

MEMORANDUM

September 30, 2021

TO: Margarita Gardea
Officer, Elementary Curriculum and Development

FROM: Allison E. Matney, Ed.D.
Executive Officer, Research and Accountability

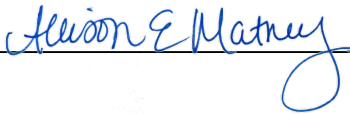
SUBJECT: **DESCRIPTIVE ANALYSIS OF TEACHERS' AND PARENTS' PERCEPTIONS OF VIRTUAL PREKINDERGARTEN PROGRAM AND LEARNING GAINS AMONG PREKINDERGARTEN CHILDREN IN HISD, 2020–2021**

In the 2020–2021 school year, Houston Independent School District (HISD) offered in-person and virtual instruction to early learners at school-based programs (SBPs), early childhood centers (ECCs), and charter/magnet schools. The evaluation objective was to compare the enrollment trends, student performance, and perception of parents and teachers regarding the virtual prekindergarten program across campus types. Descriptive analyses were performed identifying enrollment trends, teachers' and parents' perceptions of virtual learning, and students' performance. Students' academic growth was measured using beginning-of-year and end-of-year academic performance on the CIRCLE language and literacy and mathematics subtests.

Key findings include:

- There was a 28.4 percentage point decrease in the number of prekindergarten students in the district in 2020–2021 from the previous year.
- For the 2020–2021 academic year, 50.1 percent of prekindergarten students learned in person, 28.7 percent were virtual, and 21.2 percent alternated between virtual and in-person learning.
- Across age groups and test languages, students who learned in person showed a higher increase in academic performance on the CIRCLE language and literacy and mathematics assessments compared to those who learned remotely.
- A lower proportion of teachers at SBPs (52.2%) and ECCs (41.2%) reported their students would make academic progress for the 2020–2021 school year, compared to teachers at charter/magnet schools (63.6%).
- Across campus types, over two-thirds of parents reported the quality of the in-person / virtual prekindergarten program was much better or better than expected.
- A higher proportion of parents of prekindergartners at ECCs (70.8%) and SBPs (66.7%) reported their child's school performance was much better or better than expected compared to parents of prekindergartners at charter/ magnet schools (50.5%).

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


_____ AEM

Attachment

cc: Millard L. House II
Richard A. Cruz, Ed.D.
Marisol Castruita



RESEARCH

Educational Program Report

**DESCRIPTIVE ANALYSIS OF TEACHERS'
AND PARENTS' PERCEPTIONS OF VIRTUAL
PREKINDERGARTEN PROGRAM AND
LEARNING GAINS AMONG
PREKINDERGARTEN CHILDREN IN HISD,
2020-2021**



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EVALUATION REPORT

BUREAU OF PROGRAM EVALUATION

Descriptive Analysis of Teachers' and Parents' Perceptions of the Virtual Prekindergarten Program and Learning Gains in HISD Early Childhood Centers and School-Based Programs Compared to Charter and Magnet Schools, 2020–2021

Prepared by Georgia Graham, PhD

Abstract

School districts altered instructional delivery from solely in-person to a combined virtual/ in-person model in the 2020–2021 school year in response to the COVID-19 pandemic. The Houston Independent School District (HISD) offered in-person and virtual instruction to early learners at school-based programs (SBP), early childhood centers (ECC), and charter/magnet schools. The analyses were conducted across the three campus types (SBP, ECC, and charter/magnet). Descriptive analyses were performed using enrollment trends, teachers' and parents' perceptions of HISDs virtual prekindergarten program compared to charter and magnet schools, and student performance. Students' academic growth was measured using beginning-of-year and end-of-year academic performance on the CIRCLE language and literacy and mathematics assessments in the 2020–2021 school year. The analysis showed a decrease of 28.4 percentage points in the number of prekindergarten students in the district. Of those enrolled in the prekindergarten program, 50.1 percent were learning in person, 28.7 percent learned virtually, and 21.2 percent alternated between virtual and in-person. Teachers with prior experience had higher mean ratings for using technology for virtual instruction and supporting parents with accessing virtual learning tools. A higher percentage of teachers at ECCs reported using technology in the classrooms before the implementation of the virtual learning model (96.2%) compared to teachers at SBPs (87.8%) and charter/magnet schools (81.4%). Parents' and teachers' perceptions of students' academic progress in the 2020–2021 school year varied by campus type. A lower proportion of teachers at ECCs reported a high confidence level that their students would make academic progress (41.2%) compared to ECCs (52.2%) and charter/magnet schools (63.6%). However, a higher proportion of parents whose child attended an ECC reported their child's school performance was much better/better than expected compared to parents of prekindergartners at SBPs (66.7%) and charter/magnet schools (50.5%). Prekindergarten students who learned in person showed a higher increase in academic performance on CIRCLE language and literacy and mathematics assessments compared to virtual learners.

During the 2020–2021 school year, the Houston Independent School District (HISD) offered virtual an in-person prekindergarten classes in response to the COVID-19 pandemic. With a virtual program delivery, concerns rose regarding learning loss, the challenges faced by students due to limited or no internet access, and the varying impact of remote learning on the diverse student populations, including early learners. For early learners, virtual learning meant limiting the in-person interactions that were central to a high-quality prekindergarten program.

The National Association for the Education of Young Children (NAEYC) developed accreditation guidelines to promote high-quality contexts for learning (Graue, Ryan, Nocera, Northey, & Wilinski, 2017). Key to a high-quality program is interpersonal interactions,

physical environment, and high functioning support structures. All three factors need to be in place to ensure quality (Graue, Ryan, Nocera, Northey, & Wilinski, 2017). With the pandemic, maintaining interpersonal interactions and physical environment presented a challenge.

The preschool years are a time when young children “are exploring their ability to create and communicate using a variety of media (crayons, felt-tip markers, paints, and other art materials, blocks, dramatic play materials, miniature life figures) and through creative movement, singing, dancing, and using their bodies to represent ideas and experiences. Digital technologies provide one more outlet for them to demonstrate their creativity and learning” (NAEYC, 2012a, p. 2). The challenge with a virtual prekindergarten program is

maintaining the tenets of a high-quality program (e.g., interpersonal interactions, physical environments, play-based learning, hands-on experience) (see **Figure 1**).

Background

In addition to living within HISD boundaries, three and four-year-old children were eligible for free, full-day prekindergarten based on any of the following criteria: (i) unable to speak and understand English; (ii) be economically disadvantaged, which means eligible to participate in the National School Lunch Program; (iii) be a child of a member of the U.S. Armed Forces; (iv) been in state foster care; and (v) homeless (HISD, 2020). HISD also offers tuition-based prekindergarten to early learners who do not meet the eligibility requirements to attend.

Children enrolled in one of the four prekindergarten models: (i) early childhood center (ECC); (ii) school-based program (SBP); (iii) Head Start; or (iv) Montessori. HISD offered full-day prekindergarten programs to all eligible students that resided within the district boundaries (HISD, 2018a). During the 2020–2021 academic year, HISD had 142 campuses with prekindergarten that provided nurturing environments for young learners to reach their highest potential. In addition, there were eight early childhood centers (ECCs) that catered specifically to the youngest learners. Finally, the district partnered to offer prekindergarten at seven magnet schools and five charter schools. In total, there were 159 HISD campuses that offered the prekindergarten program across three campus types (school-based program, early childhood centers, and charter/magnet schools).

For community-based ECC or a school-based program (SBP) enrollment, home language surveys were administered to the child's parent or guardian. Based on the home language surveys, children were placed in linguistically appropriate HISD prekindergarten programs. Students whose primary language was English were placed in the English program. All instruction in academic subjects and non-academic subjects were delivered in English. If a student was classified as an English learner (ELs), they were assigned to one of the following programs- Transitional Bilingual, English as a Second Language (ESL), or Dual Language (HISD, 2018b). The English as a Second Language (ESL) Program was offered to students with a home language other than English or Spanish. Teachers in an ESL classroom have specific state certification and training to work with students learning English.



Figure 1. A picture of HISD prekindergarten students doing arts and crafts, 2020–2021 school year.

To support school readiness, the HISD prekindergarten program used the Frog Street Prekindergarten (FSPK) curriculum, except for HISD Montessori schools. The FSPK curriculum was focused on the physical, social, emotional, cognitive, and language development of preschool children (Schiller, 2015). HISD curriculum for prekindergarten aligned with the prekindergarten guidelines set forth by the state of Texas (HISD, 2018b). Prekindergarten students received instruction in language and literacy, mathematics, science, social studies, social-emotional development, gross and fine motor skills, health, visual arts, music, and physical education.

The mission of the HISD prekindergarten program was to prepare all students for academic success by building positive, supportive, caring learning communities that foster good self-esteem and encourage excellence through a structured learning environment, high expectations, and a never-give-up attitude (HISD, 2020). The vision for the program was high behavioral expectations, focus on skill and content mastery, and core values that develop positive contributing citizens (HISD, 2020).

Literature Review

As the district navigated the ongoing COVID–19 pandemic that shutdown the nation since March 2019, educators remained committed to providing a high-

quality education for all students and ensuring the safety of students and employees (HISD, 2021). To this end, in the 2020–2021 academic year, the district continued to offer virtual-only instruction for the first six weeks of school, followed by the option of in-person instruction. This required teachers to teach in virtual classrooms or combined classrooms with teachers simultaneously teaching students face-to-face and virtually. For those students learning virtually, teachers relied on the parents as the at-home learning partners in the absence of face-to-face interaction. The literature on early child development stresses the important role parents play in child development (Varshney, Lee, Temple, & Reynolds, 2020) and the importance of effectively using technology in the classroom to enhance student learning (Donohue & Schomburg, 2017; NAEYC, 2012a).

Parental Role in Learning

Exploring parent engagement in early learning, Barnett, Paschall, Mastergeorge, Cutshaw, & Warren (2020) examined how practices used by early childhood education (ECE) providers to engage parents (e.g.,

sending home information about the child), parent-school involvement in ECE centers (e.g., volunteering, attending meetings), and parent engagement in home learning activities (e.g., reading, stimulating cognitive development) were linked to children's kindergarten academic readiness. Facilitating ECE practices to promote parent engagement and increasing home learning activities were found to have the potential of bolstering children's school readiness.

Looking at school and home environment on student learning, Han, O'Connor, & McCormick (2020) used data from the National Institute of Child Health and Human Development Study of Early Child Care and Youth Development (NICHD SECCYD) to fit a 2-level random effects models. They found that the quality of the home environment moderated the association between prekindergarten quality and children's vocabulary achievement. Supportive home environments during elementary school were found to have a stabilizing effect beyond the positive effects of prekindergarten quality in predicting children's vocabulary achievement. In contrast, when children experienced high levels of prekindergarten quality and lower quality home learning environments, the positive effects of prekindergarten were less likely to be sustained.

Use of Technology in Early Learning

Technology and interactive media are part of everyday life, including that of young children. However, of

importance is the appropriate use of technology and interactive media in the classrooms (NAEYC, 2012). Early childhood educators play a vital role in integrating technology and interactive media in a manner that does not diminish but rather enhances student's learning. It is important that early childhood teachers implement technology in a meaningful manner without compromising the value of play-based learning or hands-on experience, and, most importantly, enhancing the enjoyment that young children experience during learning (NAEYC, 2012b).

When technology and interactive media are integrated into early childhood programs based on solid developmental foundation principals, and early childhood professionals are aware of both the challenges and the opportunities, educators are positioned to improve program quality by intentionally leveraging the potential of technology and media for the benefit of every child (Donohue & Schomburg, 2017).

There have been conflicting findings on the benefits of technology and interactive media on early learners, particularly the use of tablets (Reeves, Gunter, & Lacey, 2017; Shifflet, Mattoon, & Bates, 2020). Research indicates that the issue of technology integration in early childhood education should move beyond discussion around the appropriateness of the technology used, to focus on how to integrate this medium in a developmentally appropriate manner (Aldemir, Barreto, & Kermani, 2019; Parette, Quesenberry, & Blum, 2010). Technology and interactive media have not been included in teacher education, creating a knowledge gap (NAEYC, 2012a).

New technologies keep advancing and taking their place in educational institutions and educators need to be equipped with the pedagogical knowledge to evaluate and use these tools in their classrooms (Aldemir, Barreto, & Kermani, 2019). Teachers need to function in a digital world, using technology to design, deliver and support learners regardless of the learners' location, status, or education level (Ally, 2019).

NAEYC acknowledges that early childhood educators need training, professional development opportunities, and examples of successful practices to develop the technology and media knowledge, skills, and experience needed to meet student needs (NAEYC, 2012b). Research studies highlight the necessity to train early childhood pre-service teachers (PST) to evaluate and select tablet applications that are developmentally appropriate for educational and instructional purposes (Aldemir, Barreto, & Kermani, 2019; Eutsler, Mitchell, Stamm, & Kogut, 2020).

When incorporating technology in education, careful consideration needs to be given to the unresolved issues of equity and access (NAEYC, 2012b). Children growing up in affluent families more often have access to technology tools and the internet in their homes, begin using the internet at an earlier age, and have highly developed technology skills and beginner digital literacy when they enter school (NAEYC, 2012b). Children in families with fewer resources may have little or no access to the latest technologies in their homes, early childhood settings, schools, or communities (NAEYC, 2012b). Once issues related to equity and access are resolved, the use of digital technology has the potential of reaching students who were unreachable in the old education system and providing education for all (Ally, 2019).

Research Questions

This evaluation comparatively investigates teachers' perception and interaction with technology and their effects on learning at home for early learners across campus types. Central to any discussion of high-quality prekindergarten program in a virtual setting is the ability to amend the curriculum for remote instruction. There are several categories of public schools, which include magnet and charter schools. However, magnets and charters have features that allow both to have greater autonomy over the curriculum. While charter schools are guided by a contract that gives autonomy, magnet schools are subject to the regulations and guidelines of the public-school administration. The research questions are as follows:

1. What were the enrollment trends and demographic characteristics of prekindergarten students in HISD in the 2020–2021 school year based on prekindergarten campus type (SBP, ECC, charter/magnet)?
2. What strategies were implemented by HISD's Early Childhood Department to improve outcomes for prekindergarten students in the 2020–2021 school year?
3. What were prekindergarten teachers' perceptions of teaching in a combined learning model (teach simultaneously in person and virtually)?
4. What were HISD prekindergarten parents' perceptions of learning at home?
5. What differences in proficiency in language and literacy, and mathematics were observed among students enrolled in HISD virtual and in-person classrooms during the 2020–2021 school year?

While charter and magnet schools have autonomy over curriculum, HISD was able to leverage resources toward implementing a distance learning program to support student learning at home during the COVID–19 school closure. HISD launched Home-based Ongoing Mobile Education (HISD@H.O.M.E.) program to bring parents, students, and educators together with the objective of supporting students at home and virtually (HISD, 2020a). HISD@H.O.M.E. provided instructor-led lessons in English and Spanish for students of all grade levels on HISD TV.

Method

Currently, there is only one district-wide assessment administered to prekindergarten students. As a result, the evaluation used a single source of data for continuous improvement to examine the performance of prekindergarten students who learned in virtually and in-person combined classrooms. The performance of prekindergarten students who attended SBPs, ECCs, charter/magnet schools was compared across two measures of school readiness, language and literacy proficiency, and mathematics proficiency.

Data Collection

Teacher survey. The prekindergarten teachers completed an online survey that included measures of perception, experience, and expectations teaching in a combined environment. The survey was disseminated via email between February 15–March 31, 2021. An introductory email was sent out by lead teachers to their network of prekindergarten teachers. Following the initial email, Research and Accountability Department sent weekly reminders to the 845 HISD prekindergarten teachers. A total of 485 surveys were received, a response rate of 57.4 percent. Power analysis indicated that a sample of 466 responses would have a 99% confidence level ($\pm 4\%$) based on the population size.

Of the sample of surveys received, 71.5 percent were from teachers who taught at an SBP ($n=343$), 14.4 percent from teachers who taught at an ECC ($n=69$), 8.8 percent from teachers who taught at a charter school ($n=42$), and 5.4 percent from teachers who taught at a magnet school ($n=26$). Teacher respondents had an average of 14.1 years of teaching experience (S.D. 9.4). In terms of prekindergarten program type, most of the teachers who completed the survey were from Traditional English (35.6%), Traditional Bilingual (27.3%), ESL (14.0%), Dual Language (11.3%), and Preparation for Adult Living (PALs) (11.9%).

Parent survey. The prekindergarten parents completed an online survey in either English or Spanish that included questions on parents' perceptions, experiences, and expectations supporting their child's learning in a combined classroom environment. The online survey was disseminated from March 22–April 30, 2020, to the 10,360 parents of HISD prekindergarten students. Biweekly dissemination of the survey via a listserv to parents' email addresses followed by reminder text messages.

A total of 2,136 parent surveys were received, with a response rate of 20.6 percent. Removal of incomplete and duplicate surveys left a total of 1,581 surveys, 901 English and 680 Spanish. Power analysis indicated that based on the population size (N=10,360 prekindergarten students), a sample of 1,564 responses would have a 99% confidence level ($\pm 3\%$). Most parents reported that their child attended an SBP (72.4%), followed by ECC (15.1%), and magnet/charter school (12.6%).

Academic performance. As a measure of progress toward school readiness, the evaluation used the CIRCLE online assessment tool designed to monitor the academic progress of prekindergarten children ages three years and six months to four years and eleven months. HISD currently uses this standardized, criterion-referenced assessment to determine children's growth over time in the areas of language and literacy, and mathematics.

Appendix–A, Table A1, (p. 18) shows the list of subtests HISD administered to students during the 2020–2021 school year and associated cut points. English and Spanish versions of the CIRCLE assessment were administered three times a year to HISD prekindergarten students. Assessment “waves” occurred at the beginning-of-year (BOY; Wave 1), middle-of-year (MOY; Wave 2), and end-of-year (EOY; Wave 3). CIRCLE progress monitoring uses dichotomous benchmarks that indicate if a student is proficient or not proficient (Children's Learning Institute, 2019a).

Measures

From the parent and teacher survey, several Likert-type variables were merged into scale variables using the factor analysis technique, Cronbach's alpha (α). Cronbach's alpha provides evidence that the items in the scale were sufficiently intercorrelated and that the grouped items measured the underlying variable (Sullivan & Artino, 2013). A Cronbach's alpha of $\leq .50$ is unacceptable, $\geq .60$ is poor, $\geq .70$ is acceptable, $\geq .80$ is good, and $\geq .90$ is excellent. The Likert scales were normally distributed, and Cronbach's alpha indicated

reliability or internal consistency for all measures ranging from acceptable to excellent.

Parental involvement. Parents were asked if someone was always present to assist child(ren) with schoolwork, encourage child(ren) to participate in physical activity and exercise at home, set expectations and established routines for their child(ren), and created a dedicated learning space. Parental involvement was measured on a scale of *always* (4) to *never* (1). Cronbach's alpha for parental involvement was acceptable ($\alpha=0.78$).

Technical skills. Ten items from the teacher survey were used to measure teachers' and parents' perception of the level of technical skills present. Using a scale of (1) *poor* to (4) *excellent* teachers were asked to rate their level of technical skills to teach in a combined environment, to support parents with virtual learning at home, their students' technical skills, and district technical support. Cronbach's alpha for technical skills items was good ($\alpha=0.83$).

Sample

The sample of students used in this evaluation was drawn from the 10,360 students who participated in the HISD prekindergarten programs in the 2020–2021 academic year. The PEIMS 2020–2021 HISD student database was merged with the HISD CIRCLE 2020–2021 database to create a list of prekindergarten students tested in the 2020–2021 academic year. After merging the data, students were removed who had either multiple subtest administrations in English and/or Spanish, incomplete or no scores, had not achieved a minimum score greater than zero on the literacy or mathematics subtests, or had not completed both BOY and EOY for a specific subtest.

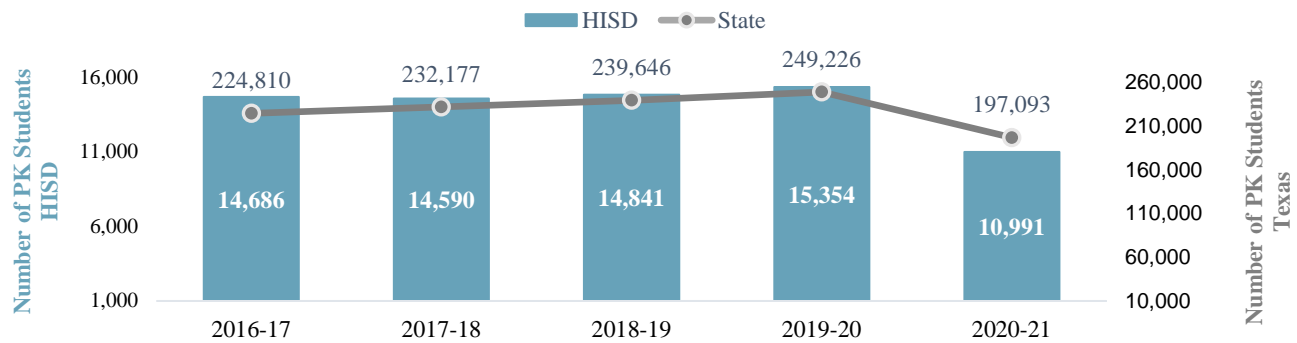
Statistical Analyses

The evaluation provided a descriptive analysis of teacher and parent perceptions of in-person and virtual learning at HISD ECCs, SBPs, and charter/magnet schools. Descriptive statistics are provided for the beginning-of-year and the end-of-year academic performance of prekindergarten students in language and literacy, and mathematics. The academic performance of prekindergarten students who participated in virtual learning was compared to in-person learners.

Limitations

The CIRCLE assessment was “not designed or evaluated for use for children with disabilities, e.g., language delays, [autism] spectrum disorders, or intellectual disabilities” (Landry et al., 2014, p. 4).

Figure 3: Comparative 5-year change in Prekindergarten student enrollment in HISD and statewide, 2016–2021



Notes: Data was retrieved from PEIMS Data File, PEIMS Snapshot for October of each year, 2016–2017 to 2020–2021, state data was retrieved from PEIMS Standard Reports, 2020–21, <https://rptsrv1.tea.texas.gov/adhocrpt/adspr.html>

Therefore, caution should be exercised when interpreting results in the context of special education status. Due to the COVID-19 pandemic, the district altered the delivery of the PK program providing parents with the option of in-person or remote learning. As a result of the altered delivery and depending on their learning mode, students may not have fully participated in all aspects of the PK program. Taking this into consideration, the evaluation included learning mode as part of the analysis. Finally, the assessment data used in this report was not examined to determine if children participated in either an SBP, ECC or charter/magnet in the years before 2019–2020. Thus, findings should be interpreted as the average impact of prekindergarten programs compared to each other and not over time (Zhai, Brooks-Gunn, & Waldfogel, 2011).

Results

What were the enrollment trends and demographic characteristics of prekindergarten students in HISD in the 2020–2021 school year based on prekindergarten campus type (SBP, ECC, charter/magnet)?

For the 2020–2021 academic year, 50.1 percent of prekindergarten students learned in person, 28.7 percent virtual, and 21.2 percent were combined, alternated between virtual and in-person learning for the first 6-weeks cycle (Figure 2).

Figure 3 presents the prekindergarten student enrollment trends for HISD and Texas from 2016–2017 to 2020–2021. The district historically has provided support to approximately 6.2 percent of the prekindergarten student population in Texas. Prekindergarten students normally account for less than

7 percent of the district’s student population. The number of prekindergarten students in the district showed a decrease of 28.4 percentage points in 2020–2021 from the previous year (10,991 vs. 15,354) (Figure 3). The number of prekindergarten students decreased statewide by 20.9 percentage points from the previous year (Figure 3).

Analysis of the distribution of students by prekindergarten program type for the 2020–2021 school year showed that the majority of prekindergarten students attended school-based programs (SBPs) (82.2%) and early childhood centers (ECCs) (17.3%). (Appendix A, Table A2, p.18). A lower proportion of prekindergarten students attended charter schools (7.3%) and magnet schools (4.1%).

There were fewer prekindergarten students that were less than three-and-half years old that attended an SBP (Appendix A, Table A2, p.18). A higher percentage of students that were less than three-and-half years old were enrolled in charter schools (7.9%) and magnet

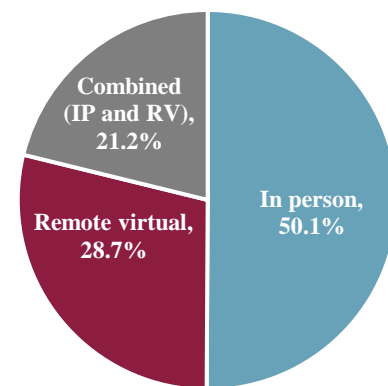


Figure 2. Percentage of students who participated in each learning mode (virtual, in person, combined).

schools (7.0%) compared to SBPs (3.5%). Similarly, more students that were three-and-half years old and less than four years old were enrolled in ECCs (26.2%) and charter schools (25.9%) compared to SBPs (17.0%). A higher percentage of prekindergarten students four years old and older were enrolled in SBPs, 31.3 percent were four years old to less than 4.5 years old, and 48.2 percent were four-and-half years old and older.

When examined across program types, a higher percentage of Black and Hispanic students attended SBPs and ECCs compared to magnet and charter schools. (Appendix A, Table A2, p.18). A higher percentage of Black students attended charter schools (30.5%), and a smaller percentage attended magnet schools (19.3%). A higher percentage of Hispanic students attended ECCs (68.9%), and a smaller percentage attended magnet schools (41.9%).

For socioeconomic status (SES), magnet schools had the lowest percentage of students that were identified as economically disadvantaged (62.6%) compared to ECCs (98.9%), SBPs (94.4%), and charter schools (95.7%) (Table 2) (Appendix A, Table A2, p.18). Charter schools had the lowest percentage of students identified as at-risk (75.3%), followed by magnet schools (85.2%), SBPs (91.5%), and ECCs (93.8%).

A larger percentage of students with limited English proficiency (LEP) attended ECCs (54.1%) compared to SBPs (45.1%), charter schools (47.8%), and magnet schools (33.2%) (Appendix A, Table A2, p.18). Roughly half of the prekindergarten students who attended ECCs were enrolled in bilingual programs (50.3%). A higher proportion of prekindergarten students who attended SBPs (39.4%) and magnet schools (33.6%) were enrolled in bilingual programs compared to charter schools (25.8%).

What strategies were implemented by HISD’s Early Childhood Department to improve outcomes for prekindergarten students in the 2020–2021 school year?

The Early Childhood Team (ECH) from the Elementary Curriculum & Development Office began including virtual learning strategies in their professional development sessions starting the summer of 2020. Since then, the ECH specialists have been exploring the structure of prekindergarten instruction during the pandemic and the virtual components for 3-and-4-year-olds, while adhering to district policy and CDC safety requirements (i.e., social distancing, masks, and no sharing of materials).

To develop the strategy, the ECH team drew from best practices for virtual learning for young learners.

ECH team members shared their insight on strategies they employed with their students during district closure in the spring of 2020 (e.g., workstation choice boards, dramatization, preparing for virtual learning starting with parent communication). In addition, master teachers were observed at the beginning of the year to gain first-hand knowledge of modified instructional strategies being used at campuses to meet the needs of prekindergarten students in combined learning.

Once the strategy was developed, in early October 2020, the ECH team focused on the dissemination of information to campuses. Prekindergarten program leaders met with several ECC principals and Tier II leaders to share and discuss strategies for combined face-to-face and virtual learning. The objective of the meetings was to address concerns brought forward by teachers and administrators relating to combined learning (face-to-face and virtual learning). The ECH team supported teachers in implementing effective strategies for combined and virtual learning through coaching. The team shared guidance and resources with teachers and administrators through virtual and in-person coaching with campuses.

Finally, the ECH team collaborated with the Academic Instructional Technology (AIT) department to create professional development training that supported the implementation of combined and virtual models of instruction for prekindergarten instructors. The virtual PD workshop, *Establishing Routines & Procedures for Concurrent Instruction*, was held on February 4th and 10th. Three virtual sessions were offered each day from 3:30–4:30 p.m., with staggering start times to give teachers different opportunities to attend. The training focused on establishing systems, routines, and procedures for combined instruction. The workshop was attended by 173 teachers.

When asked about their level of satisfaction with the workshop, 36.0 percent of attendees reported that they were satisfied (n=63), and 62.3 percent were very satisfied (n=109). Thematic analysis was conducted of teachers’ responses to the open-ended questions “*what did you most enjoy about today’s presentation*” and “*what you would change about today’s presentation*”. Participants reported that the use of Pear Deck was a great way to model the application of the software in the classroom. The workshop was delivered using Pear Deck for Google Slides, which allows for the add-on of formative assessments and interactive questions to presentations right from Google Slides (Pear Deck, 2020). The presentation format, organization, and knowledge of presenters was a common theme found across survey comments (24.5%)

(Figure 4). Also found to be beneficial was the transition between technology and face-to-face learning, as well as troubleshooting technical problems provided in the workshop (9.5%) (Figure 4). Most teachers reported that they enjoyed the practical examples and ideas (32.0%), videos and resources (21.1%), and training on implementing workstations in a combined learning environment.

What were prekindergarten teachers' perceptions of teaching in a combined learning model (teach simultaneously in person and virtually)?

Teachers shared their perception of various survey items related to challenges observed, supports and training provided, and technology use for teaching in a combined learning environment. There four areas of focus: (i) technical skills (ii) curriculum and classroom instruction, (iii) teacher expectation, (iv) preferred delivery mode.

Technical skills and support

Figure 5 shows that the mean rating (m) for the technical skills indicator was higher for charter/magnet schools (m=2.6) compared to teachers at SBPs (m=2.5) and ECCs (m=2.3). Teachers at charter/magnet schools rated their technical skills to teach in a combined learning environment, in person and virtual simultaneously, higher (m=2.6) than teachers at SBPs (m=2.5) and ECCs (m=2.4). Teachers at ECCs had the highest mean rating for technical skills for virtual learning (m=2.6) compared to teachers at charter/magnet schools (m=2.5) and SBPs (m=2.4) (Figure 5). Teachers at charter/magnet schools also rated their technical skills to support parents with virtual learning at home (i.e., accessing platforms) higher (m=2.5) than teachers at SBPs (m=2.4) and ECCs (m=2.1). Teachers' mean rating for the technical support provided by the district was higher for ECCs (m=2.2) compared to SBPs and charter/magnet schools (m=2.1).

Most teachers reported integrating technology and interactive media in the classroom (tablets, interactive games) before the COVID-19 closures. There was a higher percentage of teachers at ECCs that reported using technology in the classroom before the implementation of the virtual learning model (96.2%) compared to teachers at SBPs (87.8%) and charter/magnet schools (81.4%) (Figure 6).

A point-biserial correlation was conducted to determine the relationship between teachers' use of technology before COVID-19 pandemic and teachers' rating of their technical skills for using technology for

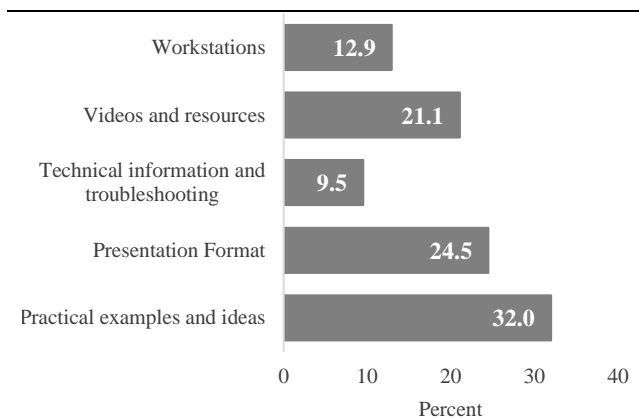


Figure 4. Teacher perception of PD training for virtual learning. February 2021 PD Workshop Survey.

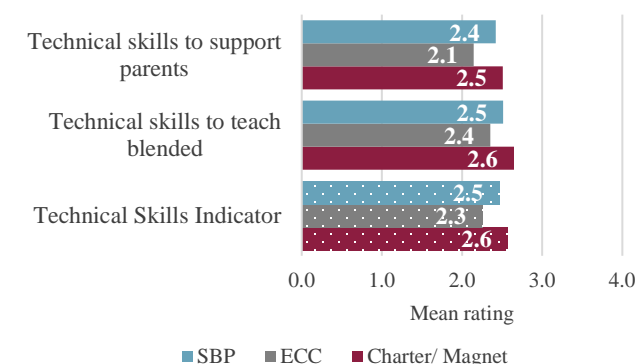


Figure 5. Teachers mean rating of their technical skills by program type

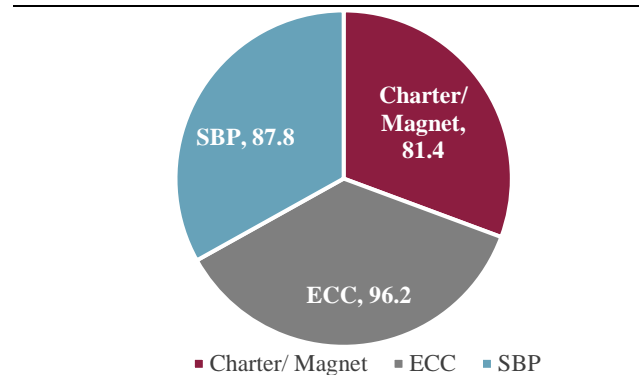


Figure 6. Percentage of teachers that responded 'yes' to integrating technology and interactive media in the classroom (tablets, interactive games) prior to the COVID-19 closures by campus type, Teacher survey, 2021.

virtual learning and support. There was a positive correlation between teachers' use of technology for instruction before the COVID-19 pandemic and technical skills indicator, which was statistically significant ($r_{pb} = .214, n = 385, p = .01$). Teachers who used technology in the classroom before the pandemic had a higher reported mean rating for using technology

in a combined learning environment and supporting parents with virtual learning tools.

Teachers reporting of being very satisfied/satisfied with the apps/platforms used for distance learning was highest across program types for MS Office. Most teachers reported satisfaction with MS Office, 91.5 percent of teachers at SBPs, 88.2 percent at ECCs, and 90.3 percent at charter/magnet schools (**Appendix A, Table A3**, pp. 19–20). The HUB was a districtwide initiative aimed at digitally transforming teaching and learning (HISD, 2021). The HUB had the lowest satisfaction rating across program types, with 66.4 percent of teachers at SBPs, 61.5 percent teachers at charter/magnet schools, and 60.9 percent of teachers at ECCs reported being satisfied. The HUB K–12 online platform was the center of collaboration, personalization, curriculum, instruction, and communication for all HISD staff, students, and parents.

Curriculum and classroom structure

For the curriculum and classroom structure indicator, teachers rated their level of agreement with several items regarding the combined (virtual and in person) learning environment. Overall, across items for the curriculum and classroom instruction indicator, a higher percentage of teachers at charter/magnet schools reported *strongly agree/agree* compared to SBPs and ECCs.

As shown in **Figure 7**, a lower proportion of SBP teachers (50.0%) and ECC teachers (47.1%) reported *strongly agree/agree* that in a combined model the schedule was paced appropriately for explaining content

and assessing progress of the collective class (students learning in person and virtually) compared to charter/magnet schools (65.7%). There was a lower proportion of teachers at SBPs (57.4%) and ECCs (50.7%) that reported *strongly agree/agree* that an adult was always present in the home during virtual learning to assist students with their schoolwork compared to charter/magnet schools (63.6%). The lowest rating was for students’ ability to mostly complete their work without the help of a parent. A lower proportion of teachers reported that they *strongly agree/agree* students were able to complete work without parent’s help, 36.4 percent of teachers at charter/magnet schools, 25.5 percent of teachers at SBPs, and 13.2 percent of teachers at ECCs (Figure 7). The percentage of teachers that reported *strongly agree/agree* that combined classroom allows time to connect and build a relationship with students was lower at ECCs (45.6%) and SBPs (44.9%) compared to teachers at charter/magnet schools (53.7%).

When looking at student performance, there was disparity across campuses for teacher’s confidence level in their students making adequate academic progress with the combined instructional model (Figure 7). A lower proportion of teachers at ECCs (41.2%) and teachers at SBPs (52.2%) reported *strongly agree/agree* that they were confident their students would make academic progress compared to teachers at charter/magnet schools (63.6%). In terms of satisfaction with combined prekindergarten program, across campus types, less than fifty percent of teachers responded *strongly agree/agree*. For prekindergarten program satisfaction, a lower percentage of teachers at ECCs (26.1%) and SBPs (38.4%) responded *strongly agree/agree* compared to teachers at charter/magnet schools (49.3%) (Figure 7).

Teacher expectations

The teacher expectation indicator included several items relating to virtual learning, classroom stress level, student’s school performance, parent communication, and overall quality of the PK program.

In response to how virtual learning went for them as a teacher, approximately one-third of teachers reported *much better/better than expected*. For 30.4 percent of teachers at ECCs, 36.6 percent of teachers at SBPs, and 31.3 percent of teachers at charter/magnet schools indicated that virtual learning was going *much better/better than expected* (**Figure 8**, p. 10). Teachers at ECCs had the highest percentage of teachers reporting that the stress level in the classroom when teaching in person and virtual simultaneously was *much*

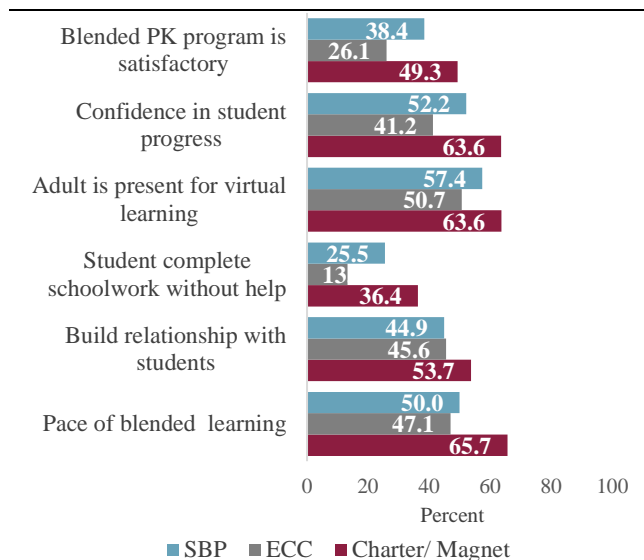


Figure 7. Percentage of teachers that responded strongly agree/ agree on items relating to the blended (virtual and in-person) curriculum and classroom structure by program type

better/better than expected (50.7%) compared to ECCs (29.9%) and SBPs (21.7%).

Approximately thirty percent of teachers across campus types reported that their student’s performance for the 2020–2021 school year was *much better/better than expected*. A higher percentage of teachers at charter/magnet schools (33.8%) and SBPs (33.5%) reported their students’ performance was *much better/better than expected* compared to teachers at ECCs (24.6%) (Figure 8). Similarly, a higher percentage of teachers at SBPs (49.9%) and charter/magnet schools (47.8%) reported parents' frequency of communication was *much better/better than expected* compared to teachers at ECCs (35.3%).

Across campus types, approximately one-third of teachers reported the quality of the combined (simultaneous in person and virtual) prekindergarten program was *much better/better than expected*. The largest percent of teachers who reported the quality of the combined learning mode was *much better/better than expected* was for ECCs (36.2%) and charter/magnet schools (32.8%) compared to SBPs (27.9%) (Figure 8).

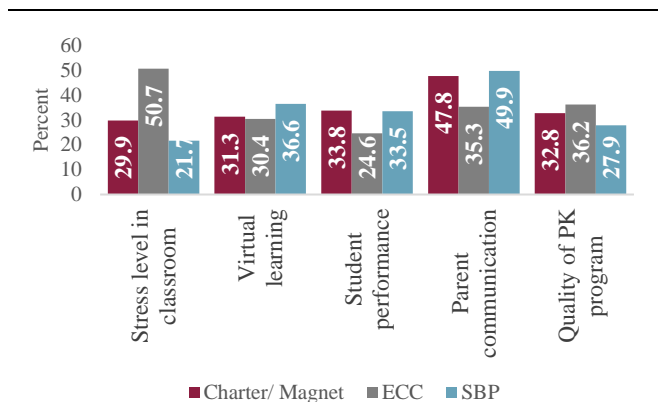


Figure 8. Percentage of teachers that responded much better or better than expected on items relating to their expectations for in-person / virtual learning model by program type

	Learning Mode	Charter/ Magnet	ECC	SBP
Difficult preparation	Blended	77.6	88.4	85.8
Easiest preparation	In-person	64.2	81.2	72.8
Least amount preparation time	Blended	76.1	79.1	71.8
Greatest amount preparation time	In-person	50.0	52.3	57.0
Most effective method	In-person	78.8	97.1	85.3
Least effective method	Virtual	57.6	51.5	52.8

Table 2. Teachers’ perceptions of learning modes used in 2020–2021 academic year by program type

Instructional delivery mode

The district has used several learning modes for the 2020–2021 academic year, including combined classroom (simultaneously teach students in class and online), in person, and virtual (Table 2). Teachers responded to several questions on the mode they found to be the most difficult and easiest, requiring the greatest and least amount of time, and the most and least effective for prekindergarten students.

In terms of preparation time, most teachers reported that combined learning required the greatest amount of preparation time, 79.7 percent of teachers at ECCs, 76.1 percent of teachers at charter/magnet schools, and 71.8 percent of teachers at SBPs (Table 2). Almost half of the teachers reported fully in person required the least amount of time for preparation, 50.0 percent of teachers at charter/magnet schools, 52.3 percent at ECCs, and 57.0 percent at SBPs. A lower percentage of teachers at charter/magnet schools reported the most effective method for prekindergarten student learning was fully in person (78.8%) compared to 97.1 percent of teachers at ECCs and 85.3 percent at SBPs (Table 2). Over fifty percent of teachers identified fully virtual as the least effective mode for prekindergarten student learning, 57.6 percent of teachers at charter/magnet schools, 51.5 percent to ECC teachers, and 52.8 percent of SBP teachers (Table 2).

What were HISD prekindergarten parents’ perceptions of learning at home?

In reviewing parent’s survey responses relating to their perception of learning at home in the 2020–2021 academic year, this section uses descriptive statistics (counts, means, standard deviations, and percentages) to examine parents experience and involvement, with virtual learning.

Parent involvement

Parents were asked whether someone was present to assist their child with schoolwork. More parents of prekindergarten students were enrolled at ECCs (83.9%) and SBPs (86.9%) responded *strongly agree/agree* someone was present to assist child with schoolwork compared to charter/magnet schools (78.6%) (Figure 9, p. 11). Parent reported that the average amount of time that a kindergartener spent on schoolwork was less than 1 hour for 52.1 percent of ECC parents (n=122), 45.6 percent of charter/magnet school parents (n=89), and 43.0 percent of SBP parents (n=485) (Appendix A, Table A3, pp. 19–20). Also, there was a higher percentage of parents for prekindergartners at SBPs that

reported 1–2 hours each day spent on schoolwork (37.9%) compared to 30.3 percent of parents of prekindergartners at ECCs and 26.7 percent of charter/magnet school parents (Figure 9).

Most parents reported that they encouraged their child to participate in physical activity and exercise while at home. The highest reporting for participation in physical activity was from parents of students attending ECCs (97.5%) and SBPs (97.4%) compared to charter/magnet schools (95.9) (Figure 9).

When asked whether they set expectations and established routines, most parents reported *strongly agree/agree*, 95.4 percent of charter/magnet school parents, 94.5 percent ECCs, and 95.9 percent SBPs (Appendix A, Table A3, pp. 19–20). In terms of creating a dedicated learning space, more parents of prekindergartners at charter/magnet schools (92.9%) and SBPs (92.5%) reported that they *strongly agree/agree* compared to ECCs (88.9%) (Figure 9).

Technical skills and support

As part of the combined learning model, students needed access to reliable technology and the internet. A higher percentage of parents whose prekindergartner attended an SBP reported their child has access to reliable internet (94.2%, n=1,038), compared to 93.8 percent for charter/magnet schools (n=179) and 90.8 percent for ECCs (n=206) (Figure 10). A lower percentage of parents whose prekindergartner attended an SBP reported their child has access to reliable technology for instructional purposes (92.5%, n=1,028) compared to 92.9 percent for charter/magnet schools (n=182) and 93.5 percent for SBPs (n=215) (Figure 10).

As shown in Figure 11, when asked who provided the computer or digital device used for educational purposes, a higher percentage of parents of children who attended ECCs (73.5%) reported the device was provided by their child’s school or school district compared to 63.0 percent of parents whose child attended an SBP and 39.8 percent of charter/magnet school parents (Figure 11). A higher percentage of parents of prekindergartners at charter/magnet schools reported the device belonged to the child (28.6%) compared to 23.6 at SBPs and 15.5 percent at ECCs. A lower proportion of parents whose child attended an SBP or ECCs reported that the device was provided by someone in the household or family (12.7% and 9.7%, respectively) compared to charter/magnet school (31.6%)

Parents reporting of being very satisfied/satisfied with the apps/ platforms used for distance learning was highest across program types for MS Teams. Most

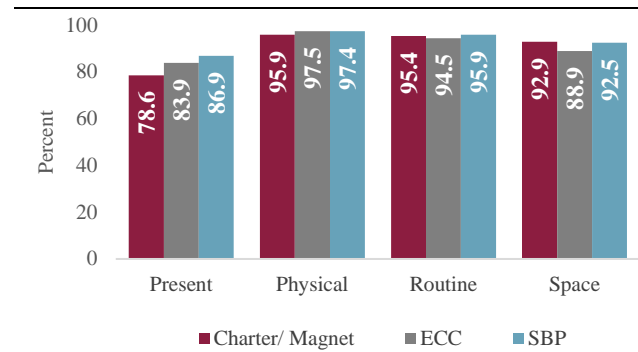


Figure 9. Percentage of parents who reported strongly agree/ agree survey items related to parent involvement by program type

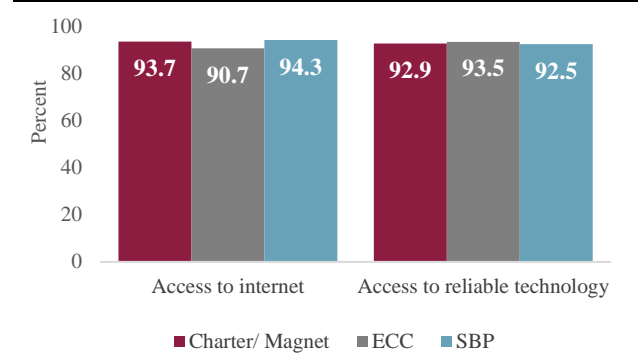


Figure 10. Percentage of parents that responded yes students had access at home to reliable internet and technology by program type

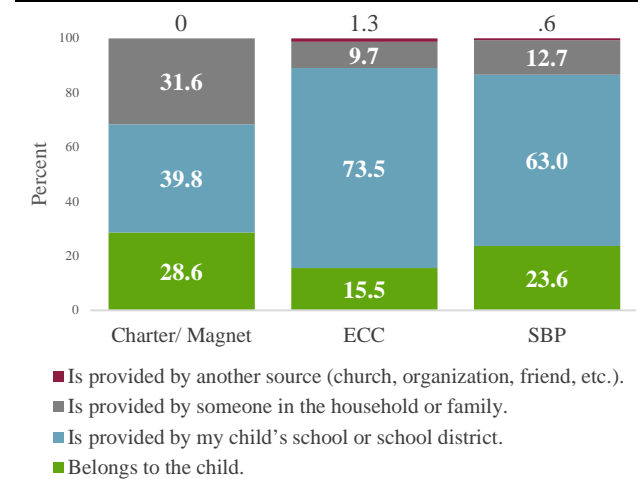


Figure 11. Percentage of parents that responded on source of technology used for virtual learning by program type

parents reported satisfaction with MS Office, 94.9 percent of parents of prekindergartners at SBPs, 97.4 percent at ECCs, and 92.8 percent at charter/magnet schools (Appendix A, Table A3, pp. 19–20). Relative to teachers, the HUB had the lowest satisfaction rating across program types, with 88.9 percent of prekindergarten parents at SBPs, 81.1 percent parents at charter/magnet schools, and 90.1 percent of parents at ECCs.

Student challenges

Parents were asked about challenges their child faced with virtual learning (access materials, understand assignments, receive regular feedback, and keep up with work). A higher percentage of ECC parents reported their child could not access all materials for the class (38.2%) compared to 37.3 percent at SBPs and 31.7 percent at charter/magnet schools (Appendix A, Table A3, pp. 19–20). A higher percentage of parents ECCs (33.2%) and charter/magnet schools (32.2%) reported their child does not understand the assignments compared to 29.0 percent of SBP parents.

Across program type, a quarter of parents reported that their child could not keep up with the work assigned, 25.6 percent at charter/magnet schools (n=51) and 25.3 percent of SBPs (n=289) compared to 30.3 percent of parents at ECCs (n=72) (Appendix A, Table A3, pp. 19–20). A higher percentage of parents whose prekindergartner attended a charter/magnet school, 26.6 percent (n=53), reported their child does not get regular feedback from the teacher compared to 21.6 percent for SBPs (n=247) and 21.5 percent for ECCs (n=51) (Appendix A, Table A3, pp. 19–20).

Parents' expectations

When asked about their expectations for in-person and virtual learning, parents were asked questions about their expectations relating to virtual learning, stress level at home, child's school performance, their ability to help with schoolwork, and quality of the PK program.

In response to how virtual learning went for them as a parent, less than half of parents reported *much better/better than expected*. For 48.7 percent of parents of prekindergartners at ECCs, 46.3 percent of parents of prekindergartners at SBPs, and 39.3 percent of parents of prekindergartners at charter/magnet schools reported virtual learning was going *much better/better than expected* (Figure 12). Similarly, a low percentage of charter/magnet school parents described the stress level in your home related to virtual learning as *much better/better than expected* (37.7 %) compared to 31.0 percent for SBPs and 22.4 percent for charter/magnet schools (Figure 12).

Over fifty percent of parents across campus types reported that their child's school performance was *much better/better than expected* (Figure 12). The highest percentage of parents who reported their child's school performance was *much better/better than expected* was for ECCs (70.8%) compared to parents of prekindergartners at SBPs (66.7%) and charter/magnet schools (50.5%) (Figure 12). A high percentage of parents reported that they have been able to help with

their child's schoolwork *much better/better than expected* at SBPs (65.2%) and ECCs (64.1%) compared to charter/magnet schools (45.6%).

Across campus types, over two-thirds of parents reported the quality of the prekindergarten program was *much better/better than expected* (Figure 12). The largest percent of parents who reported the quality of the prekindergarten program was *much better/better than expected* was for SBPs (75.6%) and ECCs (73.1%) compared to charter/magnet schools (60.4%).

As shown in Figure 13, most parents reported *strongly agree/agree* that it was very important that their child participated in the prekindergarten program, with 98.7 percent of parents at ECCs, 97.3 percent of parents of prekindergartners at SBPs, and 95.9 percent of parents of prekindergartners at charter/magnet schools responding *strongly agree/ agree*. However, in terms of academic progress, across campus types, fewer parents responded *strongly agree/agree*. For parents of prekindergartners at SBPs, 76.6 percent responded

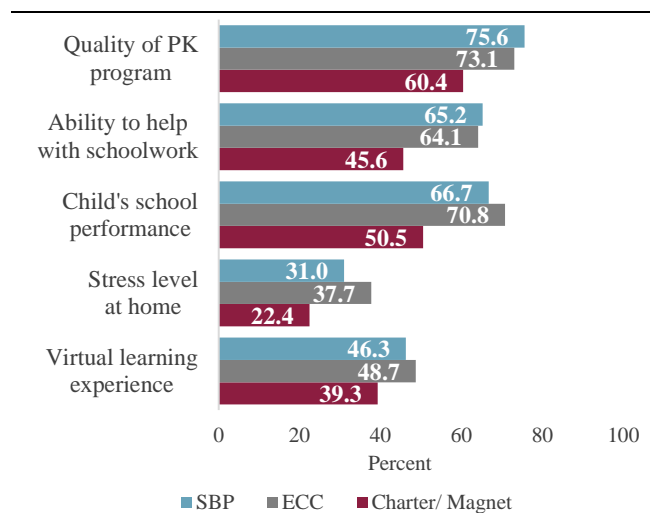


Figure 12. Percentage of parents that responded much better or better than expected on items relating to their expectations for in-person and virtual learning by program type

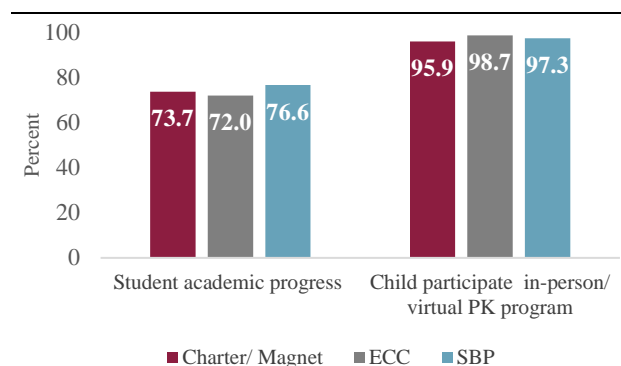


Figure 13. Percentage of parents that responded strongly agree/agree on items relating to expectations with virtual learning by program type

strongly agree/agree that they are confident their child will make adequate academic progress this year through virtual learning, 73.7 percent of parents of prekindergartners at charter/magnet schools, and 72.0 percent of parents of prekindergartners at ECCs (Figure 13).

What differences in proficiency in language and literacy, and mathematics were observed among students enrolled in HISD virtual and in-person classrooms during the 2020–2021 school year?

The analyses used descriptive statistics to examine the performance of prekindergarten students on the 2020–2021 CIRCLE language and literacy subtests and math subtests. Results were analyzed by age groups and learning mode of prekindergarten students. There are three language and literacy subtests (rapid letter naming, rapid vocabulary, and syllabication) and four math subtests (counting sets, number naming, rote counting, and shape naming) included in this report. Across age groups and test language, students who learned in person showed *higher increases in academic performance* in content-specific areas (language and literacy and mathematics) (**Appendix A, Table A4 – A7, p. 21**).

Language and Literacy

English-language test-takers, across age groups, showed higher growth in proficiency on the rapid letter naming and syllabication subtests. A higher percentage of PK3 students who learned remotely met the proficiency benchmark on the rapid letter naming subtest at the beginning of the year (35.8%) compared to in-person learners (25.0%) (**Figure 14**). By the end of the year, 60.3 percent of PK3 English-language test-takers who learned in person were proficient on the rapid letter naming subtest compared to 57.9 percent of remote learners. A higher percentage of PK4 English-language test-takers who learned remotely met the proficiency benchmark on the rapid letter naming subtest at the beginning of the year (54.4%) compared to in-person learners (44.2%) (**Figure 15**). By the end of the year, 76.5 percent of PK4 English-language test-takers who learned in person were proficient on the rapid letter naming subtest and 75.1 percent of remote learners.

The highest increase on the language and literacy assessment for PK3 English-language test-takers was the syllabication subtest (**Appendix A, Table A4, p. 21**). Students who learned remotely showed a 37.9 percentage point increase from BOY to EOY compared

to a 42.5 percentage point increase for students who learned in person. There was a 54.0 percentage point increase on the syllabication subtest for PK4 students who learned in person compared to a 46.1 percentage point increase for remote learners (**Appendix A, Table A5, p. 21**).

The lowest increase on the language and literacy assessment across age groups was the rapid vocabulary subtest. PK3 English-language test-takers who learned in person showed a 13.4 percentage point increase from BOY to EOY compared to a 1.4 percentage point increase for remote learners (Appendix A, Table A4, p. 21). Similarly, PK4 students who learned in person showed a 12.2 percentage point increase from BOY to EOY compared to a 4.3 percentage point increase for remote learners (Appendix A, Table A5, p. 21).

Spanish-language test-takers, across age groups, showed lower growth in proficiency on the rapid vocabulary subtest. A lower percentage of PK3 students

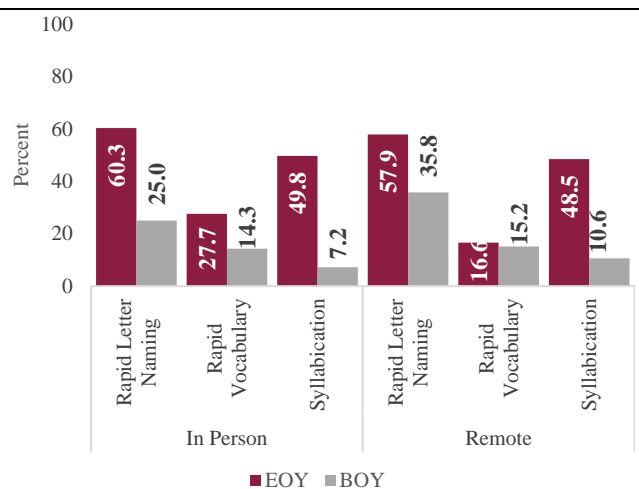


Figure 14. Proficiency of HISD PK3 students on 2020–2021 English CIRCLE language and literacy subtests by learning mode

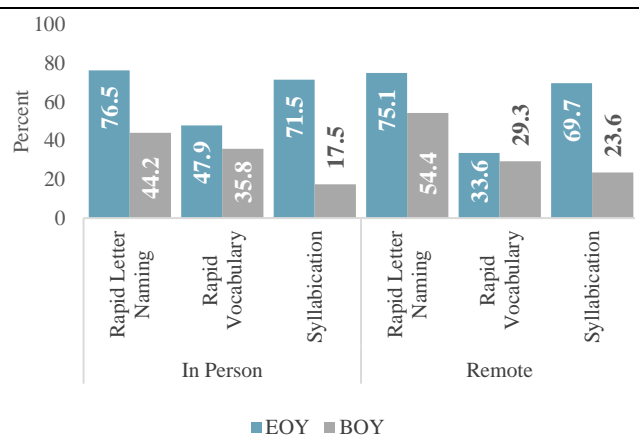


Figure 15. Proficiency of HISD PK4 students on 2020–2021 English CIRCLE Language and Literacy subtests by learning mode

who learned remotely met the proficiency benchmark on the rapid vocabulary subtest at the beginning of the year (11.1%) compared to in-person learners (13.6%) (Figure 16). By the end of the year, 42.5 percent of PK3 students who learned in person were proficient on the rapid letter naming subtest compared to 38.0 percent of remote learners. A comparable percentage of PK4 students who learned remotely (19.3%) and in person (20.1%) met the proficiency benchmark on the rapid letter naming subtest at the beginning of the year (Figure 17). By the end of the year, 65.2 percent of PK4 students who learned in person were proficient on the rapid letter naming subtest compared to 61.3 percent of remote learners.

The highest increase on the language and literacy assessment for PK3 Spanish-language test-takers was on the rapid letter naming subtest (Appendix A, Table A4, p. 21). Students who learned remotely showed a 45.2 percentage point increase from BOY to EOY compared to a 58.8 percentage point increase for students who learned in person on the rapid letter naming subtest. There was a 67.5 percentage point increase on the syllabication subtest for PK4 students who learned in person compared to a 59.8 percentage point increase for remote learners (Appendix A, Table A5, p. 21).

The lowest increase on the language and literacy assessment across age groups was the rapid vocabulary subtest (Appendix A, Table A4–A5, p. 21). PK3 Spanish-language test-takers who learned in person showed a 28.9 percentage point increase from BOY to EOY compared to a 26.9 percentage point increase for remote learners. Similarly, PK4 Spanish-language test-takers who learned in person showed a 45.2 percentage point increase from BOY to EOY compared to a 42.0 percentage point increase for remote learners (Appendix A, Table A5, p. 21).

Mathematics

Of the four math subtests, English-language test-takers, across age groups, showed a lower percentage of students at the beginning of the year who met proficiency on the rote counting subtest (Appendix A, Table A6–A7, p. 22). A lower percentage of PK3 students who learned in person met the proficiency benchmark on the rote counting subtest at the beginning of the year (8.0%) compared to remote learners (12.8%) (Figure 18). By the end of the year, 23.3 percent of PK3 students who learned in person were proficient on the counting sets subtest compared to 29.3 percent of remote learners. A lower percentage of PK4 students who learned in person met the proficiency benchmark on the rote counting subtest at the beginning of the year

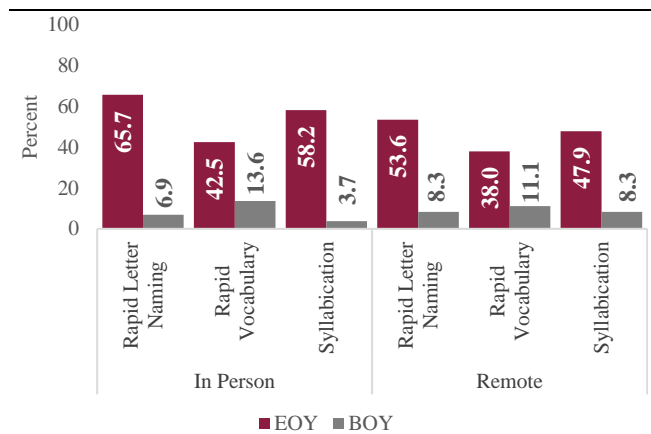


Figure 16. Proficiency of HISD PK3 students on 2020–2021 Spanish CIRCLE Language and Literacy subtests by learning mode

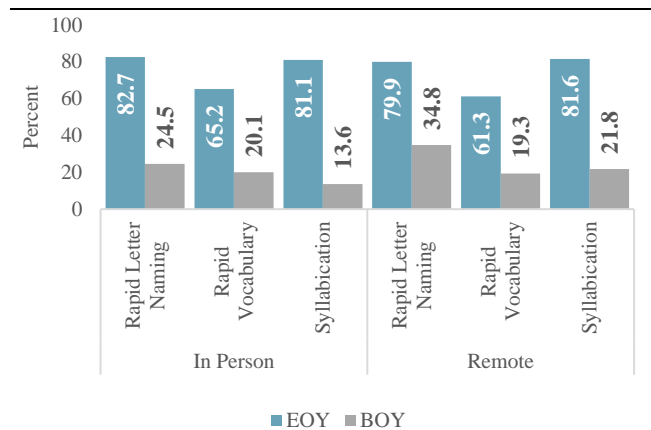


Table 17. Proficiency of HISD PK4 students on 2020–2021 Spanish CIRCLE Language and Literacy subtests by learning mode

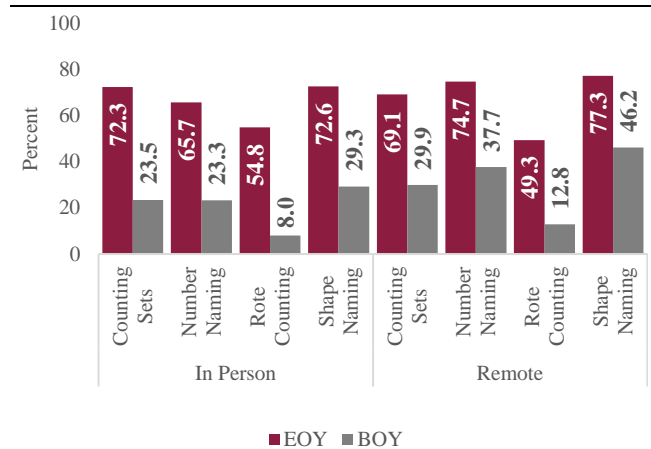


Figure 18. Proficiency of HISD PK3 students on 2020–2021 English CIRCLE math subtests by learning mode

(21.7%) compared to remote learners (28.6%) (Figure 19, p. 15). By the end of the year, 21.7 percent of PK4 students who learned in person were proficient on the rote counting subtest compared to 28.6 percent of remote learners.

For PK3 English-language test-takers, there was a higher percentage point increase on the counting sets subtest (Appendix A, Table A6, p.22). PK3 in-person learners showed a 48.9 percentage point increase from BOY to EOY on counting sets subtest compared to a 39.3 percentage point increase for remote learners. There was a 52.0 percentage point increase from BOY to EOY on the rote counting subtest for PK4 students who learned in person compared to a 45.0 percentage point increase for remote learners (Appendix A, Table A7, p. 22).

The lowest increase on the mathematics assessment for PK3 English-language test-takers was on the shape naming subtest. Students who learned in person showed a 43.3 percentage point increase from BOY to EOY compared to a 31.0 percentage point increase for remote learners (Appendix A, Table A6, p. 22). PK4 English-language test-takers who learned in person showed a 52.0 percentage point increase from BOY to EOY on the rote counting subtest compared to a 45.0 percentage point increase for remote learners (Appendix A, Table A7, p. 22).

Spanish-language test-takers in PK3 demonstrated a lower percentage point increase on the rote counting subtest. A higher percentage of PK3 students who learned remotely met the proficiency benchmark on the rote counting subtest at the beginning of the year (3.3%) compared to in-person learners (0.3%) (Figure 20). By the end of the year, 41.3 percent of PK3 students who learned in person were proficient on the rote counting subtest compared to 35.5 percent of remote learners. However, PK3 Spanish-language test-takers who learned remotely showed a lower percentage point increase from BOY to EOY (32.2%) compared to in-person learners (41.0%) (Appendix A, Table A6, p. 22).

The lowest percentage point increase for PK4 Spanish-language test-takers was on the number naming subtest (Appendix A, Table A7, p. 22). A higher percentage of PK4 students who learned remotely met the proficiency benchmark on the number naming subtest at the beginning of the year (36.3%) compared to in-person learners (26.3%) (Figure 21). By the end of the year, a comparable percentage of learners met the proficiency benchmark on number naming. There were 84.8 percent of PK4 students who learned in person who were proficient on the number naming subtest compared to 86.0 percent of remote learners. However, PK4 students who learned in person showed a 58.5 percentage point increase from BOY to EOY compared to a 49.7 percentage point increase for remote learners (Appendix A, Table A7, p. 22).

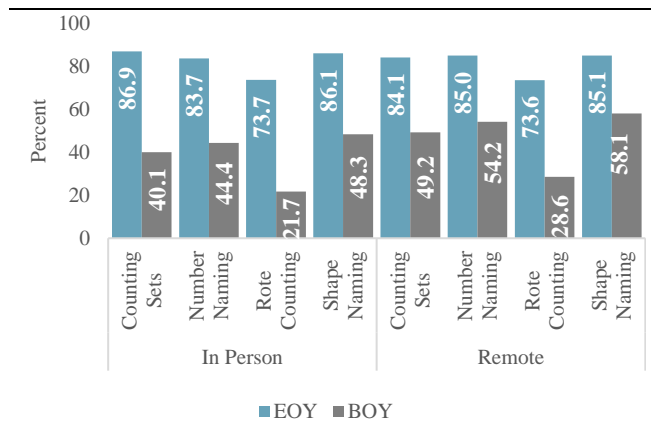


Figure 19. Proficiency of HISD PK4 students on 2020–2021 English CIRCLE math subtests by learning mode

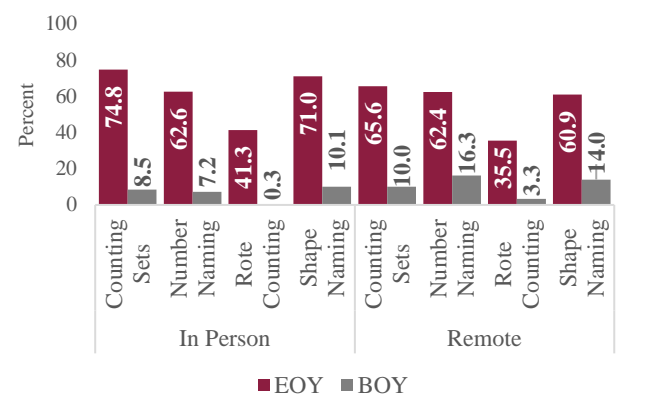


Figure 20. Proficiency of HISD PK3 students on 2020–2021 Spanish CIRCLE math subtests by learning mode

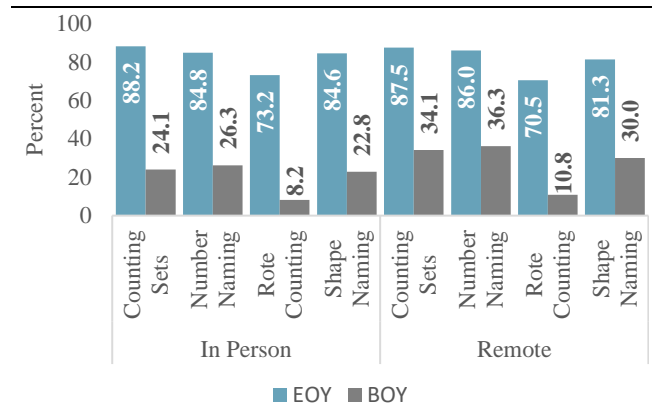


Figure 21. Proficiency of HISD PK4 students on 2020–2021 Spanish CIRCLE math subtests by learning mode

The highest percentage point increase on the mathematics assessment for PK3 Spanish-language test-takers was on the counting sets subtest. Students who learned in person showed a 66.2 percentage point increase from BOY to EOY compared to a 56.6 percentage point increase for remote learners (Appendix A, Table A6, p. 22). The highest increase on the

mathematics assessment for PK4 Spanish-language test-takers was on the rote counting subtest. For PK4 Spanish-language test-takers who learned in person showed a 65.0 percentage point increase from BOY to EOY on the rote counting subtest compared to a 59.7 percentage point increase for remote learners (Appendix A, Table A7, p. 22).

Discussion

Houston Independent School District (HISD) campuses were closed due to the COVID-19 pandemic that gripped the world. Closures due to the pandemic resulted in schools having to adapt quickly to ensure student learning. In the 2020–2021 school year, parents had the option of in-person or virtual learning. However, all HISD students learned virtually for the first 6-week cycle, which meant beginning of the year assessments occurred in different learning environments, at home and/or on campus.

Enrollment in prekindergarten is not mandatory; however, research has shown long-term benefits to early learning. In total, there were 159 HISD campuses that offered the prekindergarten program across three campus types (school-based program, early childhood centers, and charter/magnet schools). The 2020–2021 school year saw a decrease of 28.4 percentage points in the number of prekindergarten students in the district. Of those enrolled in the prekindergarten program, 50.1 percent were learning in person, 28.7 percent virtually, and 21.2 percent alternated between virtual and in person.

With virtual learning, the integration of technology into the prekindergarten curriculum became a necessity. In HISD, early childhood educators reportedly used technology for instruction in the classroom prior to COVID-19. A higher percentage of teachers at ECCs reported using technology in the classrooms before the implementation of the virtual learning model (96.2%) compared to teachers at SBPs (87.8%) and charter/magnet schools (81.4%). Prior research has shown effective integration of technology for instruction had a positive effect on students' academic achievement (Reeves, Gunter, & Lacey, 2017; Shifflet, Mattoon, & Bates, 2020). However, technology and interactive media have not been included in teacher education, creating a knowledge gap (NAEYC, 2017).

Teachers reported a high confidence level that their students would make academic progress, 41.2 percent of teachers at ECCs, 52.2 percent at SBPs, and 63.6 percent of teachers at charter/magnet schools. Similarly, across campuses, over two-thirds of parents reported the quality

of the prekindergarten program was *much better / better than expected*.

Parents' level of involvement was comparable across campuses for several survey items (someone was present to help with schoolwork, creating opportunities for physical activity and exercise, setting expectations, establishing routines, and creating a dedicated learning space). Over ninety percent of parents reported *strongly agree/agree* that they encouraged physical activity and established a routine. A lower proportion of parents reportedly agreed someone was always present to help with schoolwork, with the highest reporting from parents of SBPs (86.9%) and the lowest from charter/magnet school parents (78.6%). The highest percentage of parents who reported their child's school performance was *much better/better than expected* was for ECCs (70.8%) compared to parents of prekindergartners at SBPs (66.7%), and charter/magnet schools (50.5%).

Across age groups and test languages, students who learned in person showed a higher increase in academic performance in content-specific areas (language and literacy, and mathematics). These findings align with current research that found attending a virtual school led to a reduction in English language arts, mathematics, science, and social studies achievement test scores for elementary and middle school students (Bueno, 2020).

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APPENDIX–A

Table A1. Cut scores for CIRCLE subtests administered to HISD students in the 2019–2020 school year

SUBTESTS	3.0 - <3.5		3.5 - <4.0		4.0 - <4.5		4.5 or above		
	English	Spanish	English	Spanish	English	Spanish	English	Spanish	
LANGUAGE AND LITERACY	Rapid Letter Naming	***	***	8	6	14	10	14	13
	Rapid Vocabulary	10	7	12	9	19	16	20	16
	Phonological Awareness Total Score*	9	7	12	11	15	13	17	15
	Syllabication*	***	***	6	5	6	5	6	5
	Alliteration*	***	***	6	5	6	5	6	5
	Words in a Sentence*	***	***	4	3	4	3	4	3
	Rhyming I*	***	***	7	5	7	5	7	5
MATHEMATICS	Math Total Score	11	10	13	13	18	17	20	20
	Rote Counting	***	***	2	2	2	2	2	2
	Shape Naming	***	***	4	4	4	4	4	4
	Number Discrimination	***	***	2	2	2	2	2	2
	Number Naming	***	***	3	3	3	3	3	3
	Shape Discrimination	***	***	5	5	5	5	5	5
	Counting Sets	***	***	4	4	4	4	4	4

Source. Adapted from Children’s Learning Institute (August 2018). CIRCLE Progress Monitoring Cut Points. University of Texas Children’s Learning Institute: Houston, TX.

Note. If a student scores at or above cut points determined for a particular measure, they are considered proficient. If a student scores below the benchmark, they are considered ‘developing’ (refers to students younger than four years old) or ‘emerging’ (for students four years old and older). Those age groups with not cut points are identified as *** and those subtests that are not administered in Spanish have a dash (-).

Table A2: Demographic characteristics HISD prekindergarten students by program type, 2020–2021

	HISD Early Childhood Center		HISD School Based Program		HISD School Based Charter Program		HISD School Based Magnet Program		
	n	%	n	%	n	%	n	%	
Overall Sample	1,957	17.8	7,789	70.8	799	7.3	446	4.1	
Age	3.0 to 3.49	123	6.3	275	3.5	63	7.9	31	7.0
	3.5 to 3.99	514	26.3	1,321	17.0	207	25.9	88	19.7
	4 to 4.49	512	26.2	2,435	31.3	212	26.5	142	31.8
	4.5 and up	808	41.3	3,758	48.2	317	39.7	185	41.5
Gender	Female	1,009	51.6	3,916	50.3	400	50.1	229	51.3
	Male	948	48.4	3,873	49.7	399	49.9	217	48.7
Ethnicity	Black	532	27.2	1,938	24.9	244	30.5	86	19.3
	Hispanic	1,349	68.9	5,180	66.5	498	62.3	187	41.9
	White	34	1.7	317	4.1	30	3.8	71	15.9
Home Language	Spanish	1,036	52.9	3,489	44.8	374	46.8	103	23.1
	English	866	44.3	3,848	49.4	385	48.2	236	52.9
Economically Disadvantage	Other	55	2.8	452	5.8	40	5.0	107	24.0
	No	21	1.1	439	5.6	34	4.3	167	37.4
At-Risk	Yes	1,936	98.9	7,350	94.4	765	95.7	279	62.6
	No	122	6.2	665	8.5	197	24.7	66	14.8
Limited English Proficiency (LEP)	Yes	1,835	93.8	7,124	91.5	602	75.3	380	85.2
	No	899	45.9	4,280	54.9	417	52.2	298	66.8
Bilingual Program	Yes	1,058	54.1	3,509	45.1	382	47.8	148	33.2
	No	972	49.7	4,717	60.6	593	74.2	296	66.4
English Learners (ELs)	Yes	985	50.3	3,072	39.4	206	25.8	150	33.6
	No	1,888	96.5	7,207	92.5	623	78.0	397	89.0
SPED	Yes	69	3.5	582	7.5	176	22.0	49	11.0
	No	1,870	95.6	7,468	95.9	764	95.6	433	97.1
	Yes	87	4.4	321	4.1	35	4.4	13	2.9

Source. 2020–2021 PEIMS student databases. Retrieved from OnPoint, February 10, 2021

Table A3. Descriptive statistics for HISD Prekindergarten Parent Survey Responses, 2020-2021

Survey items	Scale	Charter/ Magnet		ECC		SBP	
		n	%	n	%	n	%
Device provider The computer or digital device used for educational purposes (i.e., laptop, tablet)	Belongs to the child.	56	28.6	37	15.5	269	23.6
	Is provided by another source (church, community organization, friend, etc.).	0	0.0	3	1.3	7	0.6
	Is provided by my child’s school or school district.	78	39.8	175	73.5	718	63.0
	Is provided by someone in the household or family.	62	31.6	23	9.7	145	12.7
Pace of the PK program The schedule and pace of virtual learning was appropriate for balancing learning and schoolwork while at home	Strongly agree	54	28.0	89	38.4	384	34.4
	Agree	87	45.1	98	42.2	466	41.8
	Disagree	40	20.7	39	16.8	194	17.4
	Strongly disagree	12	6.2	6	2.6	72	6.5
Access to reliable internet My child has access to reliable internet.	Strongly agree	138	72.3	130	57.3	683	62.0
	Agree	41	21.5	76	33.5	355	32.2
	Disagree	12	6.3	18	7.9	44	4.0
	Strongly disagree	0	0.0	3	1.3	19	1.7
Access to reliable tech My child has access to reliable technology for instructional purposes (computer, tablet, etc.)	Strongly agree	135	68.9	137	59.6	687	61.8
	Agree	47	24.0	78	33.9	341	30.7
	Disagree	11	5.6	14	6.1	58	5.2
	Strongly disagree	3	1.5	1	0.4	25	2.3
Teacher gives feedback My child does not get regular feedback from the teacher.	Strongly agree	18	9.0	18	7.6	78	6.8
	Agree	35	17.6	33	13.9	169	14.8
	Disagree	102	51.3	137	57.6	592	51.7
	Strongly disagree	44	22.1	50	21.0	305	26.7
Child able to keep-up with schoolwork My child cannot keep up with the work being assigned	Strongly agree	13	6.5	21	8.8	94	8.2
	Agree	38	19.1	51	21.4	195	17.0
	Disagree	99	49.7	127	53.4	584	51.0
	Strongly disagree	49	24.6	39	16.4	271	23.7
Able to help child with homework How have you been able to help your child with their schoolwork?	About what was expected	71	36.4	56	23.9	275	24.4
	Better than expected	42	21.5	81	34.6	370	32.8
	Much better than expected	47	24.1	69	29.5	365	32.4
	Not as good as expected	27	13.8	25	10.7	102	9.1
	Worse than expected	8	4.1	3	1.3	15	1.3
Quality of PK program How have you been able to help your child with their schoolwork?	About what was expected	56	28.4	47	20.1	203	18.0
	Better than expected	60	30.5	66	28.2	342	30.3
	Much better than expected	59	29.9	105	44.9	511	45.3
	Not as good as expected	18	9.1	11	4.7	57	5.0
	Worse than expected	4	2.0	5	2.1	16	1.4
Virtual learning How did virtual learning go for you as a parent?	About what was expected	63	32.1	66	28.0	309	27.2
	Better than expected	47	24.0	69	29.2	290	25.6
	Much better than expected	30	15.3	46	19.5	235	20.7
	Not as good as expected	37	18.9	43	18.2	221	19.5
	Worse than expected	19	9.7	12	5.1	80	7.0
Stress level at home How would you describe the stress level in your home related to virtual learning?	About what was expected	69	35.2	74	31.4	357	31.6
	Better than expected	28	14.3	65	27.5	221	19.6
	Much better than expected	16	8.2	24	10.2	129	11.4
	Not as good as expected	39	19.9	41	17.4	233	20.6
	Worse than expected	44	22.4	32	13.6	190	16.8

Table A3. Descriptive statistics for HISD Prekindergarten Parent Survey Responses, 2020-2021, *Continued*

Item	Scale	Charter/ Magnet		ECC		SBP	
		n	%	n	%	n	%
Child's progress I am confident my child will make adequate academic progress this year through virtual in the 2020-21 school year.	Strongly agree	71	36.6	92	39.7	442	39.2
	Agree	72	37.1	75	32.3	422	37.4
	Disagree	41	21.1	50	21.6	205	18.2
	Strongly disagree	10	5.2	15	6.5	59	5.2
Performance So far, how has your child's school performance been?	About what was expected	73	36.9	38	16.1	232	20.6
	Better than expected	53	26.8	93	39.4	393	34.9
	Much better than expected	47	23.7	74	31.4	358	31.8
	Not as good as expected	20	10	27	11	130	12
	Worse than expected	5	2.5	4	1.7	13	1.2
Microsoft Teams	Do not use	1	0.5	0	0.0	7	0.6
	Very satisfied	77	39.5	111	47.2	555	49.0
	Satisfied	104	53.3	118	50.2	519	45.8
	Dissatisfied	11	5.6	2	0.9	8	0.7
	Very dissatisfied	2	1.0	4	1.7	43	3.8
Google	Do not use	38	20.3	22	9.7	126	11.7
	Very satisfied	42	22.5	66	29.1	349	32.5
	Satisfied	98	52.4	127	55.9	553	51.5
	Dissatisfied	6	3.2	3	1.3	8	0.7
	Very dissatisfied	3	1.6	9	4.0	37	3.4
HISD Connect	Do not use	9	4.6	5	2.2	26	2.4
	Very satisfied	55	28.4	84	36.7	434	39.5
	Satisfied	107	55.2	131	57.2	567	51.6
	Dissatisfied	21	10.8	3	1.3	13	1.2
	Very dissatisfied	2	1.0	6	2.6	58	5.3
MS Office	Do not use	26	13.7	17	7.6	90	8.3
	Very satisfied	50	26.3	68	30.2	396	36.6
	Satisfied	105	55.3	130	57.8	544	50.2
	Dissatisfied	5	2.6	1	0.4	9	0.8
	Very dissatisfied	4	2.1	9	4.0	44	4.1
Digital resources	Do not use	5	2.6	3	1.3	12	1.1
	Very satisfied	83	43.5	108	46.4	578	51.9
	Satisfied	91	47.6	111	47.6	457	41.1
	Dissatisfied	11	5.8	2	0.9	18	1.6
	Very dissatisfied	1	0.5	9	3.9	48	4.3
HUB	Do not use	4	2.1	6	2.6	27	2.4
	Very satisfied	56	29.5	81	34.9	472	42.6
	Satisfied	98	51.6	128	55.2	514	46.3
	Dissatisfied	19	10.0	5	2.2	22	2.0
	Very dissatisfied	13	6.8	12	5.2	74	6.7

Table A4. Proficiency of HISD PK3 students on 2020–2021 CIRCLE Language and Literacy subtests by learning mode and test language

Test Language		In Person									Remote								
		BOY				EOY				Percent increase	BOY				EOY			Diff	
		0		1		0		1			0		1		0	1			
		n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	%	
English	Rapid Letter Naming	482	75.0	161	25.0	255	39.7	388	60.3	35.3	194	64.2	108	35.8	127	42.1	175	57.9	22.2
	Rapid Vocabulary	539	85.7	90	14.3	455	72.3	174	27.7	13.4	246	84.8	44	15.2	242	83.4	48	16.6	1.4
	Syllabication	589	92.8	46	7.2	319	50.2	316	49.8	42.5	269	89.4	32	10.6	155	51.5	146	48.5	37.9
Spanish	Rapid Letter Naming	269	93.1	20	6.9	99	34.3	190	65.7	58.8	154	91.7	14	8.3	78	46.4	90	53.6	45.2
	Rapid Vocabulary	254	86.4	40	13.6	169	57.5	125	42.5	28.9	152	88.9	19	11.1	106	62.0	65	38.0	26.9
	Syllabication	286	96.3	11	3.7	124	41.8	173	58.2	54.5	155	91.7	14	8.3	88	52.1	81	47.9	39.6

Note. 0= Not proficient; 1= Proficient

Table A5. Proficiency of HISD PK4 students on 2020–2021 CIRCLE Language and Literacy subtests by learning mode and language

Test Language		In Person									Remote								
		BOY				EOY				Diff	BOY				EOY			Diff	
		0		1		0		1			0		1		0	1			
		n	%	n	%	n	%	n	%	%	n	%	n	%	n	%	n	%	%
English	Rapid Letter Naming	1527	55.8	1209	44.2	644	23.5	2092	76.5	32.3	783	45.6	935	54.4	428	24.9	1290	75.1	20.7
	Rapid Vocabulary	1721	64.2	959	35.8	1395	52.1	1285	47.9	12.2	1191	70.7	494	29.3	1118	66.4	567	33.6	4.3
	Syllabication	2209	82.5	470	17.5	763	28.5	1916	71.5	54.0	1282	76.4	397	23.6	508	30.3	1171	69.7	46.1
Spanish	Rapid Letter Naming	1425	75.5	463	24.5	327	17.3	1561	82.7	58.2	972	65.2	519	34.8	299	20.1	1192	79.9	45.1
	Rapid Vocabulary	1502	79.9	377	20.1	653	34.8	1226	65.2	45.2	1205	80.7	288	19.3	578	38.7	915	61.3	42.0
	Syllabication	1612	86.4	254	13.6	353	18.9	1513	81.1	67.5	1157	78.2	323	21.8	272	18.4	1208	81.6	59.8

Note. 0= Not proficient; 1= Proficient

Table A6. Proficiency of HISD PK3 students on 2020–2021 CIRCLE math subtests by learning mode and test language

		In Person									Remote									
		BOY				EOY				Percent increase	BOY				EOY				Diff %	
		0		1		0		1			0		1							
		n	%	n	%	n	%	n	%		n	%	n	%	n	%				
Test Language	English	Counting Sets	437	76.5	134	23.5	158	27.7	413	72.3	48.9	209	70.1	89	29.9	92	30.9	206	69.1	39.3
		Number Naming	440	76.7	134	23.3	197	34.3	377	65.7	42.3	185	62.3	112	37.7	75	25.3	222	74.7	37.0
		Rote Counting	532	92.0	46	8.0	261	45.2	317	54.8	46.9	258	87.2	38	12.8	150	50.7	146	49.3	36.5
		Shape Naming	408	70.7	169	29.3	158	27.4	419	72.6	43.3	161	53.8	138	46.2	68	22.7	231	77.3	31.1
	Spanish	Counting Sets	279	91.5	26	8.5	77	25.2	228	74.8	66.2	162	90.0	18	10.0	62	34.4	118	65.6	55.6
		Number Naming	283	92.8	22	7.2	114	37.4	191	62.6	55.4	149	83.7	29	16.3	67	37.6	111	62.4	46.1
		Rote Counting	314	99.7	1	0.3	185	58.7	130	41.3	41.0	177	96.7	6	3.3	118	64.5	65	35.5	32.2
		Shape Naming	276	89.9	31	10.1	89	29.0	218	71.0	60.9	154	86.0	25	14.0	70	39.1	109	60.9	46.9

Note. 0= Not proficient; 1= Proficient

Table A7. Proficiency of HISD PK4 students on 2020–2021 CIRCLE math subtests by learning mode and test language

		In Person									Remote									
		BOY				EOY				Diff %	BOY				EOY				Diff %	
		0		1		0		1			0		1							
		n	%	n	%	n	%	n	%		n	%	n	%	n	%				
Test Language	English	Counting Sets	1460	59.9	978	40.1	320	13.1	2118	86.9	46.8	809	50.8	785	49.2	253	15.9	1341	84.1	34.9
		Number Naming	1356	55.6	1083	44.4	398	16.3	2041	83.7	39.3	729	45.8	861	54.2	239	15.0	1351	85.0	30.8
		Rote Counting	1914	78.3	532	21.7	643	26.3	1803	73.7	52.0	1148	71.4	460	28.6	425	26.4	1183	73.6	45.0
		Shape Naming	1272	51.7	1189	48.3	342	13.9	2119	86.1	37.8	676	41.9	937	58.1	241	14.9	1372	85.1	27.0
	Spanish	Counting Sets	1483	75.9	471	24.1	230	11.8	1724	88.2	64.1	1009	65.9	523	34.1	192	12.5	1340	87.5	53.3
		Number Naming	1441	73.7	513	26.3	297	15.2	1657	84.8	58.5	969	63.8	551	36.3	213	14.0	1307	86.0	49.7
		Rote Counting	1789	91.8	159	8.2	522	26.8	1426	73.2	65.0	1365	89.2	166	10.8	451	29.5	1080	70.5	59.7
		Shape Naming	1518	77.2	449	22.8	303	15.4	1664	84.6	61.8	1068	70.0	458	30.0	285	18.7	1241	81.3	51.3

Note. 0= Not proficient; 1= Proficient