10 percent of Head Start grantees to be lower than those found in the current study with one exception (Early Childhood Learning & Knowledge Center, 2020). The Instructional Support domain for Pre-K 4 SA was slightly lower (0.28 points) than the top 10 percent of Head Start grantees. In Figure 2, Pre-K 4 SA scores are visually depicted with the national Head Start and top 10 percent of Head Start average scores, as well as the research thresholds.

Interaction Quality by Center

The three CLASS domains were analyzed to determine if there were significant differences in classroom teacher-child interactions across Pre-K 4 SA centers. No significant differences were found by center, which indicates classroom experiences of similar quality were offered across Pre-K 4 SA centers.

Kindergarten Readiness – GOLD Results

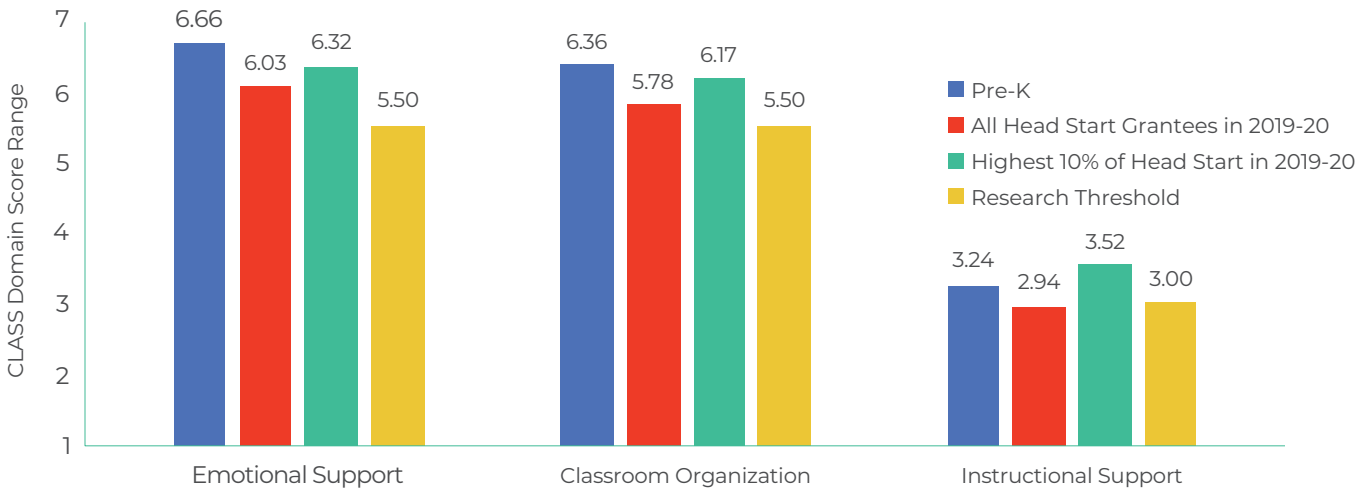
Teaching Strategies GOLD

Pre-K 4 SA used the GOLD assessment to collect information on children at three time points throughout the academic year: fall, winter, and spring. Children (76.1%; n = 1,207) were included in analyses if they had outcome data for all three time points[11] in at least one of the following six outcomes: Cognitive, Literacy, Mathematics, Oral Language, Physical, and Social-Emotional. No significant differences were found between children included and not included in analyses for gender ($X^2(1) = 0.308$, $p = .579$), free lunch status ($X^2(1) = 1.421$, $p = .233$), and tuition status ($X^2(2) = 1.234$, $p = .540$); however, differences were found for race and ethnicity ($X^2(6) = 15.881$, $p = .014$).

[10] This is the most recent year of publicly available data for comparison; most likely due to the pandemic.

[11] Out of 378 children not able to be included in GOLD analyses, 60 (15.9%) appeared to have invalid data for at least one time point. In Mathematics, one child was excluded, in Physical two children were excluded, in Literacy 19 children were excluded, and in Oral Language 57 children were excluded. No children were excluded for Cognitive or Social-Emotional.

Figure 2 | Pre-K 4 SA and Head Start average classroom quality scores



Note: This visual representation is for descriptive purposes only; no statistical tests have been conducted to compare Pre-K 4 SA and Head Start classrooms for this evaluation.

Source: Early Childhood Learning & Knowledge Center (2020). *A national overview of grantee CLASS scores in 2020*. Available at: https://eclkc.ohs.acf.hhs.gov/data-ongoing-monitoring/article/national-overview-grantee-class-scores-2020

More specifically, children able to be included in at least one outcome analysis were more likely to be Hispanic ($Z = 3.549$, $p = 0.000$) and less likely to be Black ($Z = 3.125$, $p = 0.002$).

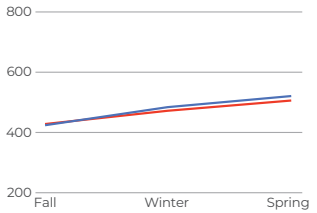
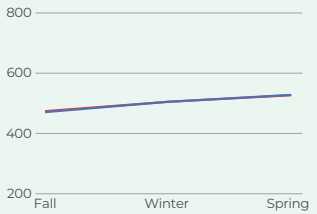
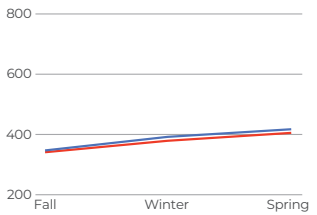
As data were not collected on a comparison or control group, comparisons were conducted using the nationally representative normed data[12] for the GOLD assessment (Lambert, 2020). When starting Pre-K 4 SA, children began the fall significantly below the normed sample on four of the six GOLD outcomes (Cognitive, Oral Language, Physical, and Social-Emotional). By spring, the Pre-K 4 SA children scored statistically significantly ($p<.001$) higher than the normed sample on these same four outcomes. Effect sizes (Hedges' g) for the significant results were all small (0.09 for Oral Language and Social-Emotional, 0.14 for Physical, and 0.25 for Cognitive). Over the course of the pre-K year, Pre-K 4 SA children gained an additional 15.69 scale score points (20.0% more) in Cognitive, 6.89 scale score points (8.2% more) in Oral Language, 8.82 scale score points (10.9% more) in Physical, and 5.45 scale score points (7.7% more) in Social-Emotional.

Across all three timepoints, Pre-K 4 SA children were on par[13] with the normed sample on Literacy and significantly higher than the normed sample in Mathematics. Furthermore, over the course of the pre-K year, Pre-K 4 SA children gained an additional 11.69 scale score points (18.3% more) in Mathematics than the normative group of children. Over the course of our series of evaluations, the Pre-K 4 SA sample has appeared to increase in initial Mathematics scores compared to the normative sample. More information is needed to understand what mechanisms might be behind this apparent continuing increase in Mathematics readiness prior to the pre-k year. See Table 5 for more information.

[12] Pre-K 4 SA children were compared to the updated normed sample based on age bands (Lambert, 2020).

[13] While Pre-K 4 SA children were technically lower in their score than the normed sample, this difference was not statistically significant.

Table 5 | Pre-K 4 SA and normed sample comparison results for six GOLD outcomes across time

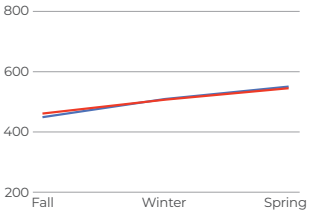
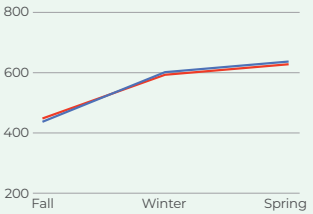
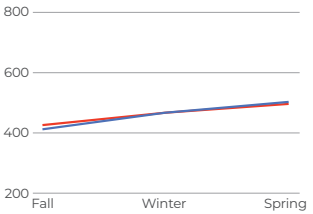
Outcome	Time point	Pre-K 4 SA mean	Normed mean	Gap (Pre-K – normed)	*t*-test statistic	*df*	Initial value	Adjusted significance	Group favored[a]	Graphic depiction of finding (Blue line = Pre-K 4 SA; Red line = normed sample)
Cognitive	Fall	424.01	427.94	−3.93	−2.647	2,742.26	0.008	Significant	Normed	
	Winter	483.54	472.29	11.25	7.468	2,348.87	0.000	Significant	Pre-K 4 SA	
	Spring	522.15	506.46	15.69	9.516	2,404.25	0.000	Significant	Pre-K 4 SA	
Literacy	Fall	472.20	474.47	−2.27	−1.785	2,425.92	0.075	Non-Significant	No difference	
	Winter	504.79	506.52	−1.73	−1.435	1,864.87	0.152	Non-Significant	No difference	
	Spring	528.85	527.01	1.84	1.580	2,143.50	0.114	Non-Significant	No difference	
Mathematics	Fall	347.36	341.41	5.95	4.595	2,589.88	0.000	Significant	Pre-K 4 SA	
	Winter	391.52	379.14	12.38	10.499	2,467.06	0.000	Significant	Pre-K 4 SA	
	Spring	416.94	405.25	11.69	9.022	2,429.02	0.000	Significant	Pre-K 4 SA	

df = degrees of freedom.

[a] If a statically significant difference was found, the group whose score was greater (the "favored" group) is listed in this column. If there was no statistically significant difference, this column states that there was "no difference."

Note: Group mean information is presented in scaled scores. The Adjusted Significance column indicates significance levels (*p*-values) after adjustment to correct for multiple hypothesis testing using the Benjamini-Hochberg technique (1995).

Table 5 | Pre-K 4 SA and normed sample comparison results for six GOLD outcomes across time (continued)

Outcome	Time point	Pre-K 4 SA mean	Normed mean	Gap (Pre-K – normed)	*t*-test statistic	*df*	Initial value	Adjusted significance	Group favored[a]	Graphic depiction of finding (Blue line = Pre-K 4 SA; Red line = normed sample)
Oral Language	Fall	448.99	461.29	−12.30	−5.477	1,760.34	0.000	Significant	Normed	
	Winter	509.86	507.14	2.72	1.177	1,693.63	0.239	Non-Significant	No difference	
	Spring	551.85	544.96	6.89	2.924	1,828.85	0.004	Significant	Pre-K 4 SA	
Physical	Fall	536.94	547.91	−10.97	−6.48	2,397.53	0.000	Significant	Normed	
	Winter	600.81	593.33	7.48	4.79	2,355.85	0.000	Significant	Pre-K 4 SA	
	Spring	637.32	628.50	8.82	5.38	2,429.74	0.000	Significant	Pre-K 4 SA	
Social-emotional	Fall	411.99	426.44	−14.45	−10.32	2,424.98	0.000	Significant	Normed	
	Winter	466.69	466.51	0.18	0.13	2,290.57	0.900	Non-Significant	No difference	
	Spring	502.80	497.35	5.45	3.36	2,323.83	0.001	Significant	Pre-K 4 SA	

df = degrees of freedom.

[a] If a statically significant difference was found, the group whose score was greater (the "favored" group) is listed in this column. If there was no statistically significant difference, this column states that there was "no difference."

Note: Group mean information is presented in scaled scores. The Adjusted Significance column indicates significance levels (*p*-values) after adjustment to correct for multiple hypothesis testing using the Benjamini-Hochberg technique (1995).

Differences in Readiness Outcomes by Center

We conducted two sets of analyses within the Pre-K 4 SA sample to explore potential differences related to GOLD outcomes for children by center. First, each fall time point for the six GOLD domains was analyzed to determine if there were significant differences across Pre-K 4 SA centers for children's assessed skills at entry into Pre-K 4 SA. There were statistically significant comparisons for three of the six GOLD outcomes (Cognitive, Mathematics, and Social-Emotional), implying children entered Pre-K 4 SA with different skills across the four centers (see Table 6). The significant findings demonstrate two patterns. First, for the Cognitive and Social-Emotional outcomes, the findings favored children in the North and West centers compared to children in the East center with small to medium effect sizes. Second, for the Mathematics outcome, the findings favored children in the North and West centers compared to the South center with small to medium effect sizes. These findings suggest children in the four centers did not start the school year at similar levels on Cognitive, Mathematics, and Social-Emotional outcomes.

Second, results showed there was no statistically significant variation in growth across centers for all six GOLD outcomes meaning the average growth was the same for children in all four centers. For these analyses it is important to note that no other characteristics were considered. Additional models will include child predictors. Moreover, the lack of significant variability in growth is important to note given the variation in children's entry for the Cognitive, Mathematics, and Social-Emotional outcomes. Those differences did not inhibit or accelerate growth for children during the year.

Differences in Readiness Outcome Growth by Child Characteristics and Pre-K 4 SA Center

We also conducted analyses within the Pre-K 4 SA sample to determine if variation in growth in GOLD outcomes was accounted for by child demographics, Pre-K 4 SA center, or the relationship between Pre-K 4 SA attendance and respective fall GOLD scores. There were significant results[14] for (1) all six GOLD outcomes based on child demographics and (2) one of the six GOLD outcomes in relation to Pre-K 4 SA center.

Table 6 | Year 9 significant GOLD domain fall scores by center

GOLD outcome	Group mean by center				X^2 statistic	df	*p*-value	Individual *p*-value	Effect Size	Significant center differences
	East	North	South	West						
Cognitive	409.1	427.5	421.9	432.4	9.35	3	0.025	0.021	0.06	East lower than North
								0.004	0.09	East lower than West
Mathematics	340.4	351.4	335.2	354.2	8.17	3	0.043	0.018	0.06	South lower than West
								0.035	0.05	South lower than North
Social-emotional[a]	397.9	413.2	412.0	421.1	10.24	3	0.017	0.002	0.10	East lower than West
								0.035	0.05	East lower than North

df = degrees of freedom.

[a] Due to large variations in children's fall score, the difference between the East center and South center was not statistically significant for the social-emotional outcome.

Note: There were no significant differences for Literacy, Oral Language, or Physical domains. Due to violations of the independence assumption a multi-level model analysis was conducted. Effect sizes between 0.00 and 0.05 are small and between 0.06 and 0.13 are medium.

[14] There were significant differences found for the interaction between Pre-K 4 SA attendance and the Fall entry time point for two outcomes: Mathematics and Physical. The results were small (< 0.01) indicating a trivial difference. Therefore, these findings are not reported in the body of the report.

Child Characteristics

There were significant differences in the GOLD outcomes based on child gender, race/ethnicity, fall GOLD score, and Pre-K 4 SA attendance. Girls were assessed as having higher growth than boys across four outcomes: the Cognitive domain, 3.22 additional scale score points; Physical 5.52 additional scale score points; Oral Language 6.23 additional scale score points; the Social-Emotional domain, 8.35 additional scale score points. Child race/ethnicity was significantly related to growth in two of the GOLD domains. In Literacy, Asian children were assessed as having significantly higher growth compared to all other race/ethnicities. Asian children scored 4.78 points higher than White children, 5.13 points higher than Black children, 6.11 points higher than Multiracial children, and 6.80 points higher than Hispanic children. In Mathematics, Asian children scored 5.79 points higher than Hispanic children.

The fall GOLD score was significantly related to growth in two of the GOLD outcomes. If children entered Pre-K 4 SA with higher scores in the fall, their potential for growth over time was lower than for children with lower scores at pre-K entry, resulting in negative findings. For the Literacy domain the result was -0.29 implying for every scale score point increase children entered with in the fall, growth from fall to spring was decreased by 0.29 scale score points. For the Mathematics domain the result was -0.54 implying for every scale score point increase children entered with in the fall, growth from fall to spring was decreased by 0.54 scale score points. There were no significant differences in growth based on entrance scores for the other four domains.

Finally, Pre-K 4 SA attendance was significantly related to growth in the Physical domain. As children attended Pre-K 4 SA more often there was more growth. This finding implies that for every 1 percent increase in Pre-K 4 SA attendance, growth from fall to spring was increased by over two scale score points (2.60).

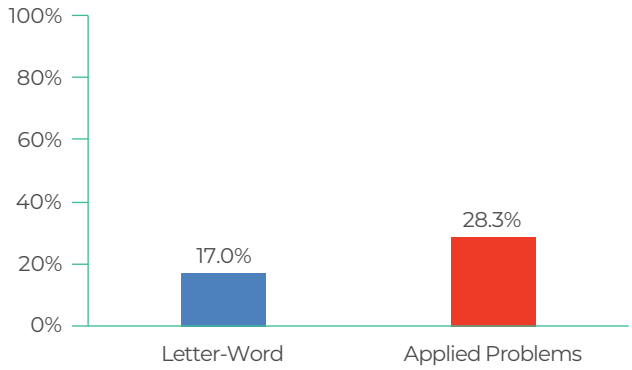
Pre-K 4 SA Center

There was one significant finding with respect to the Pre-K 4 SA center children attended. In the Oral Language domain, children in the East center had a little over 28 (28.02) additional scale score points in growth compared to children in the South center. (See Appendix C, Table C-1, for more information.)

Direct Child Assessment

Westat analyzed data collected by Pre-K 4 SA on two subtests of a direct child achievement assessment: *Letter-Word and Applied Problems* from the Woodcock-Johnson Psycho-Educational Battery-Fourth Edition and Batería III. There was one available time point for data analysis: spring of the 2021-22 school year. Results for the fourth research question, *What proportion of Pre-K 4 SA children from a random sample performed at or above their age level in early literacy and early numeracy at the end of the school year?*, showed the majority of Pre-K 4 SA children were performing below their age level as displayed in Figure 3 (for more detailed information see Appendix D Tables D-1 and D-2). This finding suggests most children did not end the school year at their age level of understanding in early literacy and numeracy. As data was available for a single time point it is not possible to determine where children started the school year, how that compares to the end of the year, or if any significant gains in understanding occurred. For example, these children's early experiences have existed within a pandemic context, and it is not clear how all facets of learning trajectories have been altered because of that fact. In the coming evaluation year, a random sample of Pre-K 4 SA children will be assessed in the fall and spring to overcome this limitation to better understand children's learning during the school year, and to determine if significant growth occurs. Finally, these findings indicate there is unfinished learning from the school year and there are continued accelerated learning gains needed as

Figure 3 | Proportion of Pre-K 4 SA children meeting age equivalency by subtest



Note: *Letter-Word* measures early literacy skills and Applied Problems measures early numeracy skills.

most children are not performing at or above their age level according to national norms. Furthermore, these findings mirror national long-term trends scores in the National Assessment of Education Progress indicating the pandemic has interrupted student learning and accelerated learning is needed (Socol, 2022).

Conclusions and Looking Ahead

Overall, results from the Year 9 evaluation indicate Pre-K 4 SA has provided quality instructional environments to more than 1,500 predominantly low-income children from across San Antonio. The characteristics of those children were similar to those from previous years. However, the children's attendance in the program was lower compared to previous years. This is not a surprising finding since national trends show similar decreases in school attendance (National Center for Education Statistics, 2022). Classroom quality scores, while sometimes lower than the previous year, were still high (or mid-range in the case of Instructional Support), indicating strong teacher-child interaction quality.

Teacher-reported kindergarten readiness at the end of the pre-K year (GOLD) suggested there was significant growth over time. There were also significant differences in growth based on child characteristics, Pre-K 4 SA attendance, initial entry, and center attended. Greater gains in the Cognitive, Oral Language, Physical, and Social-Emotional domains were found for girls compared to boys. Greater gains in the Literacy domain were found for Asian children compared to all other races and ethnicities. Asian children also demonstrated greater gains in the Mathematics domain compared to Hispanic children. Finally children who attended the East center had greater gains in Oral Language than children in the South center.

Early literacy and numeracy results suggested most children were not performing at the expected level for their age at the end of the year. This aligns with existing research evidence indicating children have experience unfinished learning and learning losses, suggesting that, as a result of the pandemic, accelerated learning is needed for children to perform at their age level (NIEER, 2021; Socol, 2022).

Taken together, the results from the Year 9 evaluation suggest children are benefiting from participation at Pre-K 4 SA centers but significant learning supports may be needed in early literacy and numeracy as is being seen across the nation.

Limitations and Recommendations

Related to these findings are three limitations. First, these findings rely on a teacher report measure (GOLD) of kindergarten readiness as the primary outcome of interest during the pre-K year rather than a direct child measure conducted by independent data collectors. Because a teacher-report measure is the primary outcome of interest, variance in the results related to teacher bias or other teacher factors cannot be excluded. Based upon recommendations, in the coming year, a random sample of Pre-K 4 SA children will be assessed in the fall and spring using the Woodcock-Johnson Psycho-Educational

Battery-Fourth Edition and Batería IV. This will also allow for a better understanding of children's learning and growth during the school year.

Second, due to resource constraints, Westat was not able to collect information on a control or comparison group of children with whom to compare the Pre-K 4 SA children with respect to kindergarten readiness outcomes at the end of the pre-K year. This is important because the normed sample that was used for comparison purposes is most likely very different from Pre-K 4 SA children and did not experience learning in the context of the pandemic. Normed samples are created to be reflective of the demographic proportions similar to those found in the U.S Census and were constructed prior to the pandemic during a 'typical' school year. There can be more confidence in interpreting resulting differences on outcomes when a comparison or control group is formed with children who are most like Pre-K 4 SA children and experienced learning during the pandemic. Furthermore, there can be more confidence that differences can be attributed to Pre-K 4 SA and are not a result of other factors.[15]

Third, there was a direct child assessment administered at the end of the school year, but it was not possible to collect similar data at the beginning of the school year. Therefore, it was not possible to assess if growth occurred over the 2021-22 school year or whether children entered the school year even further behind. Moving forward, based upon recommendations, data collection will occur at the beginning and end of the school year to investigate these points.

[15] One way to form such a group of children, similar in nature to Pre-K 4 SA children, would be to work with Teaching Strategies to create a matched comparison group from the normed sample of children in the future.

References

Barnett, W. S. (2011). Four reasons the United States should offer every child a preschool education. In E. Zigler, W. Gilliam, and W.S. Barnett (Eds.), *The pre-K debates: Current controversies and issues* (pp. 34–39). Baltimore, MD: Brookes Publishing.

Bassok, D., and Galdo, E. (2016). Inequality in preschool quality? Community-level disparities in access to high-quality learning environments. *Early Education and Development,* 27(1), 128–144.

Blad, E. (2022). Chronic absenteeism spiked during COVID. Here's what schools can do about it. *Education Week*. Available at: Chronic Absenteeism Spiked During COVID. Here's What Schools Can Do About It (edweek.org)

Bloom, H. S., & Weiland, C. (2014). To what extent do the effects of Head Start on enrolled children vary across sites. Working paper.

Benjamini, Y., and Hochberg, Y. (1995). Controlling the false discovery rate: A practical and powerful approach to multiple testing. *Journal of the Royal Statistical Society*: Series B Methodological, 57(1), 289–300.

Campbell, F.A., Ramey, C.T., Pungello, E., Sparling, J., and Miller-Johnson, S. (2002). Early childhood education: Young adult outcomes from the Abecedarian Project. *Applied Developmental Science*, 6, 42–57.

Carminucci, J., Hodgman, S., Rickles, J., and Garet, M. (2021). Student attendance and enrollment loss in 2020-21. *AIR*. Available at: https://www.air.org/sites/default/files/2021-07/research-brief-covid-survey-student-attendance-june-2021_0.pdf

Chien, N.C., Howes, C., Burchinal, M., Pianta, R., Ritchie, S., Bryant, D., Clifford, R., Early, D., and Barbarin, O. (2010). Children's classroom engagement and gains in academic and social-emotional outcomes across pre-kindergarten. *Child Development*, 81(5), 1534–1549.

Early Childhood Learning & Knowledge Center (ECLKC). (2020). *A national overview of grantee CLASS scores in 2020*. Washington, DC: U.S. Department of Health & Human Services, ECLKC. Available at: https://eclkc.ohs.acf.hhs.gov/data-ongoing-monitoring/article/national-overview-grantee-class-scores-2020

Fortin, J. (2022, April 20). Schools try to reach a pandemic casualty: The absentee student. *New York Times*, A, 16.

Heckman, J. J., Moon, S.H., Pinto, R., Savelyev, P.A., and Yavitz, A. (2010). The rate of return to the High/Scope Perry Preschool Program. *Journal of Public Economics*, 94, 114–128.

Hill, C.J., Gormley, Jr., W.T., and Adelstein, S. (2015). Do the short-term effects of a high-quality preschool program persist? *Early Childhood Research Quarterly*, 32, 60–79.

Lambert, R. (2020). *Technical manual for the Teaching Strategies GOLD assessment system* (2nd edition). Charlotte, NC: Center for Educational Measurement and Evaluation, University of North Carolina. Available at: https://teachingstrategies.com/wp-content/uploads/2020/10/2020-Tech-Manual_GOLD.pdf

La Paro, K.M., Pianta, R.C., and Shuhlman, M. (2004). Classroom Assessment Scoring System (CLASS): Findings from the pre-k year. *Elementary School Journal*, 104(5), 409–426.

Locasale-Crouch, J., Konold, T., Pianta, R., Howes, C., Burchinal, M., Bryant, D., Clifford, R., Early, D., and Barbarin, O. (2007). Observed classroom quality profiles in state-funded pre-kindergarten programs and associations with teacher, program, and classroom characteristics. *Early Childhood Research Quarterly*, 22(1), 3–17.

Mashburn, A.J., Pianta, R.C., Hamre, B.K., Downer, J.T., Barbarin, O.A., Bryant, D., Burchinal, M., Early, D.M., and Howes, C. (2008). Measures of classroom quality in prekindergarten and children's development of academic, language, and social skills. *Child Development*, 79(3), 732–749.

McCormick, M. (2022). Building Better Evidence on Pre-K by Strengthening Assessments of Children's Skills. Washington, DC: MDRC. Available at https://www.mdrc.org/publication/building-better-evidence-pre-k-strengthening-assessments-children-s-skills

McGrew, K.S., LaForte, E.M., and Schrank, F.A. (2014). *Technical manual Woodcock-Johnson IV*. Rolling Meadows, IL: Riverside.

Muñoz-Sandoval, A.F., Woodcock, R.W., McGrew, K.S., and Mather, N. (2005). *The Batería III Woodcock-Muñoz: Pruebas de aprovechamiento.* Itasca, IL: Riverside Publishing.

National League of Cities. (2012). *Educational alignment for young children*. Washington, DC: Institute for Youth, Education and Families. Available at: http://www.nlc.org/documents/Find%20City%20Solutions/IYEF/Early%20Childhood/educational-alignment-for-young-chldren-case-studies-april-2012.pdf

National Center for Education Statistics (2022). *More than 80 percent of U.S. public schools report pandemic has negatively impacted student behavior and social-emotional development*. Washington, DC: U.S. Department of Education. Available at Press Release - More than 80 Percent of U.S. Public Schools Report Pandemic Has Negatively Impacted Student Behavior and Socio-Emotional Development – July 6, 2022

Pianta, R., La Paro, K., and Hamre, B. (2008). *Classroom assessment scoring system*. Baltimore, MD: Brookes Publishing.

Puma, M., Bell, S., Cook, R., & Heid, C. (2010). *Head Start Impact Study final report*. Washington, DC: Administration for Children & Families, U.S. Department of Health and Human Services.

Reynold, A.J., Temple, J.A., White, B., Ou, S., and Robertson, D.L. (2011). Age-26 cost benefit analysis of the Child-Parent Center Early Education Program. *Child Development*, 82, 379-404.

Rolnick, A., and Grunewald, R. (2003). Early childhood development: Economic development with a high public return. *The Region*, 17(4), 6–12.

Schrank, F.A., Mather, N., and McGrew, K.S. (2014). *Woodcock-Johnson IV tests of achievement.* Rolling Meadows, IL: Riverside Publishing.

Socol, A.R. (2022, September*). NAEP results show dismal learning loss due to pandemic. What can be done?* Washington, DC: The Education Trust. Available at: NAEP Results Show Dismal Learning Loss Due to Pandemic. What Can Be Done? - The Education Trust (edtrust.org)

Valentino, R. (2018). Will public pre-K really close achievement gaps? Gaps in prekindergarten quality between students and across states. *American Educational Research Journal*, 55(1), 79–116.

Weiland, C. (2016). Impacts of the Boston prekindergarten program on the school readiness of young children with special needs. *Developmental Psychology*, 52(11), 1763–1776.

Appendix A
Evaluation Methods

Here we provide information on measures used in the Pre-K 4 SA Year 9 evaluation, as well as details on the analytic approach to the analyses described in the body of the report.

Measures

Classroom Assessment Scoring System (CLASS)

CLASS (Pianta, La Paro, & Hamre, 2008) is an observational system that assesses classroom practices in preschool by measuring the interactions between children and adults. Observations in the Year 9 evaluation consisted of five 20-minute cycles, followed by 10-minute coding periods. Scores were assigned during various classroom activities and then averaged across all cycles for an overall quality score.

Interactions were measured on 10 different dimensions (see Table A-1 for descriptions of each CLASS dimension) divided into three larger domains. The Emotional Support domain is measured using four dimensions: positive climate, negative climate, teacher sensitivity, and regard for student perspectives. The CLASS also measures Classroom Organization using three

Table A-1 | Descriptions of CLASS dimensions

Domain	Dimension	Description
Emotional Support	Positive climate	Reflects the emotional connection between teachers and children and among children, as well as the warmth, respect, and enjoyment communicated by verbal and nonverbal interactions.
	Negative climate	Reflects the overall level of expressed negativity in the classroom. The frequency, quality, and intensity of teacher and peer negativity are key to this dimension.
	Teacher sensitivity	Encompasses the teacher's awareness of and responsiveness to students' academic and emotional needs.
	Regard for student perspectives	Captures the degree to which the teacher's interactions with students and classroom activities emphasize students' interests, motivations, and points of view and encourage student responsibility and autonomy.
Classroom Organization	Behavior management	Encompasses the teacher's ability to provide clear behavior expectations and use effective methods to prevent and redirect misbehavior.
	Productivity	Considers how well the teacher manages instructional time and routines and provides activities for students so that they have the opportunity to be involved in learning activities.
	Instructional learning formats	Focuses on the ways in which teachers maximize students' interest, engagement, and abilities to learn from lessons and activities.
Instructional Support	Concept development	Measures the teacher's use of instructional discussions and activities to promote students' higher-order thinking skills and cognition and the teacher's focus on understanding rather than on rote instruction.
	Quality of feedback	Assesses the degree to which the teacher provides feedback that expands learning and understanding and encourages continued participation.
	Language modeling	Captures the effectiveness and amount of teacher's use of language-stimulation and language-facilitation techniques.

dimensions: behavior management, productivity, and instructional learning formats. Instructional Support is measured using three dimensions: concept development, quality of feedback, and language modeling.

The CLASS uses a 7-point Likert-type scale, for which a score of 1 or 2 indicates low-range quality and a score of 6 or 7 indicates high-range quality. Each dimension and domain is assigned a score during each 20-minute cycle (or observation period). The number of children and adults in the classroom was also recorded during each 20-minute cycle.

Teaching Strategies GOLD

The GOLD assessment is a teacher-reported measure selected and used by Pre-K 4 SA to collect information on children's progress on 36 objectives across six main categories: Cognitive, Literacy, Oral Language, Mathematics, Physical, and Social-Emotional (other categories are available to be tailored to specific programs). The GOLD assessment is conducted at three points throughout the year: fall, winter, and spring. The new updated norms for birth through third grade were used as comparison to Pre-K 4 SA children.

The Woodcock-Johnson Achievement Test

The Woodcock-Johnson Test of Achievement-IV (WJ) (Schrank, McGrew, Mather, Wendling, & LaForte, 2014) is an individually administered norm-referenced test to assess reading, oral language, mathematics, written language, and academic knowledge. We used two subtests in the current evaluation: the *Letter-Word* subtest and the *Applied Problem* subtest. Both subtests demonstrate excellent reliability (.92 for *Applied Problems* and .97 for *Letter-Word*). Correlations of the WJ with other tests of cognitive ability and achievement are reported to range from .83 to .86 (McGrew, LaForte, & Schrank, 2014). This measure has been used in numerous large-scale preschool studies (e.g., Early et al., 2007; Wong, Cook, Barnett & Jung, 2008). For children requiring assessment in Spanish, matching subtests from the Batería III were used (Muñoz-Sandoval, Woodcock, McGrew, & Mather, 2005). In both versions, the *Letter-Word* subtest is a test of basic literacy skills involving symbolic learning and identifying isolated letters and words. The child identifies letters that are in large type and reads the words correctly. The *Applied Problems* subtest is a test of basic analytic skills involving applying simple number concepts and solving math problems. The child listens to the problem, recognizes the underlying mathematical procedure and steps to solve the problem, and performs the appropriate calculations. In both subtests, items are set in difficulty order, with the easiest first and the most difficult last. Testing stops when the child scores zero on six successive items across both subtests in English and Spanish with one exception. Testing for *Applied Problems* in English stops when the child scores zero on five successive items (McGrew, LaForte, & Schrank, 2014). To help understand the range of children's age equivalence in early literacy and numeracy, descriptive information for both subtests based on the language of assessment is provided in Table A-2. As displayed in Table A-2, there was some variation in children's assessed level of understand based on language of assessment. For example, children assessed in English had a lower minimum (2 years, 4 months) than children assessed in Spanish (4 years, 10 months) for *Letter-Word*.

Analytic Approach

Research questions were addressed by analyzing study data as well as existing PreK 4 SA databases. To address the first two questions—*What were the reported levels of child attendance during the pre-K year?* and *In what ways have attendance rates changed since the COVID-19 pandemic?*—Pre-K 4 SA data were submitted to Westat and descriptively analyzed. To address the questions *What was the observed teacher-child interaction*

Table A-2 | Range of age equivalencies by assessment and language

Outcome	English		Spanish	
	Minimum	Maximum	Minimum	Maximum
Letter-Word	2 years, 4 months	8 years, 1 month	4 years, 10 months	6 years, 10 months
Applied Problems	2 years, 2 months	6 years, 3 months	4 years, 11 months	6 years, 6 months

quality in a random sample of Pre-K 4 SA classrooms in Year 9?; CLASS observation data were descriptively and inferentially analyzed to investigate potential differences by center.

The primary pre-K year outcome research question—*Do Pre-K 4 SA children demonstrate significant growth, over the pre-K year, on GOLD outcomes?*—was addressed through dependent sample *t*-tests between the fall and spring GOLD assessment outcomes. In addition, we conducted inferential tests to investigate potential differences in GOLD results by center. Because children were nested in classrooms, a multilevel model (two levels with children nested in classrooms) was conducted to investigate whether there were significant differences in the fall GOLD scores and growth in the GOLD scores by center. To determine if there was variation in GOLD growth, we used a multilevel model for the full sample of children, because individual child assessments (GOLD) were nested within classrooms (Raudenbush & Bryk, 2002). A two-level model was used, with children at level 1 and classrooms at level 2. Child gender, free or tuition status, race/ethnicity, fall GOLD score, attendance in Pre-K 4 SA, Pre-K 4 SA center attended, and the interactions between the fall GOLD score and Pre-K 4 SA attendance were included in the model.

The full model for GOLD growth is denoted as:

$$GOLD_{ij} = Y_{00} + Y_{10} * Child\ Gender_{ij} + Y_{20} * Child\ FreeTuition_{ij} + Y_{30} Child\ RaceEthnicity_{ij} + Y_{40} Child\ Fall\ GOLDij + Y_{50} Child\ Attendance_{ij} + Y_{60} Child\ Attendanceij * Child\ Fall\ GOLD_{ij} + u_{0j} + e_{ij}$$

Where

$GOLD_{ij}$ is the individual growth for child *i* in classroom *j*,

Y_{00} is the overall grand mean growth score,

Y_{10} is the child gender effect (girls were coded as 1 and boys as 0),

Y_{20} is the child free or tuition status effect (free and scholarship were coded as 1 and tuition as 0),

Y_{30} is the child race/ethnicity effect,

Y_{40} is the child fall GOLD score effect,

Y_{50} is the child attendance effect,

Y_{60} is the child attendance and fall GOLD score effect,

u_{0j} is the deviation of teacher *j*, and

e_{ij} is the deviation of child *i* in classroom *j*.

Finally, to address the fourth research question *What proportion of Pre-K 4 SA children performed at or above their age level in early literacy and early numeracy at the end of the school year?*, data collected by Pre-K 4 SA were submitted to Westat and descriptively analyzed. Raw scores were converted into age levels (measured in years and months) based on norms provided in the technical manual for each outcome and language of assessment (English and Spanish)[16] (McGrew, LaForte, & Schrank, 2014). For the age level the number of months was translated into the proportion of the year (e.g., 4 years and 6 months = 4.5) in order to compare to their actual age in year and months. Another method of analysis is to convert raw scores into grade level equivalences. For pre-K children, there is a single grade level available: *below kindergarten*. As no finer levels (e.g., pre-K and 2 months) were available and it would not be possible to determine growth over time, it was determined to use only age equivalencies.

[16] The age norms differ depending on whether a child was assessed in English or Spanish.

Appendix B
Additional CLASS Results

Table B-1 | Average Year 9 CLASS scores by center

CLASS outcome	East		North		South		West	
	M (SD)	Total range observed	M (SD)	Total range observed	M (SD)	Total range observed	M (SD)	Total range observed
Emotional Support domain	**6.45 (0.43)**	**(5.90 – 7.00)**	**6.72 (0.39)**	**(5.95 – 7.00)**	**6.67 (0.23)**	**(6.30 – 6.95)**	**6.84 (0.12)**	**(6.65 – 7.00)**
Positive climate	6.68 (0.37)	(6.20 – 7.00)	6.83 (0.33)	(6.20 – 7.00)	6.88 (0.15)	(6.60 – 7.00)	6.94 (0.11)	(6.75 – 7.00)
Negative climate[a]	6.93 (0.15)	(6.60 – 7.00)	6.95 (0.14)	(6.60 – 7.00)	7.00 (0.00)	(7.00 – 7.00)	7.00 (0.00)	(7.00 – 7.00)
Teacher sensitivity	6.00 (0.86)	(5.00 – 7.00)	6.63 (0.65)	(5.40 – 7.00)	6.40 (0.50)	(5.40 – 6.80)	6.77 (0.29)	(6.40 – 7.00)
Regard for student perspectives	6.20 (0.52)	(5.60 – 7.00)	6.48 (0.53)	(5.60 – 7.00)	6.40 (0.43)	(6.00 – 7.00)	6.64 (0.28)	(6.25 – 7.00)
Classroom Organization domain	**6.26 (0.64)**	**(5.40 – 6.93)**	**6.33 (0.74)**	**(5.00 – 7.00)**	**6.33 (0.55)**	**(5.33 – 7.00)**	**6.54 (0.60)**	**(5.38 – 7.00)**
Behavior management	6.48 (0.38)	(6.00 – 7.00)	6.35 (0.94)	(4.80 – 7.00)	6.58 (0.39)	(6.00 – 7.00)	6.60 (0.53)	(5.60 – 7.00)
Productivity	6.48 (0.68)	(5.20 – 7.00)	6.55 (0.75)	(5.00 – 7.00)	6.55 (0.68)	(5.20 – 7.00)	6.76 (0.47)	(5.75 – 7.00)
Instructional learning formats	5.83 (0.98)	(4.60 – 7.00)	6.08 (0.65)	(4.80 – 7.00)	5.88 (0.85)	(4.40 – 7.00)	6.26 (0.86)	(4.80 – 7.00)
Instructional Support domain	**3.09 (1.17)**	**(1.60 – 5.40)**	**3.72 (0.95)**	**(1.80 – 4.80)**	**3.58 (1.28)**	**(1.80 – 5.53)**	**2.47 (1.03)**	**(1.13 – 4.00)**
Concept development	2.75 (1.01)	(1.80 – 5.00)	3.35 (0.75)	(1.80 – 4.20)	3.08 (1.00)	(1.80 – 5.20)	2.32 (0.75)	(1.20 – 3.60)
Quality of feedback	3.18 (1.52)	(1.20 – 6.00)	3.93 (1.24)	(1.80 – 5.20)	3.68 (1.65)	(1.60 – 5.80)	2.36 (1.27)	(1.00 – 4.40)
Language modeling	3.35 (1.07)	(1.80 – 5.20)	3.88 (1.02)	(1.80 – 5.00)	4.00 (1.38)	(2.00 – 5.60)	2.73 (1.16)	(1.20 – 4.20)

M = mean; SD = standard deviation

[a] Negative Climate is initially scored with lower values representing no or low negative climate. These scores are then reverse-coded to reflect the same direction (higher values are positive) as the other dimensions.

Appendix C
Additional Teaching Strategies GOLD Results

Table C-1 | Year 9 significant GOLD growth results for total sample based on child characteristics and Pre-K 4 SA center

Child or Center Characteristics	Significant GOLD Outcomes	Coefficient	Standard Error	Z	*p*-value	Group Favored
Gender	Cognitive	3.220	1.383	2.33	0.020	Girls
	Oral Language	6.227	1.980	3.15	0.002	
	Physical	5.516	1.345	4.10	0.000	
	Social-Emotional	8.346	1.471	5.67	0.000	
Race/Ethnicity	Literacy	6.111	2.759	2.21	0.027	Asian (compared to Other/Multi-racial)
	Literacy	5.125	2.335	2.19	0.028	Asian (compared to Black)
	Literacy	6.800	1.926	3.53	0.000	Asian (compared to Hispanic)
	Literacy	4.782	2.229	2.15	0.032	Asian (compared to White)
	Mathematics	5.790	2.754	2.10	0.036	Asian (compared to Hispanic)
Fall GOLD score	Literacy	−0.292	0.092	−3.16	0.002	N/A
	Mathematics	−0.535	0.123	−4.34	0.000	
Pre-K 4 SA attendance	Physical	2.600	0.771	3.37	0.001	N/A
Pre-K 4 SA attendance and Fall GOLD score interaction	Mathematics	0.003	0.001	2.21	0.027	N/A
	Physical	−0.004	0.001	−3.01	0.003	
Pre-K 4 SA Center	Oral Language	28.024	13.862	2.02	0.043	East (compared to South)

Note: The fall GOLD score, Pre-K 4 SA attendance, and Pre-K 4 SA attendance and fall GOLD score interaction are marked as N/A because no groups were compared.

[a] If a statically significant difference was found, the group whose score was greater (the "favored" group) is listed in this column.

[b] Scholarship children were included in the free category.

Appendix D
Additional Woodcock Johnson and Batería Results

Table D-1 | Percentage of children on or above age level in Spring 2022 by outcome

Outcome	N	Percentage
Letter-Word	53	16.98%
Applied Problems	53	28.30%

Note: Letter-Word measures early literacy skills and Applied Problems measures early numeracy skills.

Table D-2 | Descriptives of children's assessed age level in Spring 2022 by outcome

Outcome	N	Mean	Standard Deviation	Minimum	Maximum
Letter-Word	53	4.59	0.90	2.33	8.08
Applied Problems	53	4.74	0.88	2.17	6.50

Note: Letter-Word measures early literacy skills and Applied Problems measures early numeracy skills.

Appendix References

Early, D.M., Maxwell, K.L., Burchinal, M., Alva, S., Bender, R.H., Bryant, D., Cai, K., Clifford, R.M., Ebanks, C., Griffin, J.A., Henry, G.T., Howes, C., Irondo-Perez, J., Jeon, H., Mashburn, A.J., Peisner-Feinberg, E., Pianta, R.C., Vandergrift, N., and Zill, N. (2007). Teachers' education, classroom quality, and young children's academic skills: Results from seven studies of preschool programs. *Child Development*, 78(2), 558-580.

McGrew, K.S., LaForte, E.M., and Schrank, F.A. (2014). *Technical manual Woodcock-Johnson IV*. Rolling Meadows, IL: Riverside Publishing.

Muñoz-Sandoval, A.F., Woodcock, R.W., McGrew, K.S., and Mather, N. (2005). *The Batería III Woodcock-Muñoz: Pruebas de aprovechamiento*. Itasca, IL: Riverside Publishing.

Pianta, R., La Paro, K., and Hamre, B. (2008). *Classroom assessment scoring system*. Baltimore, MD: Brookes Publishing.

Raudenbush, S.W., and Bryk, A.S. (2002). *Hierarchical linear models: Applications and data analysis methods* (Vol. 1). Philadelphia, PA: Sage.

Schrank, F.A., McGrew, K.S., Mather, N., Wendling, B.J., and LaForte, E.M. (2014). *Woodcock-Johnson IV Tests of Achievement: Form A*. Rolling Meadows, IL: Riverside Publishing.

Wong, V.C., Cook, T.D., Barnett, W.S., and Jung, K. (2008). An effectiveness-based evaluation of five state pre-kindergarten programs. *Journal of Policy Analysis and Management: The Journal of the Association for Public Policy Analysis and Management*, 27(1), 122-154.