MNPS-PRI Partnership Project

2014-2018 Data Summary and Final Report

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PARTNERSHIP FOR DEVELOPING MODEL EARLY LEARNING CENTERS

MNPS-PRI Partnership Project
Final Report, 2014-18

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BACKGROUND

This report is the culmination of a four-year partnership between the Peabody Research Institute of Vanderbilt University and the Metro Nashville Public Schools (MNPS). The work began in late 2013 when Jesse Register was Superintendent of Schools; Lisa Wiltshire served as the first Director of the Early Learning Centers.

In 2013-14, expanding high quality early learning opportunities for children in Davidson County was a priority for MNPS. Approximately 73% of MNPS' students qualified for free and reduced lunch, and at least half of incoming kindergarten students were not served by current Head Start or MNPS Pre-K classrooms. MNPS was focused not only on expanding access to high quality early learning opportunities for all children in Davidson County, but also on improving the quality of all Pre-K programs, new and existing. The district had set ambitious goals for student performance in its five-year strategic plan, and meeting the goals required all students to develop a strong foundation for learning during their preschool years.

To address this goal, MNPS implemented a multi-year strategic plan to significantly expand high quality early education programs to increase the number of eligible students served. MNPS identified the Peabody Research Institute as a critical partner in this endeavor.

The first phase of the MNPS expansion plan involved the creation of 3 strategically located Model Early Learning Centers to add 500 high quality seats in 2014-15, serving families in the communities surrounding the centers, as well as throughout the district. The Early Learning Centers were expected to serve as model programs, operating as hubs of innovation in teaching and learning, while also adding much-needed capacity.

The goals of the partnership were:

- The creation of a data-driven change process by which potential markers of classroom quality that were related to improved child outcomes were identified; and
- Data collected through the partnership would lead to a model that could be disseminated and implemented by all pre-k teachers district-wide to improve the pre-k system as a whole.

Each year of the partnership, children were individually assessed in the fall and spring for achievement in language, literacy, and math in addition to self-regulation. The battery of measures changed over the years as analyses indicated certain measures were less useful than

others. Pre and posttest scores for each of the consistently administered measures are provided for all the years in the body of this report. Scores for measures administered fewer than all four years are provided in the Appendix.

In addition the PRI research team collected extensive behavioral descriptions of the instructional foci, processes, and interactions in the classrooms and then provided those descriptions to the coaches and teachers in real time. The idea was that these data would be used by coaches to examine the ways their classrooms were functioning and to set goals for improvement if needed. In addition, the district wanted to examine gains in children's skills to determine their relation to practices.

These detailed classroom observations occurred three times the first year, three times the second year for new teachers but only two times the second year for returning teachers. In years 3 and 4, observations took place twice a year. For the first three years, two observers were present for the full day, one examining time spent (with the Narrative Record, Farran, Meador, & Bilbrey, 2004, revisions 2014) and the other examining the interactions between teachers and children using the Child Observation in Preschool (COP) (Farran, Plummer, Kang, Bilbrey, & Shufelt, 2006) and the Teacher Observation in Preschool (TOP) (Bilbrey, Vorhaus, Farran, & Shufelt, 2007). In year 4, a single observer was present for the full day using COP and TOP for the observation. These measures also yielded estimates of time spent.

Each year of the partnership changed as we grew and learned together. Initially, teachers, coaches and administrators were provided extensive information about the children's pretest performance across a variety of measures of achievement and self-regulation. Teachers did not appear to find these extensive descriptions useful. After each classroom observation, detailed information was provided back to the coaches as quickly as could be managed.

The amount of information provided by PRI from the classroom observations in the first year proved overwhelming and only modestly useful. At the end of the first year, PRI conducted analyses relating classroom practices to children's gains on the achievement and self-regulation measures; 8 practices were identified that each predicted more than one type of outcome. For the remaining three years, observational results were provided in relation to these 8 practices. The observational data in this report are structured around the changes across the year in those 8 practices.
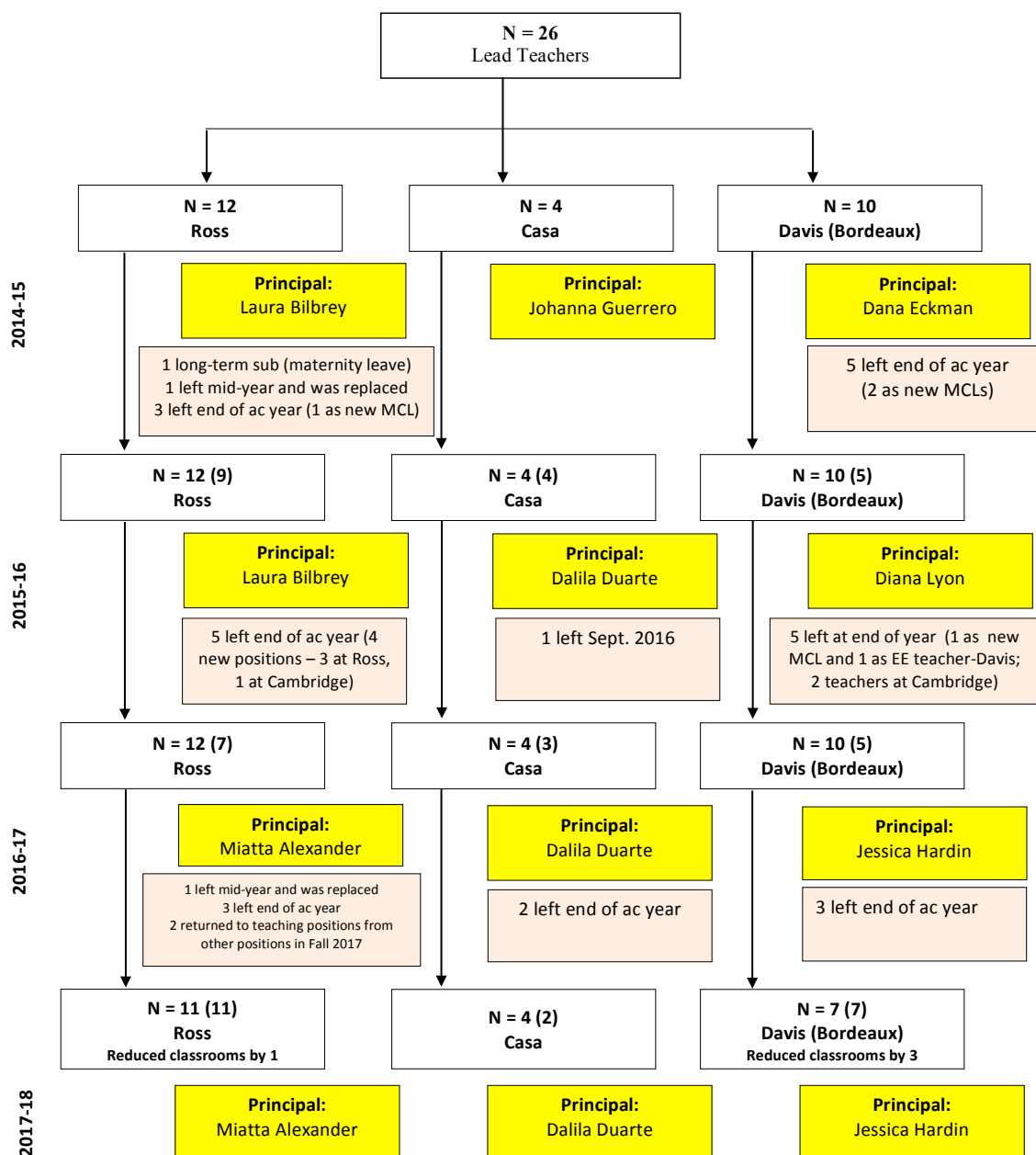
CHARACTERISTICS OF CHILDREN AND TEACHERS

Demographic Characteristics of Children Across All Years

Characteristic	2014–15		2015–16		2016–17		2017–18	
	N	Percent	N	Percent	N	Percent	N	Percent
Pre-LAS								
Pass	390	95.8	424	97.9	385	95.5	337	98.3
Fail	17	4.2	9	2.1	18	4.5	6	1.7
Primary language is English								
Yes	357	87.7	420	97.0	362	89.8	314	91.5
No	50	12.3	13	3.0	41	10.2	29	8.5
Race/ethnicity								
Black	270	66.3	291	67.2	215	53.3	162	47.2
Hispanic	55	13.5	36	8.3	48	11.9	37	10.8
White	74	18.2	95	21.9	125	31.0	119	34.7
Other	8	2.0	11	2.5	15	3.8	25	7.3
Gender								
Male	199	48.9	218	50.3	227	56.3	179	52.2
Female	208	51.1	215	49.7	176	43.7	164	47.8
Economically disadvantaged								
Yes	307	75.4	307	70.9	270	67.0	179	52.2
No	100	24.6	126	29.1	133	33.0	164	47.8
IEP/SWD								
No	360	88.5	391	90.3	350	86.8	304	88.6
Yes	47	11.5	42	9.7	53	13.2	39	11.4

Teacher Turnover Across All Years

Consort Chart for MNPS Partnership Teachers

N = 26
Lead Teachers

N = 12 Ross	N = 4 Casa	N = 10 Davis (Bordeaux)

2014-15

Principal: Laura Bilbrey

Principal: Johanna Guerrero

Principal: Dana Eckman

1 long-term sub (maternity leave)
1 left mid-year and was replaced
3 left end of ac year (1 as new MCL)

5 left end of ac year
(2 as new MCLs)

N = 12 (9) Ross	N = 4 (4) Casa	N = 10 (5) Davis (Bordeaux)

2015-16

Principal: Laura Bilbrey

Principal: Dalila Duarte

Principal: Diana Lyon

5 left end of ac year (4 new positions – 3 at Ross, 1 at Cambridge)

1 left Sept. 2016

5 left at end of year (1 as new MCL and 1 as EE teacher-Davis; 2 teachers at Cambridge)

N = 12 (7) Ross	N = 4 (3) Casa	N = 10 (5) Davis (Bordeaux)

2016-17

Principal: Miatta Alexander

Principal: Dalila Duarte

Principal: Jessica Hardin

1 left mid-year and was replaced
3 left end of ac year
2 returned to teaching positions from other positions in Fall 2017

2 left end of ac year

3 left end of ac year

N = 11 (11) Ross **Reduced classrooms by 1**	N = 4 (2) Casa	N = 7 (7) Davis (Bordeaux) **Reduced classrooms by 3**

2017-18

Principal: Miatta Alexander

Principal: Dalila Duarte

Principal: Jessica Hardin

Numbers in parentheses indicate teachers returning from the previous year.

SUMMARY: CHANGES IN CHILDREN AND TEACHERS

Children. The population of children served in the final year of the partnership was quite different from those served in the first year. Each year, the proportion of minority children has decreased and the proportion of students characterized as white has increased. Each year, fewer children in the group qualify to be labeled economically disadvantaged. Each year the number of non-English speaking children, as captured in the preLAS assessment has decreased (because English is not the primary language spoken at home does not mean children do not speak English). These changes in the population will be evident when looking at the assessment data each year. The last year of the program, the entering skills of children in the group on many of the assessments were very close to average for the population. In Appendix A, we provide data from 2017-18 on the pre-post skills of children who are classified as economically disadvantaged (ED) and those who are not (Non ED). Children who are ED left the program scoring at or below the *entering* skills of non-ED children. The two populations of children require substantially more differentiated instruction on the part of teachers. These changes in the child population may be the result of an intentional policy on the part of the school system. It is important to note that the gains achieved have been roughly similar year to year despite the changes in the population.

Teachers. The success of a partnership in which we are trying to develop a shared vision for appropriate early childhood educational environments requires consistency among the staff so that learning can build year to year. However, there was tremendous turnover both in teaching staff and in administrative leadership during the four years of working together.

In the preceding chart, the parentheses indicate the number of teachers from the immediately preceding year who returned. Overall, however, only **nine** of the original twenty-six teachers remained Lead Teachers all four years, two additional teachers became MCLs for one year at Ross and then returned to Lead Teacher positions. Three of the original twenty-six lead teachers became MCLs and remained MCLs at the schools throughout the duration of the project.
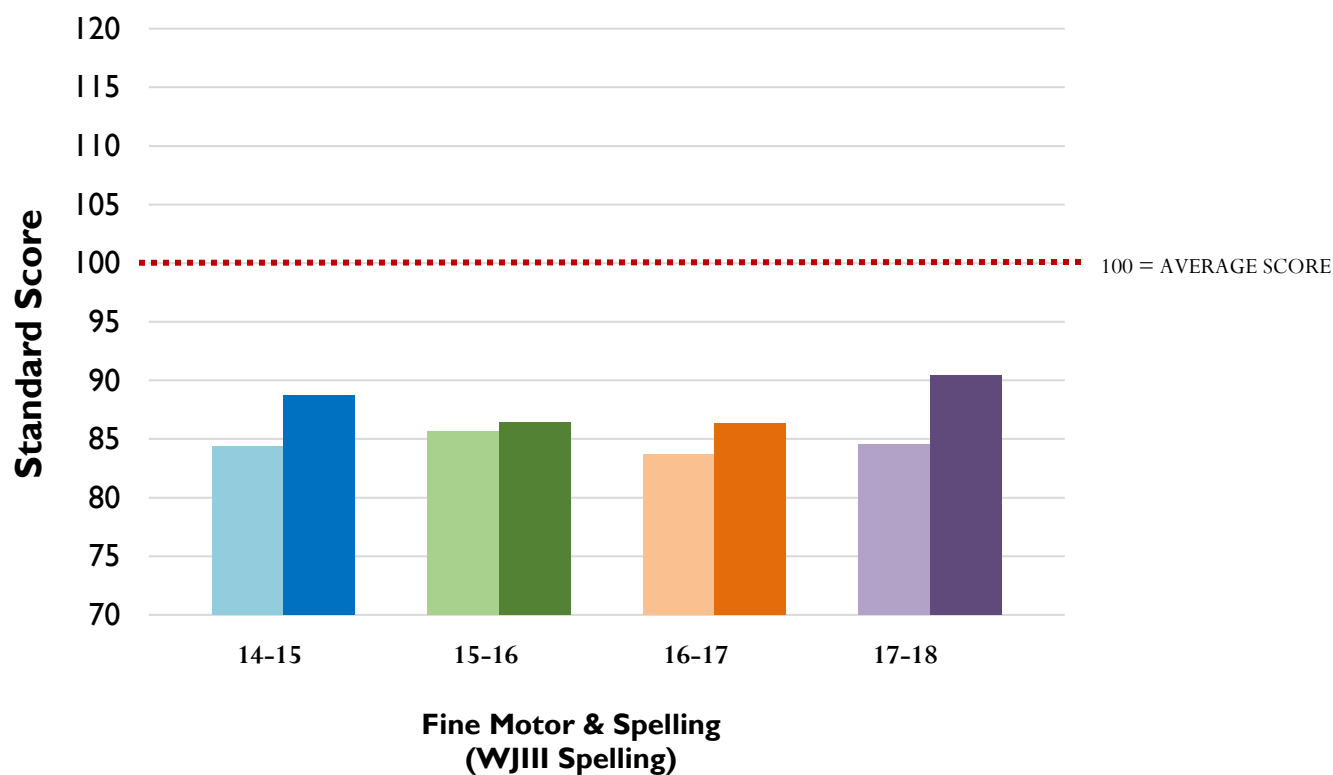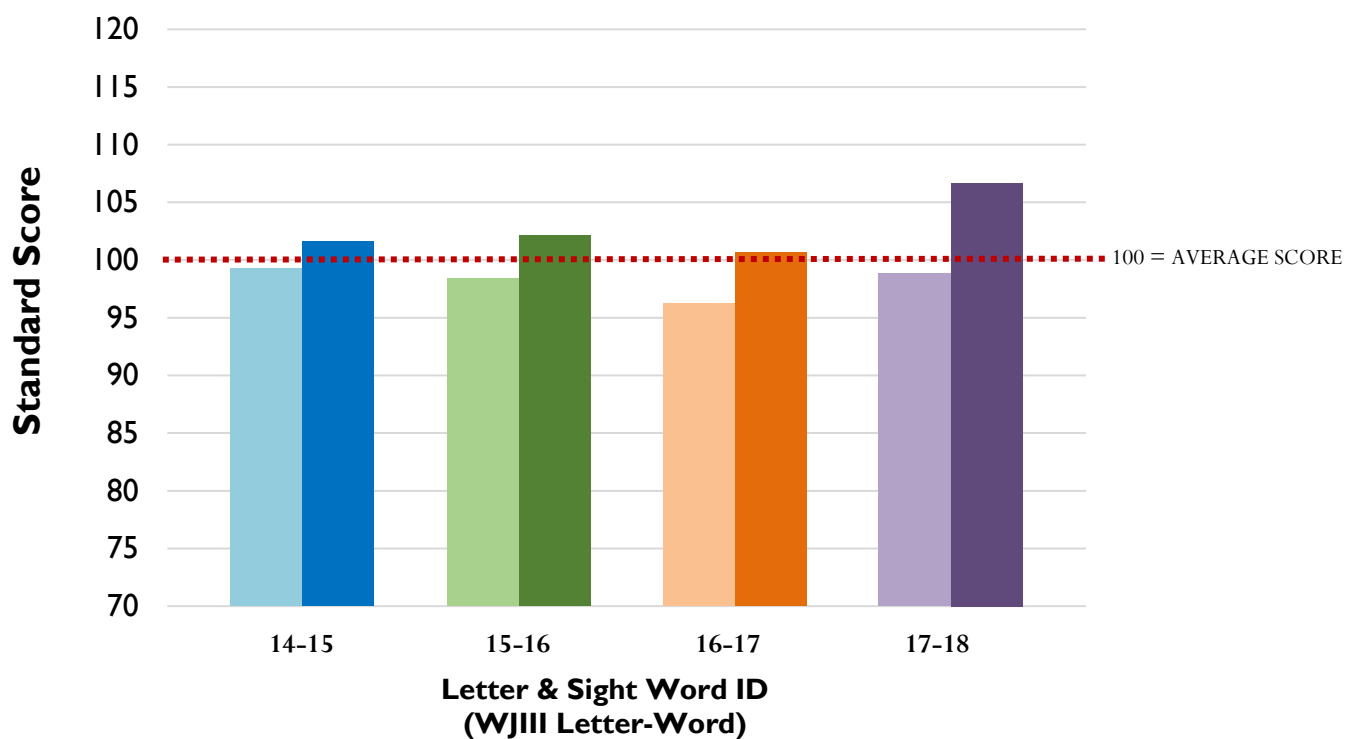
One of the original twenty-six lead teachers became an MCL and another one became a teacher at the Cambridge ELC throughout the duration of the project. Another teacher became an Exceptional Education teacher and remained at the school throughout the duration of the project. However, none of these were observed once they moved into their new positions.
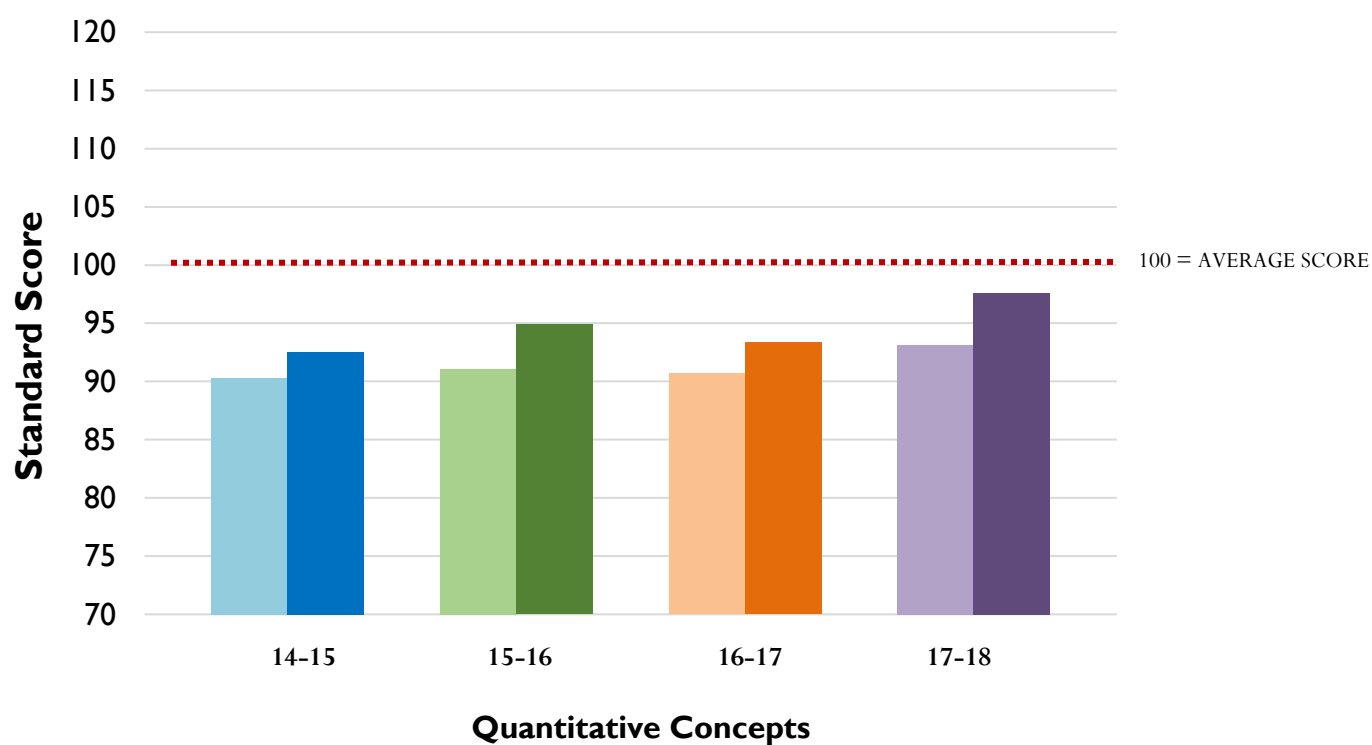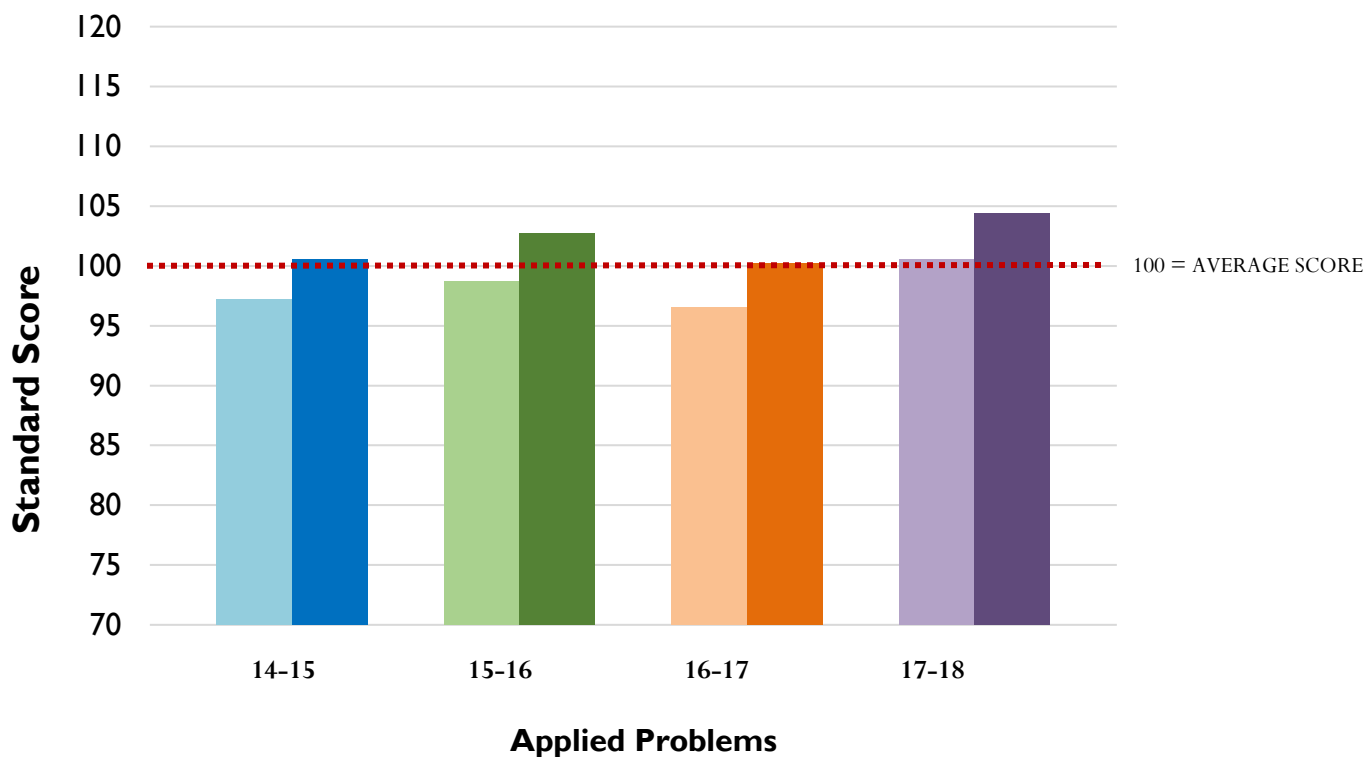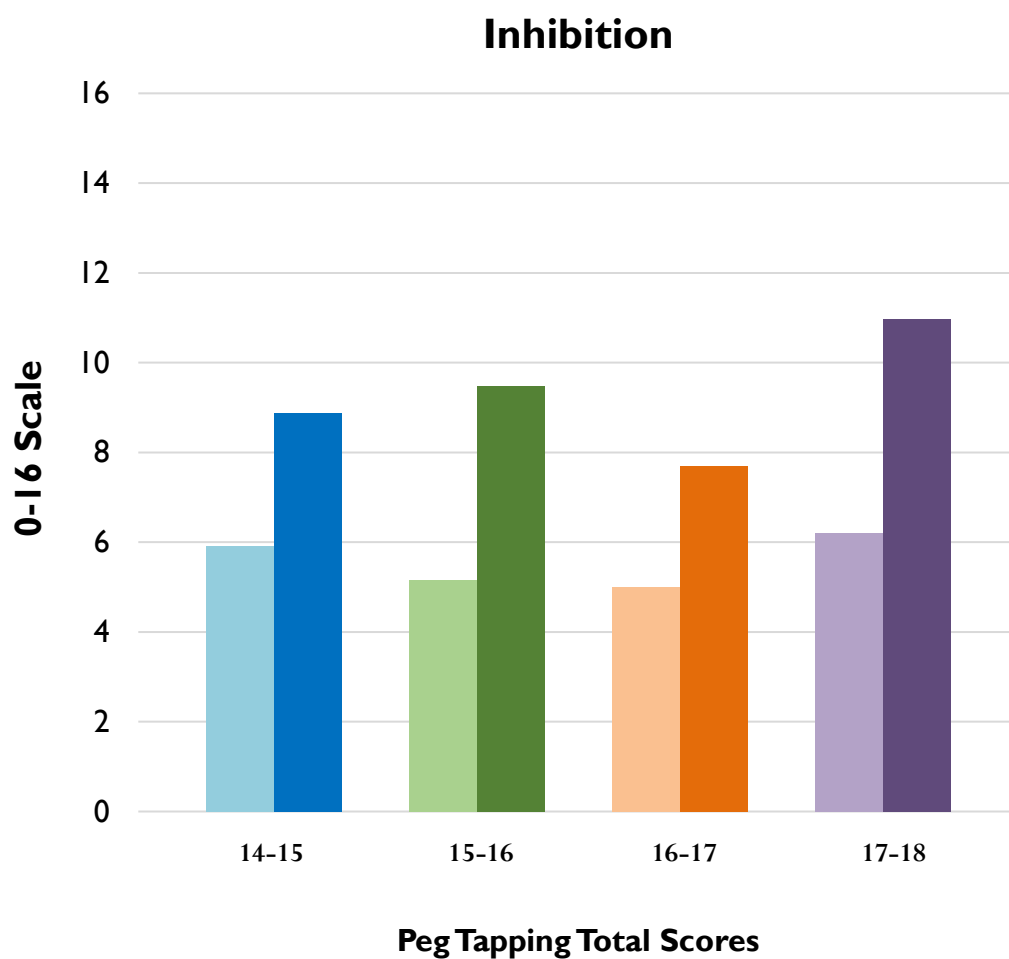
Children's Readiness for Kindergarten: Language Skills

Vocabulary (PPVT)
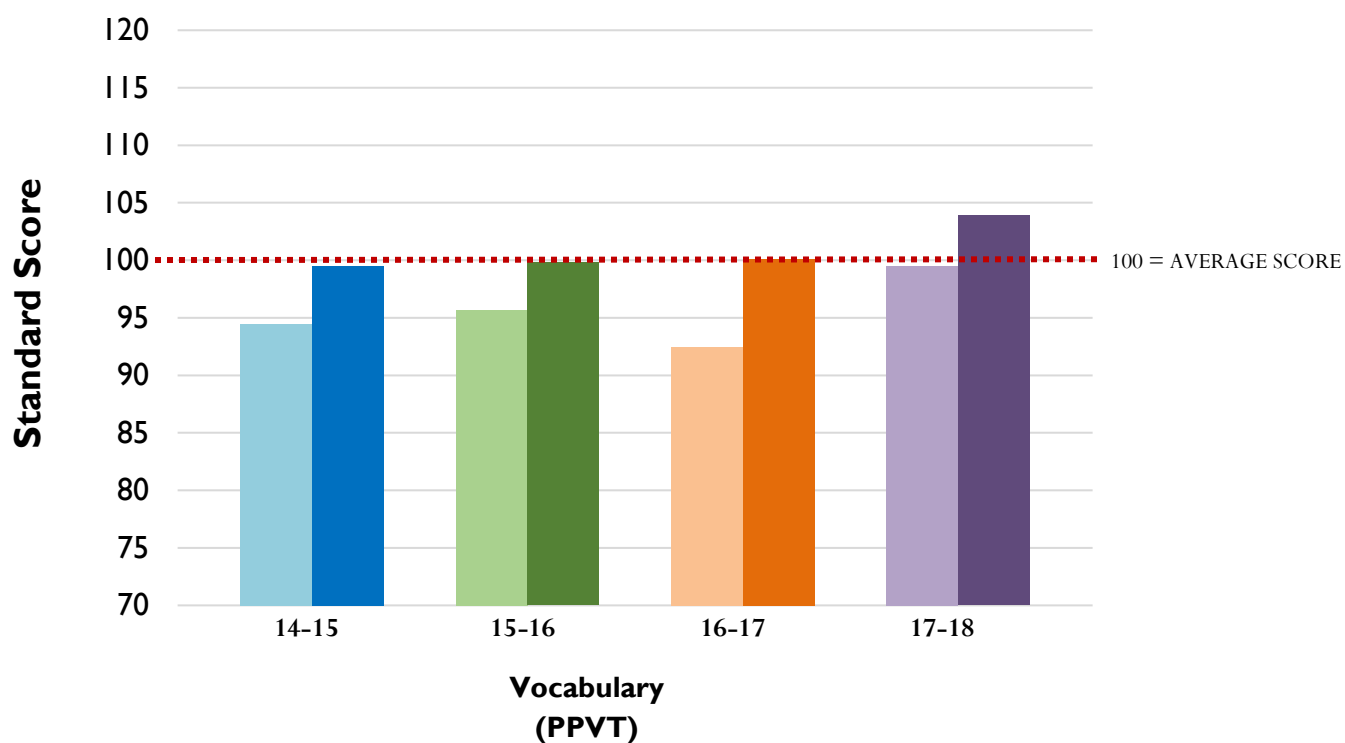
Children's Readiness for Kindergarten:
Literacy Skills

Standard Score — Letter & Sight Word ID (WJIII Letter-Word)

100 = AVERAGE SCORE

14–15   15–16   16–17   17–18

Standard Score — Fine Motor & Spelling (WJIII Spelling)

100 = AVERAGE SCORE

14–15   15–16   16–17   17–18

Children's Readiness for Kindergarten: Math Skills

Applied Problems

Quantitative Concepts

Inhibition

SUMMARY OF CHILD ASSESSMENTS

When examining the gains children made in various developmental areas, it is important to remember that in all areas except self-regulation, the measures used were standardized. This means that for each we can compare the scores of the ELC children against national norms. These tests were standardized so that an average score is 100, and 68% of children would be expected to score somewhere between 85 and 115. Scores below 85 will be in the bottom 16% of the population. The Woodcock Johnson III Achievement Battery is intended to be appropriate for children from pre-k through grade 12 and thus can be given longitudinally. Norms are constructed based on age.

In each of the major domains, children made gains each year, including language (PPVT). Each year the most gains were made in the area related to recognizing and naming letters of the alphabet and beginning to recognize elementary sight words. Gains were particularly strong in this area for the last year of the partnership, 2017-18. In fact, the last year of the partnership saw children make more gains in many of the areas measured.

Each year children made the least gains on the measure entitled *Spelling*. The Woodcock Johnson *Spelling* measure for four year olds is a rudimentary writing measure. Children are asked to mark within lines, to trace dotted letters, to reproduce letters heard orally and eventually to write sight words heard orally. Children entered pre-k scoring 85 or below on this measure putting them in the bottom 16% of the country. They made little progress across the year. In the Appendix, we report the scores on Name Writing, a separate assessment given in 2017-18. It is apparent that most children learned to write their names.

Math skills were assessed with two measures. *Applied Problems* focuses on children's knowledge of numbers and counting. *Quantitative Concepts* focuses on children's broader knowledge of mathematical concepts and particularly math vocabulary, an area that is increasingly shown to be a strong predictor of later math achievement. Children entered the program with nearly an average knowledge of number and made gains across the year so that each year they entered kindergarten scoring at the average level or a little above. Their skills in mathematical concepts were much weaker entering pre-k. Although they gained across the year in these skills, they entered kindergarten still scoring a bit below average.

Self-regulation was measured with a non-standardized assessment, *Peg Tapping*. Children made gains each year on this measure, with the most gains seen in the last year. Most children in kindergarten will score 16 on *Peg Tapping*.

CLASSROOM OBSERVATION MEASURES

For the first three years of this project, two observers were in classrooms for a full day each observation. From the analyses conducted in year 1, we determined that the most useful observational information was derived from TOP and COP. Thus in 2017-18 a single observer using TOP and COP visited each MNPS Pre-K hub classroom to note all instructional classroom activities and teacher-child interactions during the day. Information from the Narrative Record observations from the first three years can be made available on request. The TOP and COP classroom observation measures are described below.

Teacher Observation in Preschool (TOP)

The TOP is a system for observing the teacher and assistant's behaviors in preschools across a daylong visit. The TOP is based on a series of snapshots of the behaviors of both the teacher and assistant across a period of time when children and teachers are in the room. Each snapshot may, by itself, be an unreliable piece of information, but collectively, the pieces combine to provide a picture of how the teacher and assistant are spending their time. The teacher's behavior is observed for a 3-second window before coding. Once coding has been completed for the teacher, the same procedure is followed for the assistant. Teacher and assistant are coded at the beginning of a "sweep;" children are coded immediately afterward. At the end of an observation, a range of 18-24 sweeps is collected on both the teacher and the assistant. The TOP measures:

- The types of tasks in which the teacher or assistant is engaged.
    - Instruction
    - Management including administration, monitoring, and personal care
    - Behavior Approving or Disapproving
    - Social
    - None

- The level of ongoing instruction.
    - None, Low, Basic Skills, Some Inferential, and Highly Inferential

- The areas of learning on which the teacher or assistant focuses.
    - Math, literacy, science, social studies
    - Art, music, fine motor, drama, etc.
    - No Learning Focus: no instruction

- The tone of the interactions the teacher or assistant has with the class, coded on a 1-5 rating scale.

- How much and to whom the teacher talks and listens.

- Counts of Behavior Approving and Disapproving used by the teacher or assistant. These codes are marked each time a unique behavior approval or disapproval is given and are counted when an approval or disapproval is given to the same child or group of children about different behaviors or to different children for the same behavior.

TOP data were not collected when children were napping, in the gym, or outside on the playground. The TOP focuses on times when teachers and children could interact.

For More Information See: Bilbrey, C., Vorhaus, E., Farran, D. & Shufelt, S. (2007). *Teacher Observation in Preschools* (2017 revision). Peabody Research Institute, Nashville, TN.

Child Observation in Preschool (COP)

The COP is a system for observing children's behaviors in preschool across a daylong visit. The COP is based on a series of snapshots of children's behaviors during the day. Each snapshot may be, by itself, an unreliable piece of information, but collectively, they combine to provide a picture of how children are spending their time (as an aggregate), as well as information about individual differences among children in their activity preferences. A specific child is observed during a 3-second window and then coded across 9 dimensions before the observer moves to the next child. At the end of an observation, a range of 18-24 sweeps is collected on each child in the classroom. The COP measures:

- The different kinds of pedagogical situations in which children are engaged
  - Whole Group Instruction
  - Small Group Instruction
  - Small Group/Centers combined
  - Center activities
  - Specials
  - Outdoors
  - Meals
  - Naps
  - Transition

- The different types of tasks in which children are participating.
    - Passive Instruction
    - Non-sequential
    - Sequential
    - Social
    - Routines/Waiting
    - Other: disruptive, time out, none

- The different types of interactions in which children are participating.
    - Alone
    - Parallel
    - Associative or Cooperative
    - Onlooker
    - Social
    - Other: Unoccupied, Timeout, Non-Academic

- The different types of learning foci of the activities in which children are participating.
    - Math, Literacy, Science, Social Studies
        - For each of these "secondary content" is coded based on specifications in the Tennessee Early Learning Standards
    - Art, Music, Fine Motor, Drama
    - Toys and games
    - No Learning Focus

- The children's level of involvement during learning activities, coded on a 1-5 rating scale.

- How much and to whom the children talk and listen.

As with the TOP, COP interaction codes are not collected when children are napping, in the gym, or on the playground. COP codes are only collected when learning interactions could take place. (Time spent is calculated from the pedagogical activities topic.)

For More Information See: Farran, D. et al. (2006). *Child Observation in Preschools* (2017 revision). Peabody Research Institute, Nashville, TN.

OBSERVATION REPORTS OF MAGIC 8 OVER 2014-18

The information presented in this final report is structured around 8 goals (below) which were found to be associated with academic gains over the course of the first and second years of the MNPS-PRI Partnership Project (2014-15 and 2015-16). This report contains the classroom observation data gathered since the inception of the project. Although there was turnover in teachers each year, these data are summarized over the teachers who were observed each particular year. That includes 26 teachers and assistants for the first three years of the partnership and only 22 teachers in the last year of the project as four classrooms were converted to serve children of different ages and characteristics.

The 8 goals are as follows:

1. Reducing Transitions
2. Increasing the Quality of Instruction
3. Creating a More Positive Emotional Climate
4. Listening to Children More (teachers)
5. Creating More Sequential Activities
6. Fostering Associative/Cooperative Interactions
7. Fostering Higher Levels of Involvement by Children
8. Creating More Math Opportunities for Children

GOAL 1: Reducing Transitions

In classroom observations, Transitions are coded when one learning activity has ended and the next has not yet begun. Transitions involve moving between activities and also breaks of more than a minute within an activity, coded when no learning opportunity is provided. Instruction can be incorporated within a transition, achieved using multiple strategies such as initiating a song/chant.

Percentage of the Day Spent in Transitions
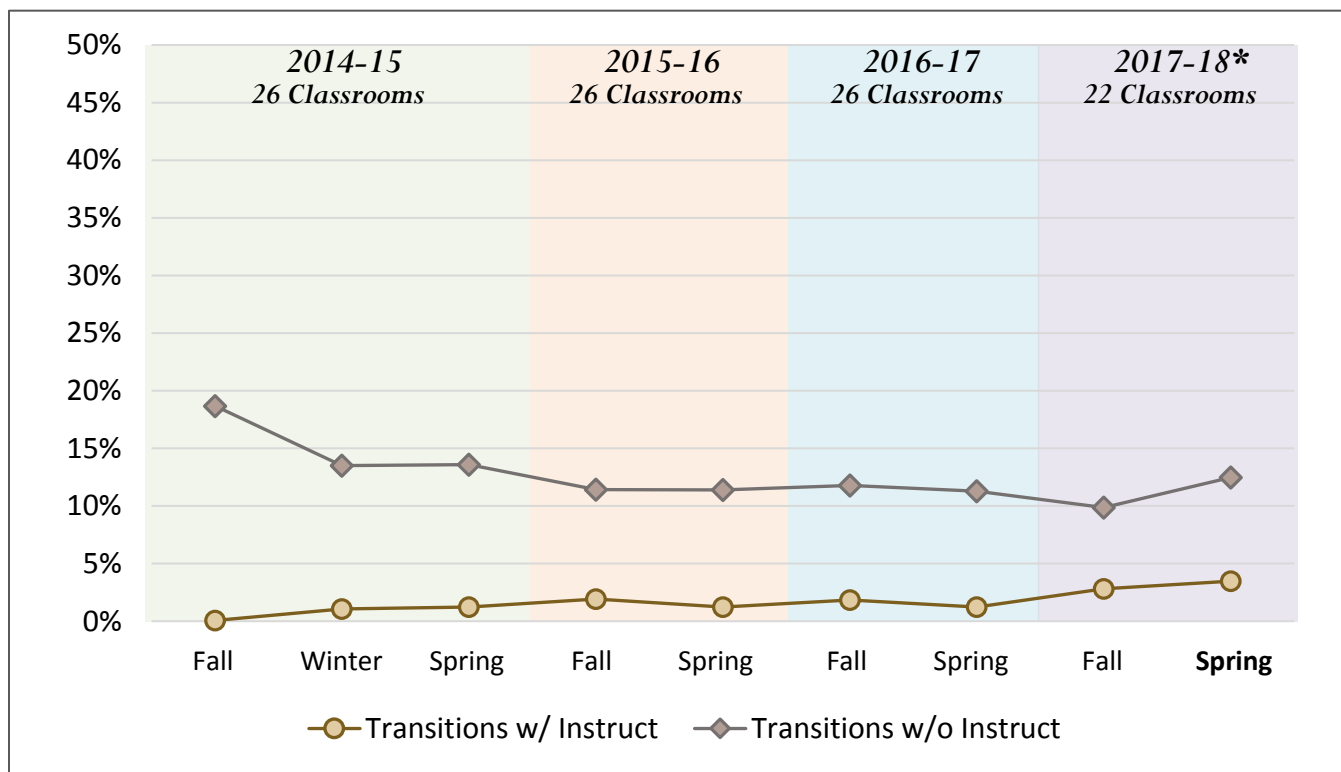
*Beginning Fall 2017, the percentages of the day children spent in a given activity were calculated based on the time between sweeps from COP, not Narrative Record. Thus, in 2017-18, **transitions with instruction** and **meal with instruction** focus on individual children's states rather than the entire class. This calculation should capture more times when instruction was included within a transition.

Description of Classroom Activity Codes

Whole Group

Whole Group occurs when the entire group is meeting together and some form of content is being discussed. If children are gradually taken out of the group for toileting and hand washing, Whole Group is coded until 75% of the children have moved away from Whole Group.

Small Groups

Small Groups are coded if the students are working in small groups that are facilitated by an adult and the activity is *not* optional. Small Groups can also be coded when the class divides to complete activities in separate locations and there are fewer than 75% of the children in each group.

Centers

Center time (sometimes called "Choice Time" or "Free Play) is coded when children are allowed to move about the classroom freely or are assigned to areas but have freedom to *choose* an activity in a given center area.

Individual Activities Established by the Teacher

Individual Activities are coded when children are working *independently* on a set of activities that the teacher has prescribed. Children may be free to do the activities in any order and even to move around the room to different "stations" to accomplish the activities. The Individual Activities code is distinct from Centers, in which children are free to *choose* their activities. It is also different from Small Groups, in which the activity is being led or facilitated by a teacher. This activity is more often seen in early elementary grades.

Small Group Centers

Small Group Centers are coded if small group(s) and center time are simultaneously occurring in the classroom.

Transition

Transition is coded during nonacademic classroom routines such as lining up or washing hands. In the case of gradual transitions (such as from Centers to Whole Group), 75% or more of the class must be disengaged from a learning activity for Transition to be coded. Transition also occurs when there is a lull of more than a minute in instruction due to problems with preparation of materials or prolonged behavior management (in 2017-18, we could also capture whether individual children were engaged in a learning activity within a Transition.)

Meal Time

Mealtime is coded when students are scheduled to eat breakfast, lunch, or snacks once 75% of students have their food and are allowed to eat.

Nap

Nap begins when lights are turned off OR when 75% of children are on their cots. Nap is over once lights are turned back on OR when the teacher has attempted to wake-up 75% of the children.

Specials

Specials occur when children are participating in activities led by someone other than the regular classroom teacher or assistant. Specials may include activities such as Plant the Seed, music, library, and assemblies/special programs and can occur inside or outside the room.

Gross Motor

Gross Motor accounts for time when children are playing on the playground, in the gym, or in another area designated for free play/recess.

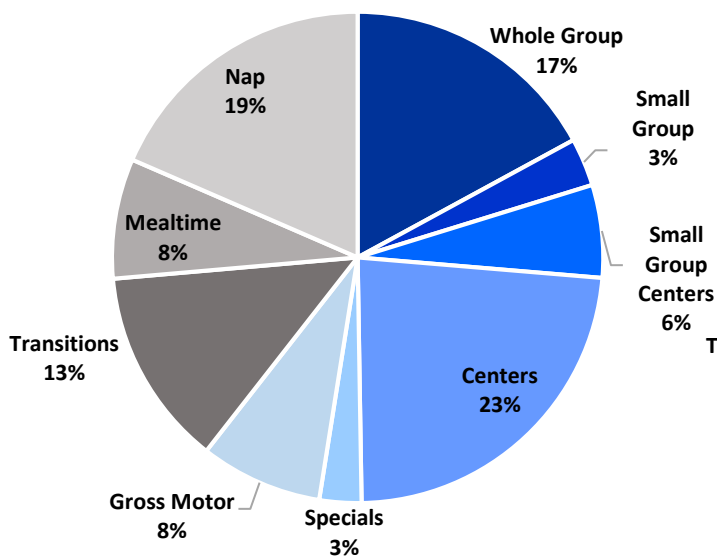# Percentage of the Day Children were Involved in Various Activities
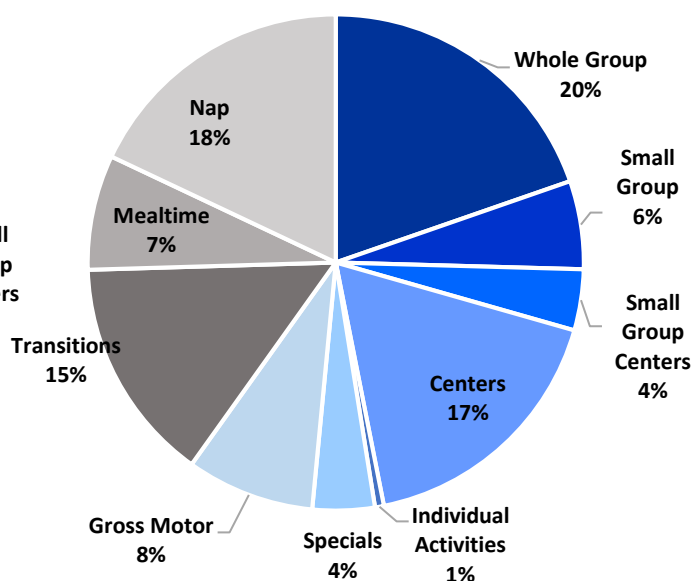
Across ELCs (26 Classrooms) 2014-15 Averages
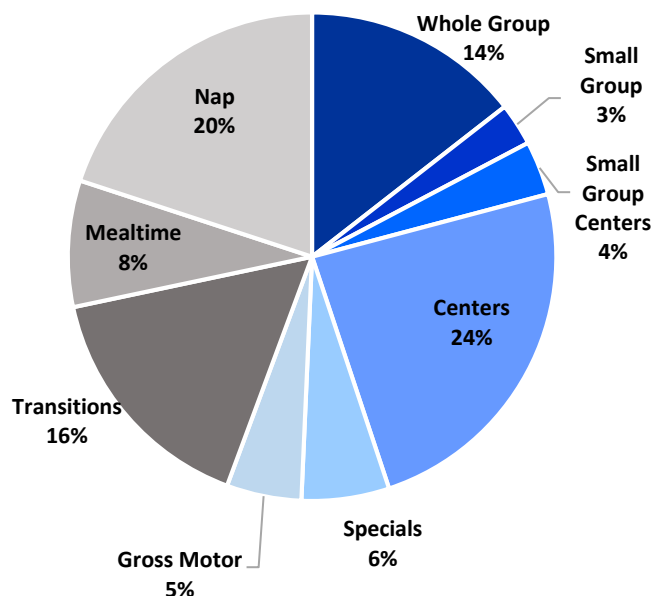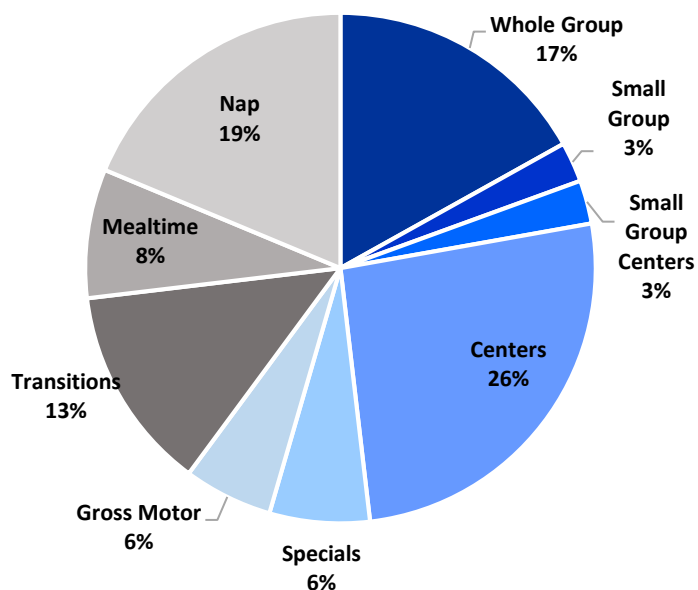
Whole Group 14%
Small Group 3%
Small Group Centers 4%
Centers 24%
Specials 6%
Gross Motor 5%
Transitions 16%
Mealtime 8%
Nap 20%

Across ELCs (26 Classrooms) 2015-16 Averages

Whole Group 17%
Small Group 3%
Small Group Centers 3%
Centers 26%
Specials 6%
Gross Motor 6%
Transitions 13%
Mealtime 8%
Nap 19%

Across ELCs (26 Classrooms) 2016-17 Averages

Whole Group 17%
Small Group 3%
Small Group Centers 6%
Centers 23%
Specials 3%
Gross Motor 8%
Transitions 13%
Mealtime 8%
Nap 19%

Across ELCs (22 Classrooms) 2017-18 Averages

Whole Group 20%
Small Group 6%
Small Group Centers 4%
Centers 17%
Individual Activities 1%
Specials 4%
Gross Motor 8%
Transitions 15%
Mealtime 7%
Nap 18%

GOAL 2: Increasing Quality of Instruction

In classroom observations, we code the Level of Instruction using a 0 - 4 scale:

- 0 - None
- 1 - Low level of Instruction
- 2 - Basic Skill Instruction
- 3 - Some Inferential Learning (e.g., teacher uses open-ended questions that have more than one possible answer to elicit active student participation)
- 4 - High Inferential Learning (e.g., interaction and discussion, in which children engage in turn-taking conversations involving at least one inferential question; may involve connections to the child's world/experiences)

Average Level of Instruction Observed in Classroom
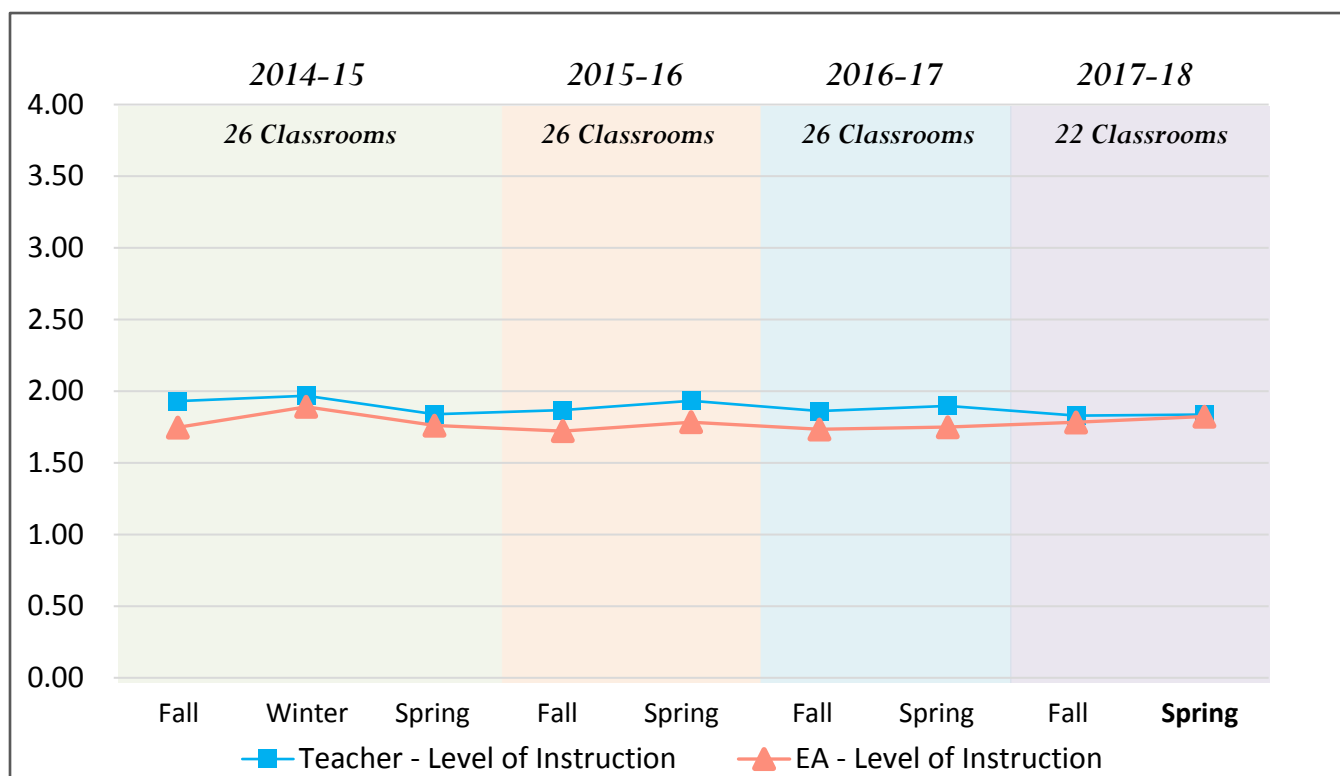
Note: Ratings could only be obtained during periods when the Teacher and EA were observed instructing (compared to other classroom duties). **Please see Pages 31-33 for graphs with information on time spent instructing.**

GOAL 3: Creating a More Positive Emotional Climate

To capture the emotional climate of the classroom, observers look for the teacher's overall Tone with children and how often teachers use Behavior Approval and Behavior Disapproval.

Tone/Affect

The Tone reflects the positive or negative feel of the classroom and the interaction of the teacher/assistant with the children, and is coded on a scale of 1 to 5:

- 1 - Extreme Negative
- 2 - Negative
- 3 - Flat
- 4 - Pleasant
- 5 - Vibrant

Average Teacher Tone Observed in Classroom
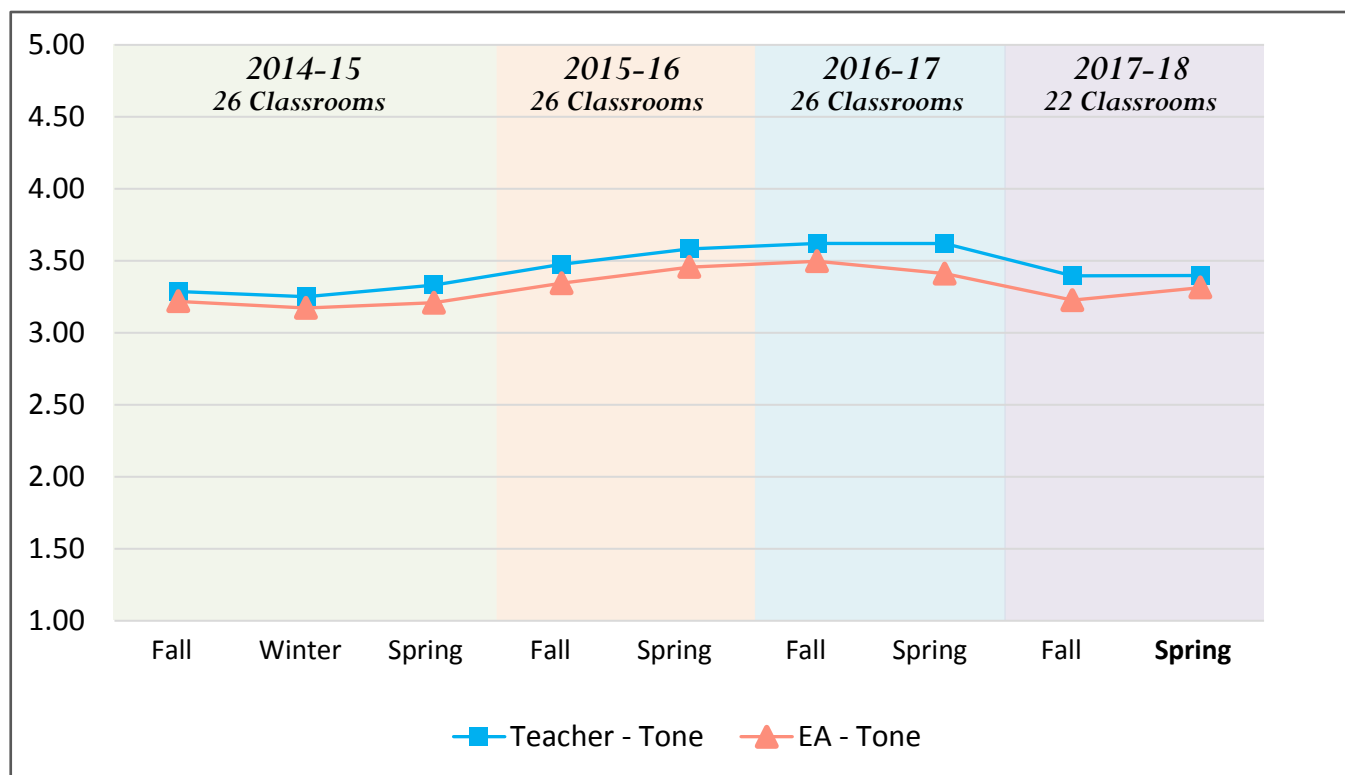
Behavior Approval and Disapproval

- **Behavior Approval:**

    Teacher/assistant uses approving verbal comments, facial expressions, or physical contact with the children.

- **Behavior Disapproval:**

    Teacher/assistant uses disapproving facial expressions, verbal comments, tone of voice, and/or physical contact with children.

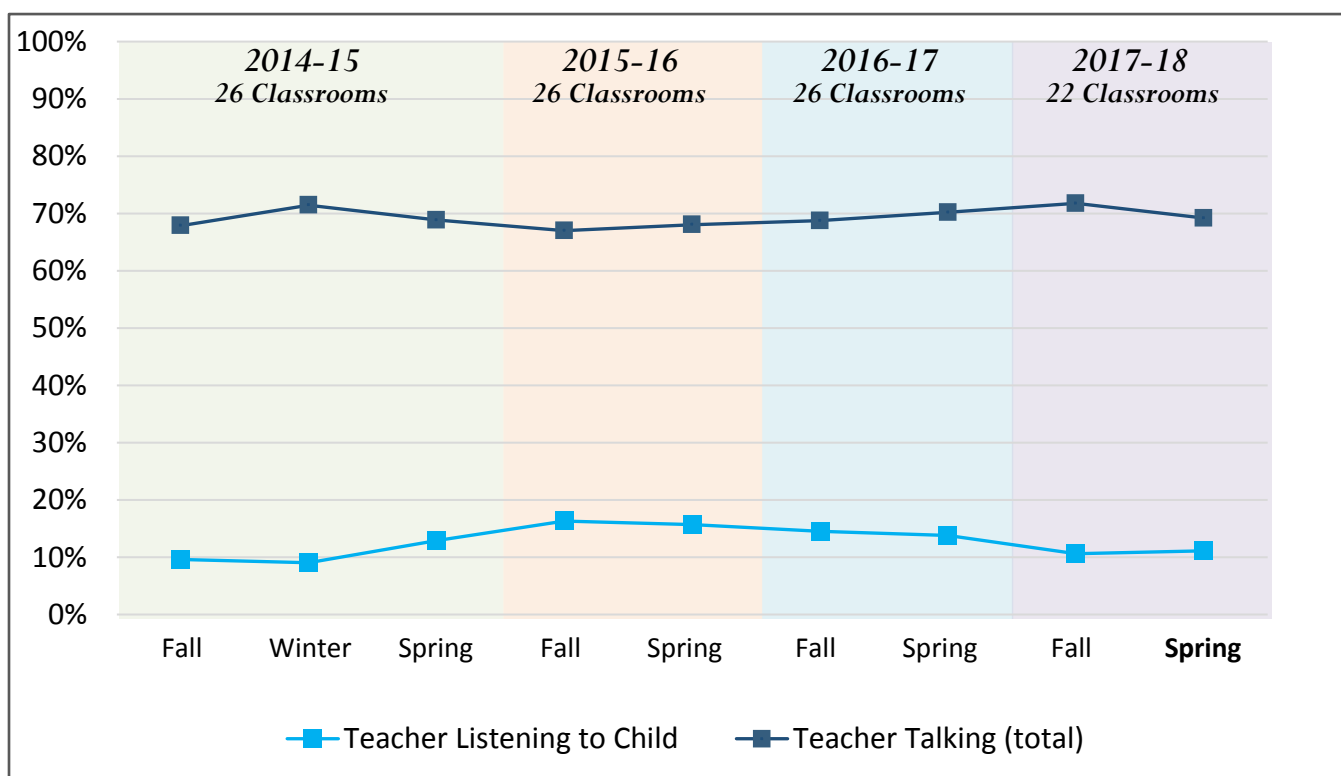### Percentage of Sweeps Teacher Engaged in Behavior Approving and Disapproving
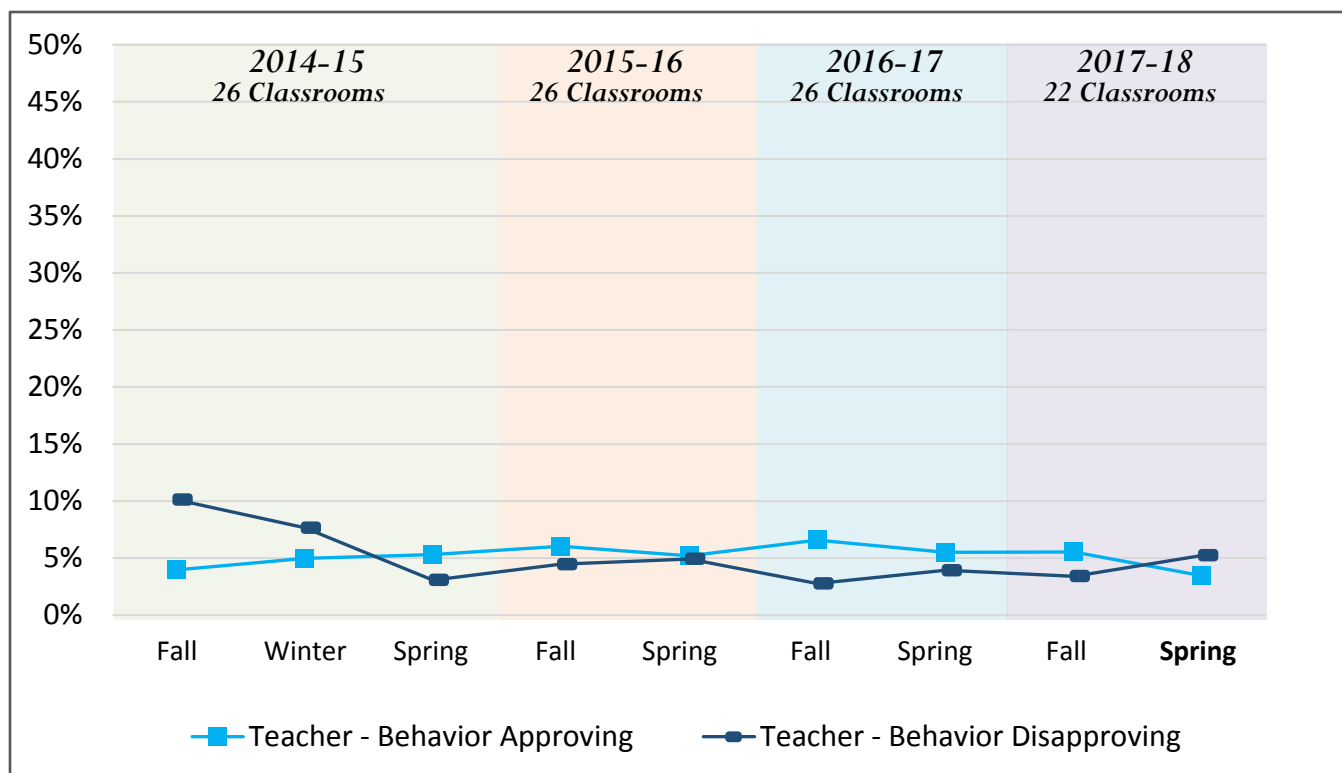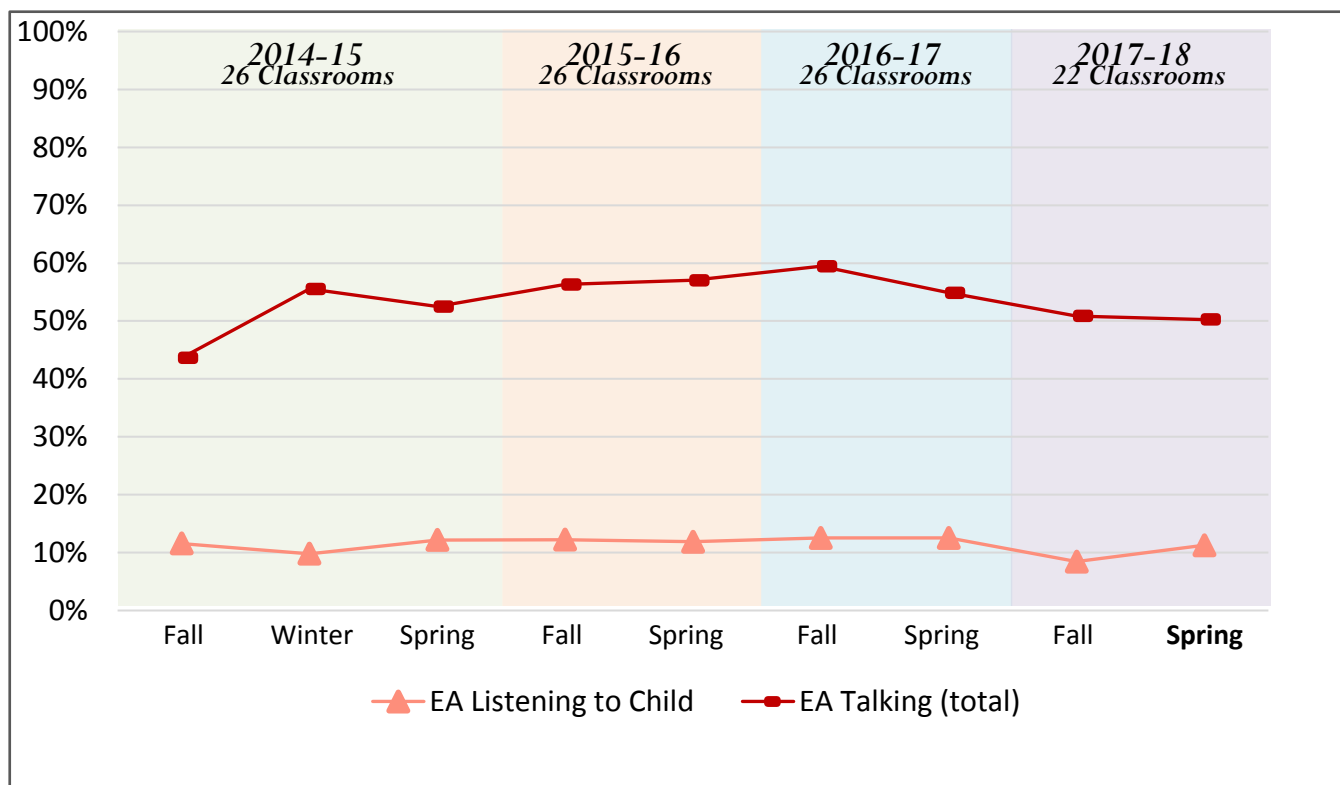
Percentage of Sweeps EA
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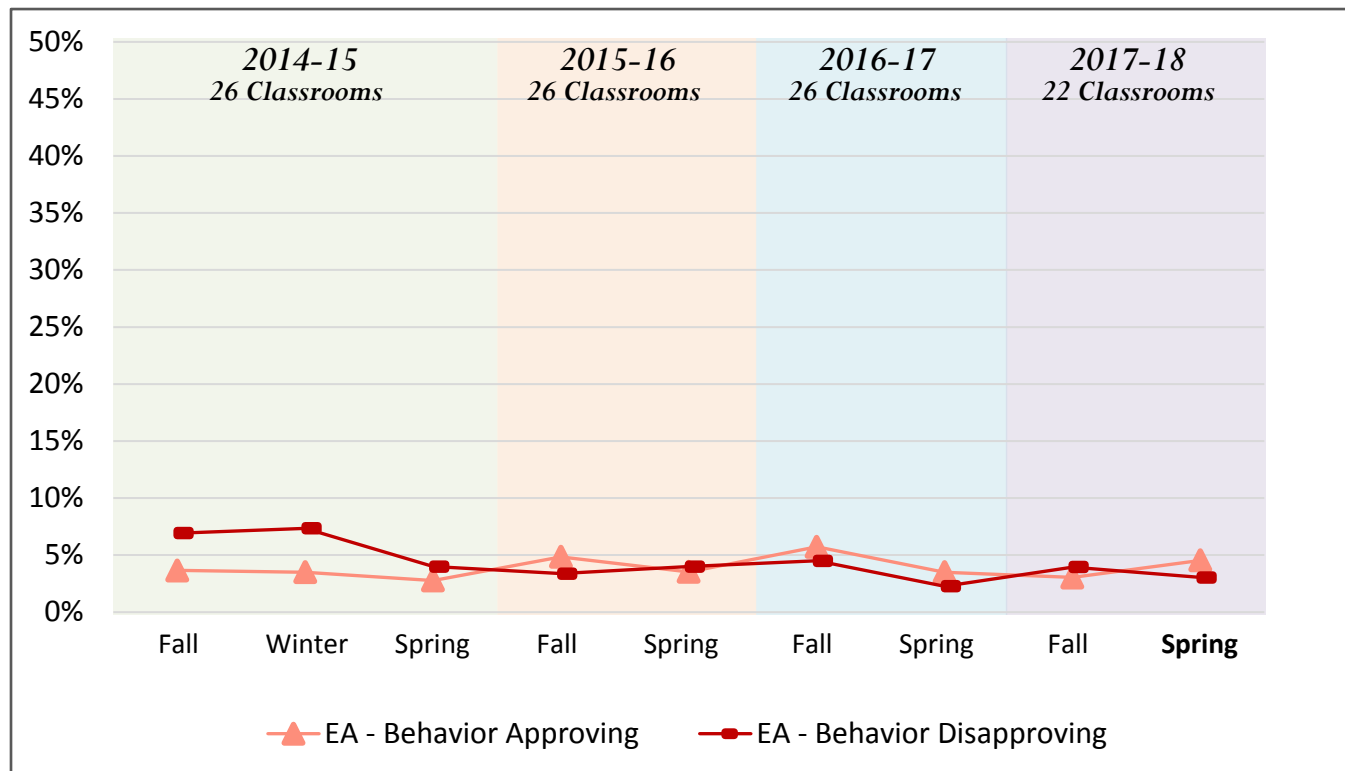
GOAL 4: Listening to Children More

One way to get children engaged in learning opportunities is to get them talking. Teachers can facilitate child talk by asking them open-ended questions, and encouraging associative and cooperative interactions among students. Observers code when teachers and children Listen (and to whom) and when teachers and children Talk (and to whom).
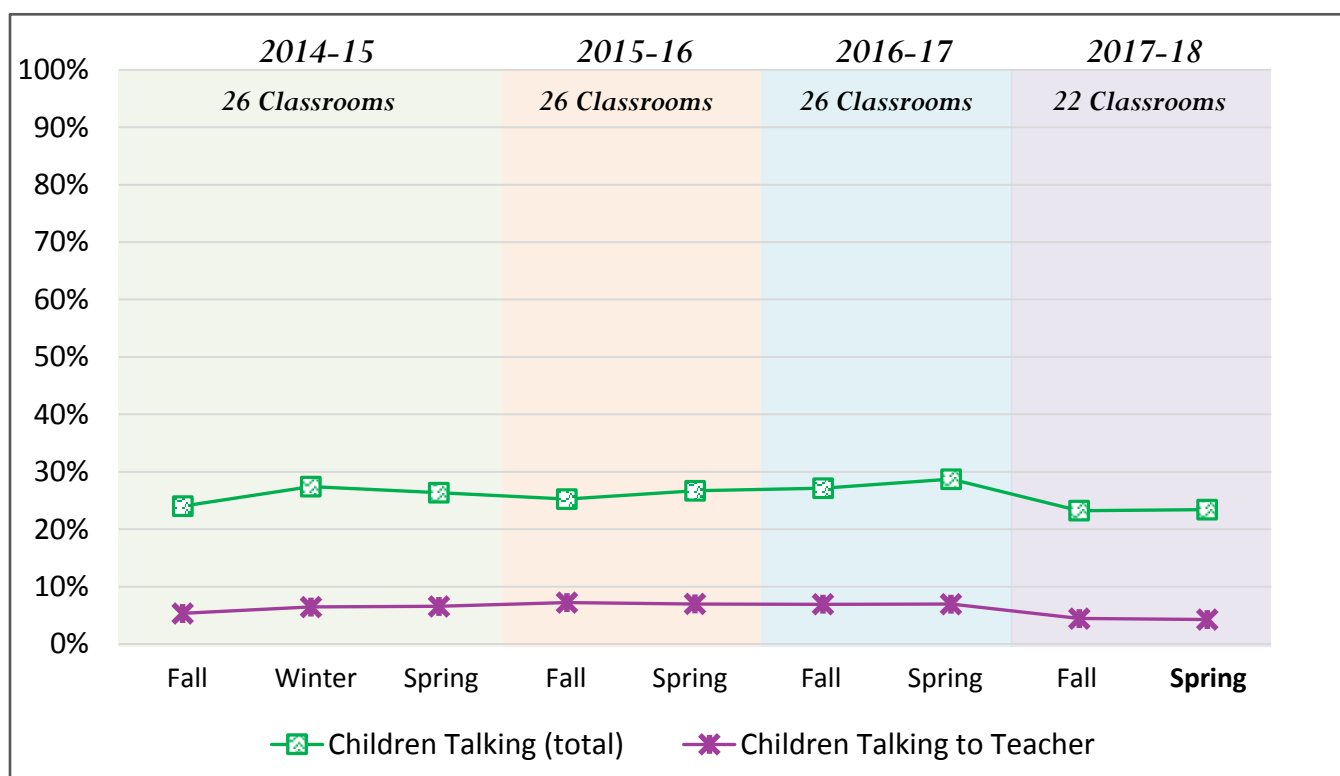
**Percentage of Sweeps Teacher was
Listening to a Child or Talking**

Legend: Teacher Listening to Child — Teacher Talking (total)

Chart regions: 2014-15 (26 Classrooms), 2015-16 (26 Classrooms), 2016-17 (26 Classrooms), 2017-18 (22 Classrooms). X-axis: Fall, Winter, Spring, Fall, Spring, Fall, Spring, Fall, **Spring**.

Percentage of Sweeps Assistant Teacher was Listening to a Child or Talking

2014-15
26 Classrooms

2015-16
26 Classrooms

2016-17
26 Classrooms

2017-18
22 Classrooms

▲ EA Listening to Child   ━■━ EA Talking (total)

Percentage of Sweeps Children were Talking to Teacher/EA and Overall

2014-15
26 Classrooms

2015-16
26 Classrooms

2016-17
26 Classrooms

2017-18
22 Classrooms

▫ Children Talking (total)   ✳ Children Talking to Teacher

GOAL 5: Creating More Sequential Activities

Children need to interact with materials and engage in planful activities that promote their learning. When children participate in sequential activities, they can engage in higher-level thinking—reflecting on the activity and planning what to do next. When setting up the classroom and choosing materials, teachers can create opportunities to promote this level of cognition throughout the day, and especially during center time.

Sequential vs. Non-Sequential

Sequential: Child is involved with activities or materials that involve a sequence of steps.
- Examples: Conducting a science experiment, working a puzzle, writing a story

Non-Sequential: Child is involved with activities or materials but not following a predetermined set of steps.
- Examples: Doodling on paper, pushing trucks around on the rug, browsing through books

Percentage of Sweeps Children were Observed in Sequential and Non-Sequential Activities (EXCLUSIVE of Meal and Nap)
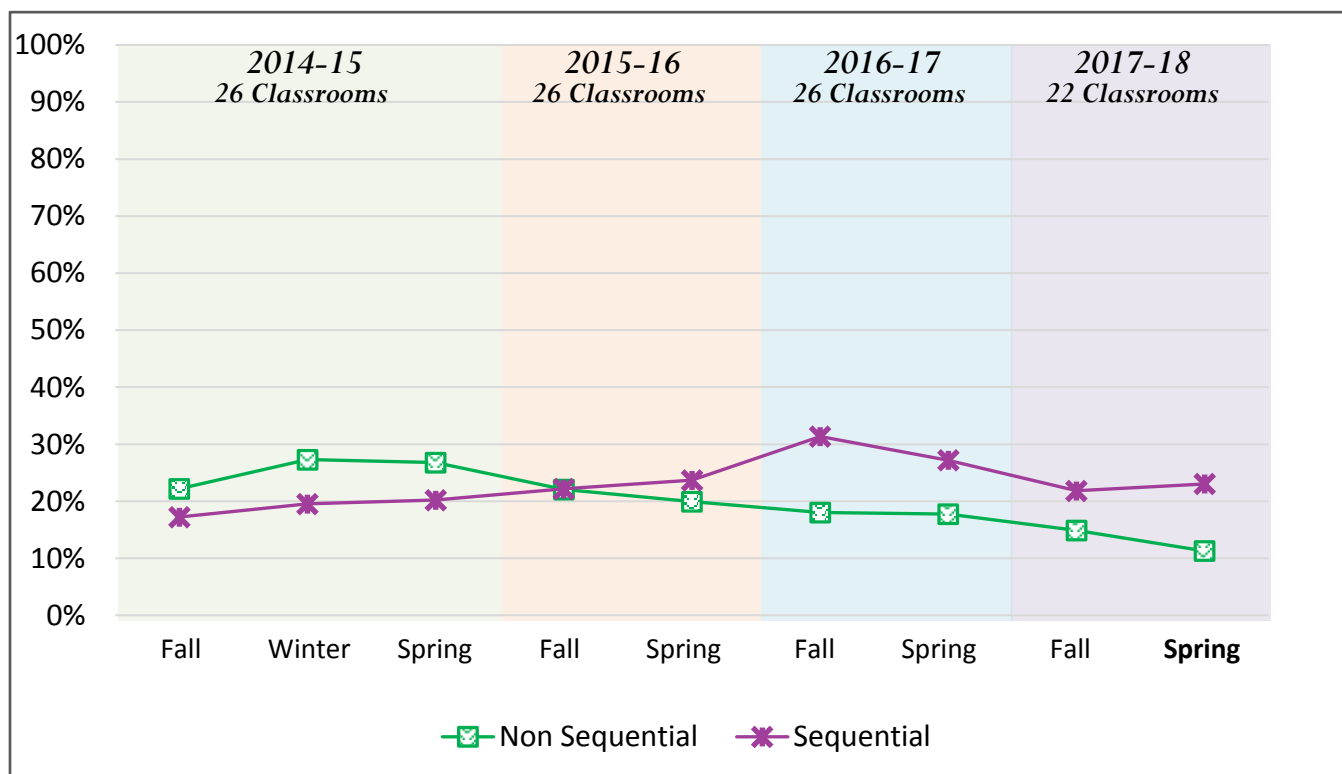
GOAL 6: Fostering Associative/Cooperative Interactions

During parallel play, children may work with similar materials but without interacting with others in the classroom. Associative and cooperative interactions occur when children are sharing materials *and* interacting to co-create something.

While associative interactions are often open-ended, cooperative play involves children working together with shared goals, rules, and/or organization. Both associative and cooperative play require children to communicate and work with peers. They also require children to monitor their own behavior and adapt to the needs and expectations of the group to accomplish a certain task. Thus, associative and cooperative play can have positive effects on children's language development, self-regulation development, and their level of involvement in classroom activities.

Percentage of Sweeps Children were Observed in Various Interaction Types (EXCLUSIVE of Meal and Nap)
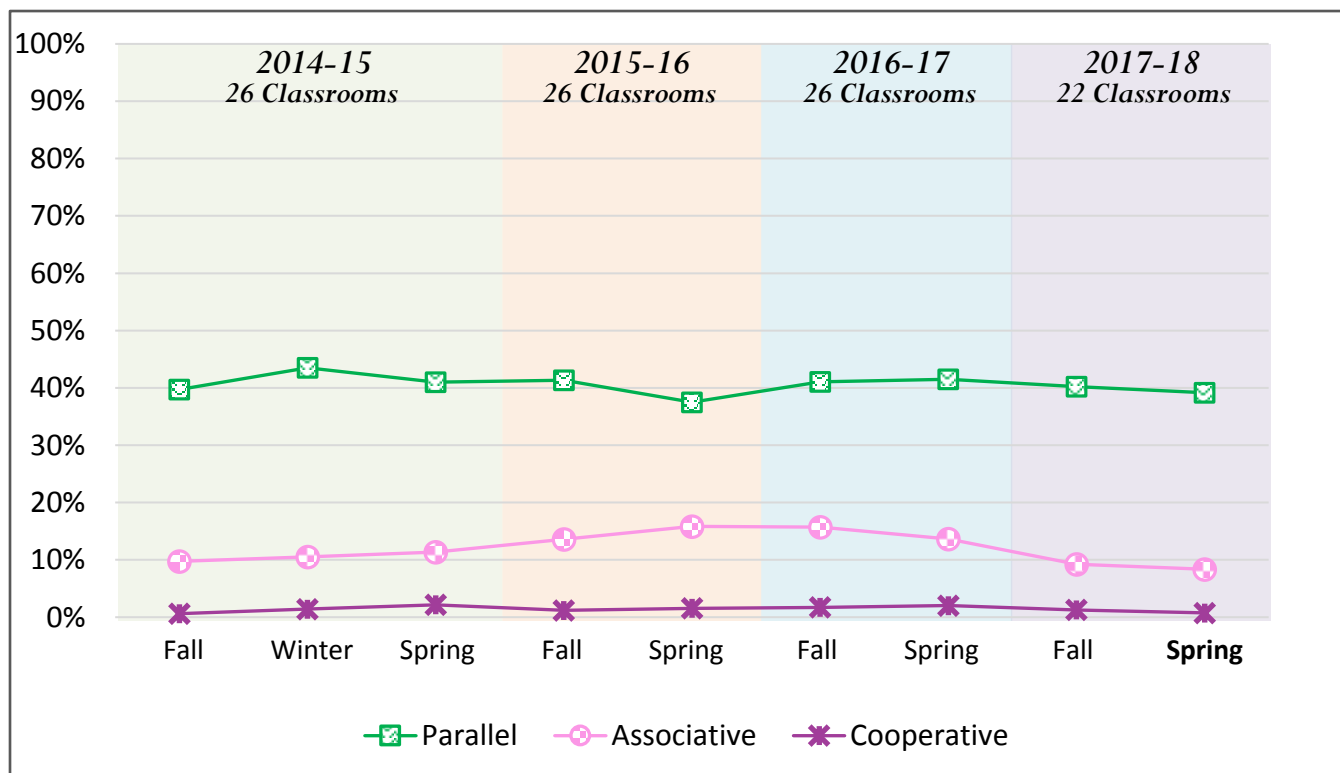
## GOAL 7: Fostering Higher Levels of Involvement

It is critical to get children involved in learning interactions in the classroom. Children who are not engaged, or who are only receiving information in a passive way are not getting the full advantage of their exposure to the content that will prepare them for later learning.

Observers code children's involvement on a 5-point scale, from Low to High. This enables us to better understand which activities are drawing the highest levels of involvement, and in which activities children tend to show lower involvement.

- 1 - Low
- 2 - Medium Low
- 3 - Medium
- 4 - Medium High
- 5 - High

The graph below shows an overall Involvement rating from all activities throughout the day (including Transitions). The second graph shows involvement in learning activities. If you wish to see a break out of Involvement ratings by activity type, we can provide that for you.

### Involvement Ratings across the Day (EXCLUSIVE of Meal and Nap)
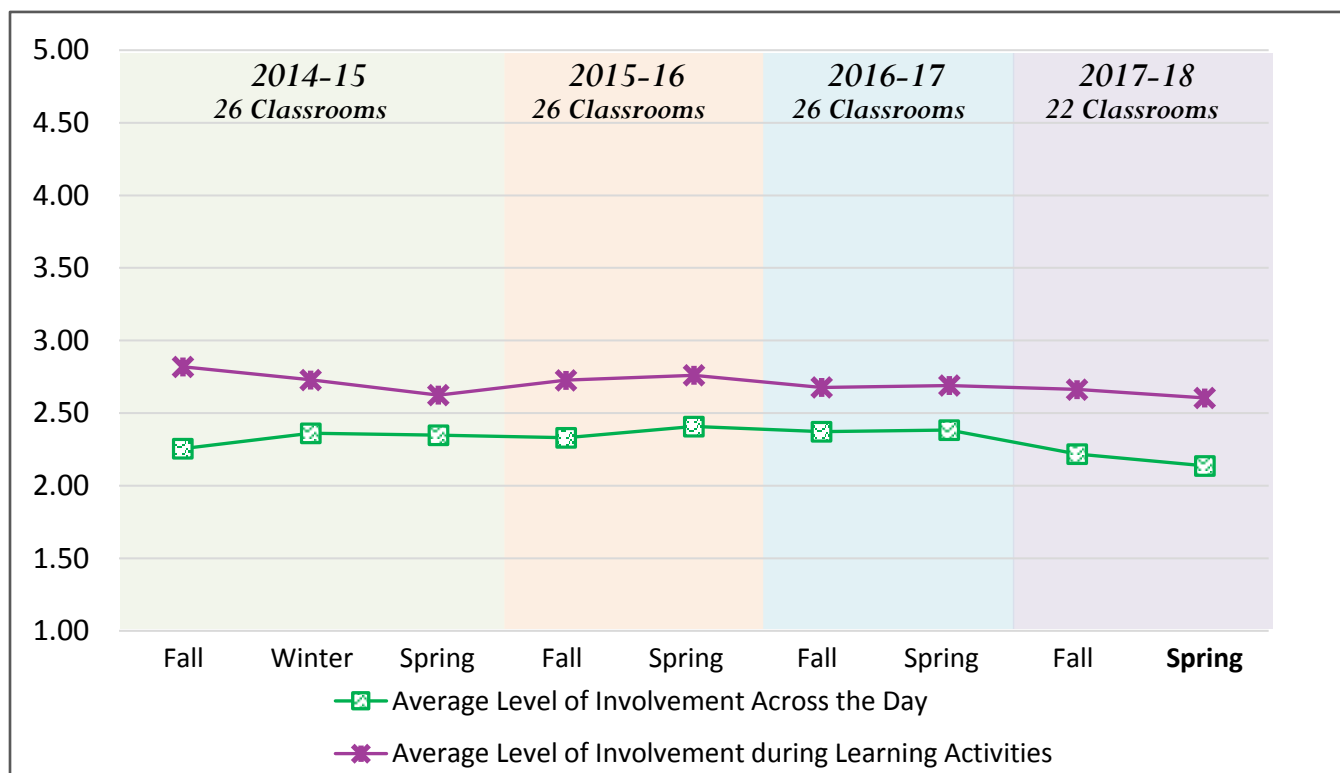
GOAL 8: Creating more Math Opportunities for Children

Children's early math exposure and knowledge are associated with long-term academic achievement in all areas, not just math. Thus, the more time children get to spend in activities designed to help them grasp mathematical concepts while they are in PreK, the better prepared they will be for kindergarten and beyond.
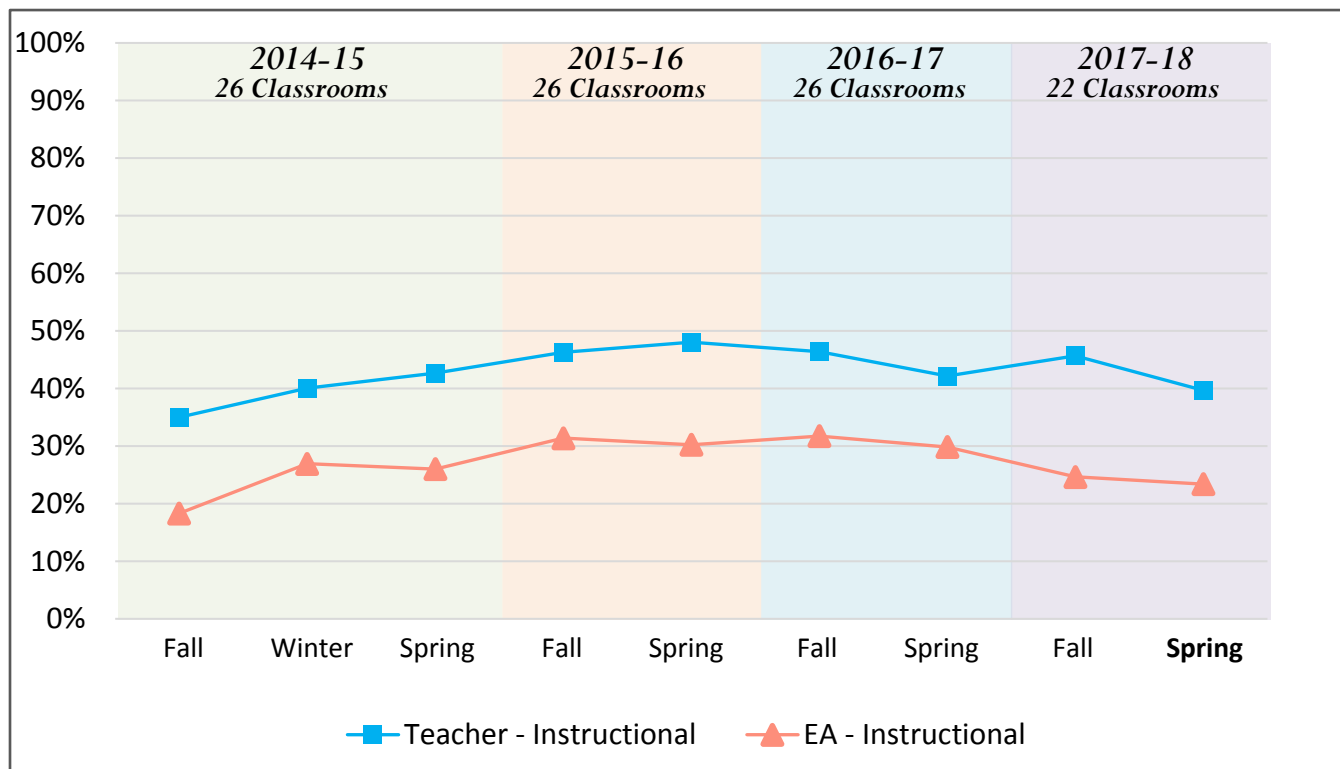
Literacy includes Reading, Code Based Instruction, and Emergent Literacy activities.

Percentage of Sweeps Children were Observed Engaging in Math and Literacy
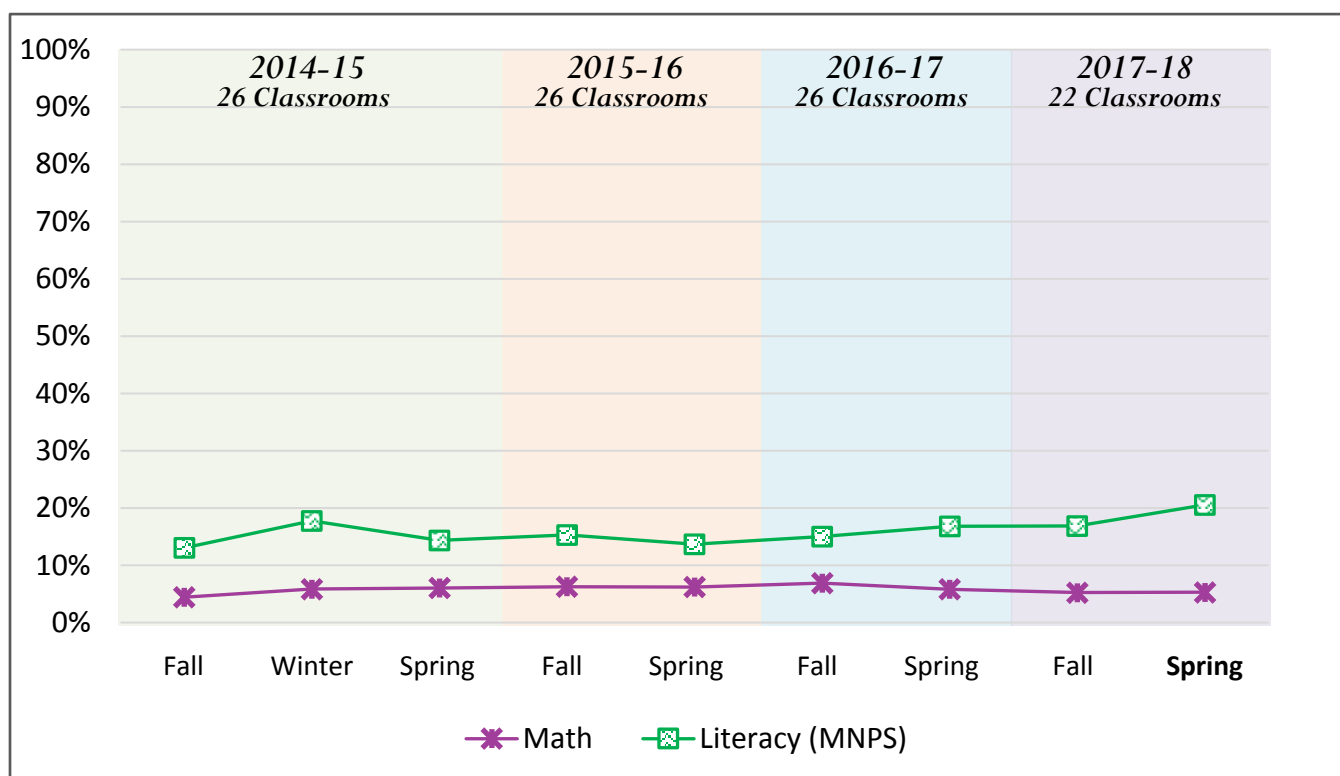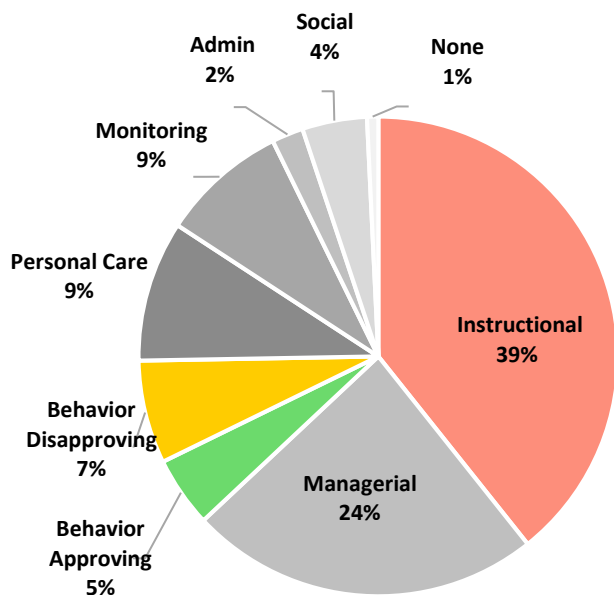
Additional Information: Teachers' Use of Time

Percentage of Sweeps Teachers and Assistants were Observed in Instructional Tasks
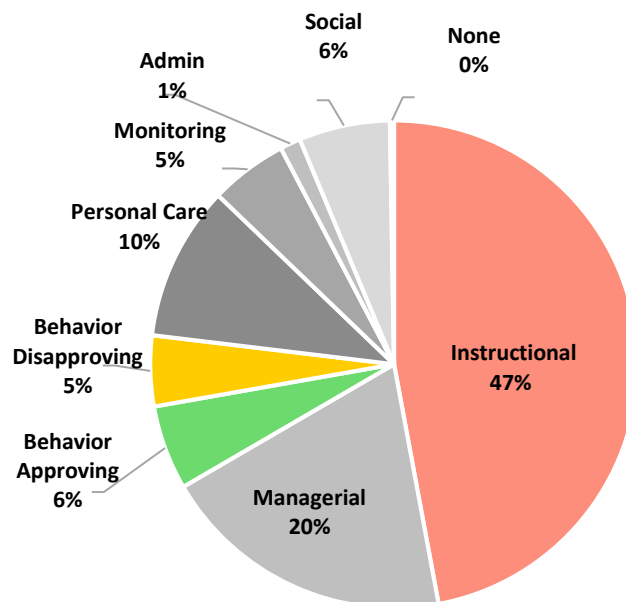**(Exclusive of Meal and Nap)**

Percentage of Sweeps Teachers Observed in Various Type Tasks
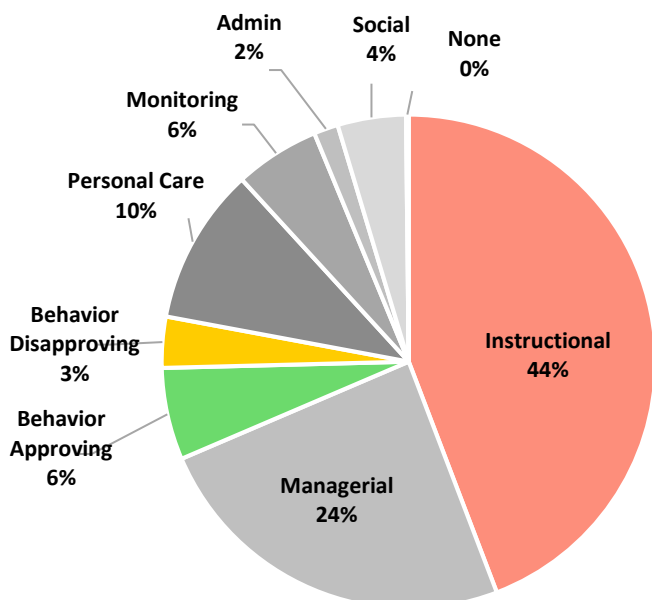(Exclusive of Meal and Nap)
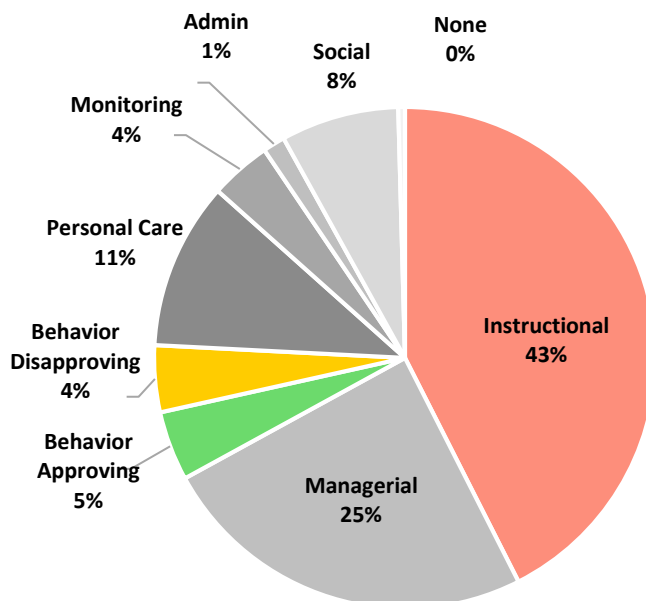
Tchrs Across ELCs (26 Classrooms)
2014-15 Averages

- Social 4%
- Admin 2%
- None 1%
- Monitoring 9%
- Personal Care 9%
- Behavior Disapproving 7%
- Behavior Approving 5%
- Instructional 39%
- Managerial 24%

Tchrs Across ELCs (26 Classrooms)
2015-16 Averages

- Social 6%
- Admin 1%
- None 0%
- Monitoring 5%
- Personal Care 10%
- Behavior Disapproving 5%
- Behavior Approving 6%
- Instructional 47%
- Managerial 20%

Tchrs Across ELCs (26 Classrooms)
2016-17 Averages

- Admin 2%
- Social 4%
- None 0%
- Monitoring 6%
- Personal Care 10%
- Behavior Disapproving 3%
- Behavior Approving 6%
- Instructional 44%
- Managerial 24%

Tchrs Across ELCs (22 Classrooms)
2017-18 Averages

- Admin 1%
- Social 8%
- None 0%
- Monitoring 4%
- Personal Care 11%
- Behavior Disapproving 4%
- Behavior Approving 5%
- Instructional 43%
- Managerial 25%
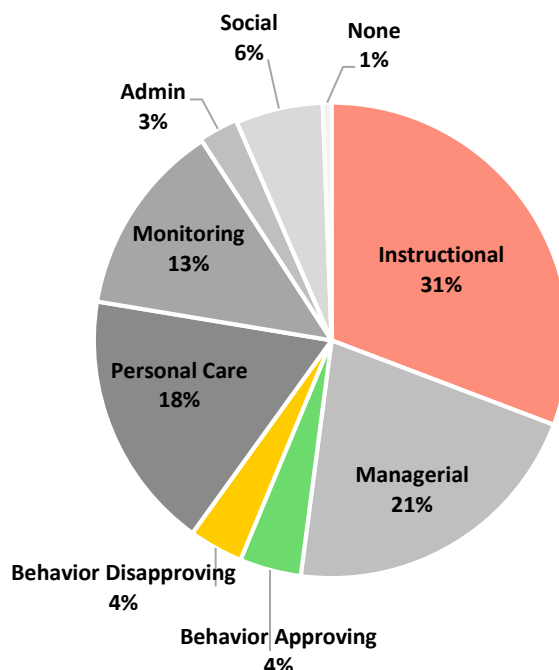
Percentage of Sweeps Educational Assistants Observed in Various Type Tasks
(Exclusive of Meal and Nap)

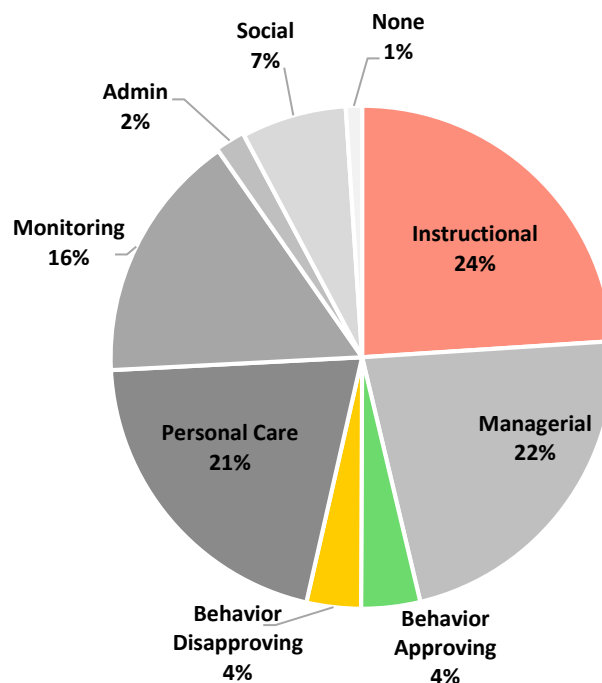**EAs Across ELCs (26 Classrooms) 2014-15 Averages**
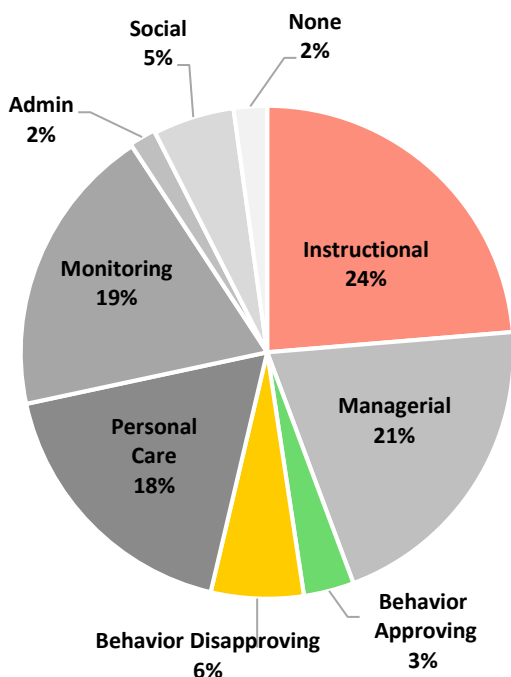
- None 2%
- Social 5%
- Admin 2%
- Monitoring 19%
- Instructional 24%
- Personal Care 18%
- Managerial 21%
- Behavior Disapproving 6%
- Behavior Approving 3%

EAs Across ELCs (26 Classrooms) 2015-16 Averages

- None 1%
- Social 6%
- Admin 3%
- Monitoring 13%
- Instructional 31%
- Personal Care 18%
- Managerial 21%
- Behavior Disapproving 4%
- Behavior Approving 4%

EAs Across ELCs (26 Classrooms) 2016-17 Averages

- None 1%
- Social 4%
- Admin 1%
- Monitoring 13%
- Instructional 31%
- Personal Care 19%
- Managerial 22%
- Behavior Disapproving 3%
- Behavior Approving 5%

EAs Across ELCs (22 Classrooms) 2017-18 Averages

- None 1%
- Social 7%
- Admin 2%
- Monitoring 16%
- Instructional 24%
- Personal Care 21%
- Managerial 22%
- Behavior Disapproving 4%
- Behavior Approving 4%
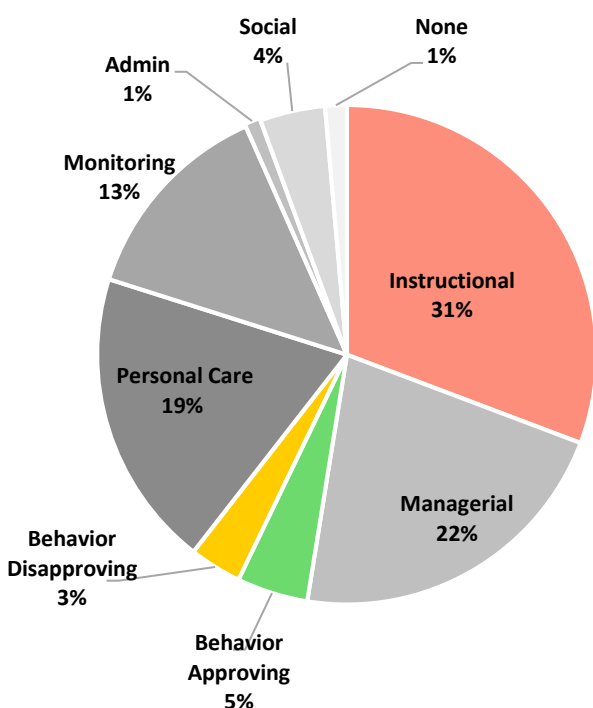
SUMMARY: CLASSROOM OBSERVATIONS

Analyses in years 1 and 2 of this partnership identified 8 classroom practices that were linked to children's gains in the assessments. We focused on identifying practices that were related to more than one outcome for children. We have been gratified to see that these practices more or less remained consistent predictors across the four years. In some years, one or more of the practices might show less predictability while others were stronger, but the 8 have remained ones that appear to be important for young children. It is really important to note also that the practices were found to be more important for those children who entered the classrooms scoring lower on the assessments. As the classrooms become more economically diverse as in this year, it will be important to help teachers remember how much their practices affect the most vulnerable children in their classrooms.

In summarizing changes in the 8 practices across the four years, we have grouped the summary into those practices that showed positive changes, even if not completely sustained; those in which no changes were observed and changes in other practices that are separate from the 8. (In the summaries below, we refer several times to the web site created for this project. It contains much helpful information about how to make positive changes in each of these 8 practices and continues to be updated. https://my.vanderbilt.edu/mnpspartnership/)

Practices That Showed Positive Changes

Transitions. Transitions decreased the most across the three observations in year 1. There were continued lower rates until spring 2018 when rates began going up again. The amount of time a classroom spends in Transitions is especially predictive of less gain for children with low entering skill levels, across a variety of outcomes. Transitions are an area where teachers are quite open to specific suggestions for how to shorten them. There are many suggestions on the MNPS/PRI partnership website.

Positive Tone. Teachers' positive tone increased from year 1 and maintained a high rate until a slight decline in year 4. Teachers' affect in the ELCs is much more positive than we see in other pre-k settings. A positive regard is an important context for learning.

Behavior Disapproving. For teachers and EAs Behavior Disapproving came down from the first two observations in year 1 and remained low across the following three years with a slight increase in spring of year 4. In year 2 and 3, for teachers the rate of approving was

higher than disapproving. The rate of Behavior Disapproving continues to be one of the strongest *negative* predictors of children's outcomes both within the ELCs and across other pre-k classrooms. It seems that teachers need to be consistently reminded of how important their disapproval is for young children. Given the uptick in year 4, this may be something worth including in professional development activities each year.

Listening to Children. Teacher listening to children increased by the end of year 1 and remained higher in years 2 and 3, but showed a decline in year 4, though not quite to the previous low levels of year 1. EAs listening to children was unchanged across the four years. Teachers continue to talk at a very high rate – 70% or more across all 4 years. While listening increased, it still remained quite low. It is hard for teachers to differentiate their instruction based on children's skills if they do not actively listen to children to determine what they know and what they think. Listening to children was a predictor of gains across all four years while teacher talking has never been a predictor of any outcome in any year (with small negative relations when there are any). Children's talking increased from the first observation and remained slightly higher until year 4 when it decreased to previous levels. Talking specifically to the teacher occurred relatively infrequently across all years.

Sequential Activities. Children's interactions with sequential activities showed a gradual increase across the first two years and then a strong increase in year 3 followed by a reduction in year 4 though not as low as to the original levels. The amount children engage in sequential activities has been a major predictor of outcomes for all four years. It predicts literacy, math and self-regulation outcomes, one of the few classroom practices that predicts self-regulation outcomes. When children are engaged in activities that provide a sequence of steps such that children can work through them independently, it makes sense that doing so should improve their skills at internal regulation.

Associative Interactions. Associative interactions showed an increase in years 2 and 3 but then a reversal down to original levels in year 4. The amount children engage in Associative Interactions has been especially predictive of gains for children who enter the classroom with lower skills. This fact may seem counter intuitive, but it turns out that lower skilled children need the opportunity to engage with peers perhaps even more than higher skilled children. Associative interactions seldom occur during whole or small group instruction, which each increased across the years (see below). Associative interactions typically occur during Center activities, but Center time decreased across the years. However, just having more time in Centers does not guarantee associative interactions will occur. The activities

provided in the centers have to be of the type that encourages children to work together. Cooperative Interactions, those that demand even more from children, seldom occurred, and that did not change across the years. The amount of time children engaged in Associative and Cooperative interactions in pre-k predicted social skills ratings by their 1st grade teachers in another study.

Practices That Showed No Changes

Level of Instruction. Teachers' Levels of Instruction hovered around or a little below the 2.0 average, indicating a concentration on basic skills. Detailed information on how to increase Level of Instruction is included on the website. Basic skills instruction will produce gains on such things a recognizing letters and numbers, but that sort of instruction does not prepare children to learn new material in later grades or to develop a deeper understanding of the concrete skills they are mastering. Whole Group activities do not generally lend themselves to higher levels of instructional interactions. Small group instruction could, but only if teachers listened to children, encouraged interaction and asked higher order questions. Often teachers teach in small group settings exactly the same as they do in whole group. Center activities could lend themselves to more in depth instruction but only if teachers circulated, held conversations with children and provided stimulating things for children to be engaged with at the centers.

Level of Involvement. Children's level involvement was essentially unchanged across the years though there was a slight uptick in year 2. Level of Involvement across the day includes times in transitions and meals, times when children are not generally involved in a learning activity. On the other hand, Level of Involvement in a learning activity charts children's engagement when there is an opportunity to be involved. For example, a Whole Group literacy activity presents an opportunity for children to be engaged; some children, however, may not be very interested and have a medium low Level of Involvement, other children may have completely disengaged and be rated as having a low Level of Involvement. Hence the *opportunity* to be engaged in learning was presented but the children were not engaged. The fact that children's average Level of Involvement during learning opportunities averaged below a 3.0 (a medium level) may indicate that the activities presented to children were not very engaging. Usually we find a higher Level of Involvement during Center activities when children have a chance to determine what they will do; we did not see a very strong difference in the ELCs between children's involvement in Centers compared to Whole Group or Small Group. This finding suggests that more

attention should be paid to the materials that are in the centers and to changing them periodically to renew children's interest. Level of Involvement is an especially strong predictor for children who enter with lower skills; teachers may need help knowing how to structure activities for them that engage them.

<u>More Math Opportunities.</u> Amount of math activities, both intentionally taught and engaged by individual children in during center time, showed no change across the years, remaining at a very small percentage. Teachers may not feel comfortable teaching math but there is good evidence that the more math skills children learn during the preschool years, the better their scores are on high stakes tests in both math and literacy at 3rd grade and beyond. There simply has to be a way of getting more complex math materials into the classrooms so that children have an opportunity to be engaged with mathematical concepts and vocabulary.

Practices That Showed Other Changes (not part of the 8)

<u>Whole Group Instruction</u> increased from year 1 to years 2 and 3 and then again in year 4. The percent time spent in <u>Center</u> activities increased from year 1 to year 2 and then began to decrease with a larger decrease in year 4. <u>Small Group Instruction</u> was used more in year 4 than any other year. These may be intentional changes or they may be the result of teachers responding to pressures or reverting to their preferred practices. Teachers engaged in <u>more instructional activities</u> across the years with some fluctuation. Some of the increase was due to the increased use of Whole Group instruction.

Summary

Extensive feedback focused on these 8 important instructional practices produced some positive changes, particularly following year 1, the first year the feedback was given and after we had simplified our contributions to focus on just 8 practices. Not all of the positive changes, however, were sustained. Year 4 saw a reversal of the changes in many areas.

Some important behaviors showed no change across the years of the partnership. Despite knowing the importance of increasing the teachers' Level of Instruction and the children's involvement levels, neither showed increases over four years. Nor was the amount of math activities increased. It would be important for a group of teachers and coaches to have a chance to talk about these, to brainstorm why they are each hard to change and what specific activities might help them increase.

FINAL WORDS

When Superintendent Register and Director of Early Learning Innovation Wiltshire organized this partnership in 2013-14, excitement and anticipation were high. This would be a partnership between a large urban school system and a major research university to collect real time data and use that information iteratively to build a model pre-k program. When teachers and coaches were hired in summer 2014, they were told to consider this enterprise like a "teaching hospital" where experimentation would occur and lessons would be learned that would be applied widely to the entire pre-k program. These dreams were highly ambitious and did not take into account the fact that administrations change, teachers turnover, and the data collected by the researchers competed with many other diverse initiatives undertaken within the pre-k program.

The researchers involved learned a lot from this partnership, not the least of which was how to present information about classroom practices in ways that were more understandable to the principals, coaches and teachers. We also learned that unless coaches themselves really understood and were comfortable with the information on their teachers, it was hard for them to use the information to improve practices.

Finally we learned how difficult it is to alter some classroom practices. As pre-k programs are implemented more widely, it becomes even more imperative to determine how the quality of instruction provided to children can move to a higher level and how children's involvement in learning can be stimulated more strongly. Early childhood classrooms are not easy environments to manage. Teachers need both clear guidance and much support to create places where children are valued, respected, and encouraged to engage deeply with interesting material.

We strongly hope that the spirit of experimentation and databased decision making continues in the district. It was a privilege to be your partner.

APPENDIX A
ECONOMICALLY DISADVANTAGED STUDENTS
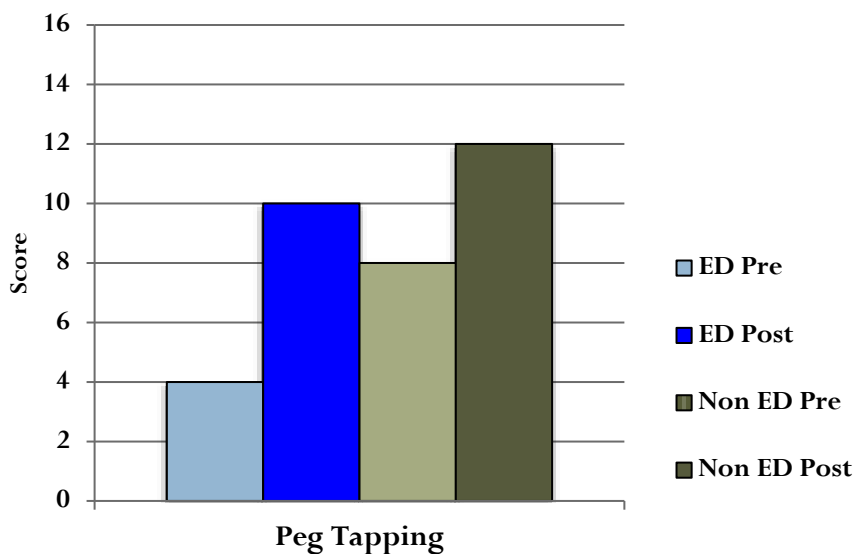## PRE-POST SCORES COMPARED TO NON ED 2017-18

Economically Disadvantaged and Non ED Children's
Pre-Post Scores, 2017-18:
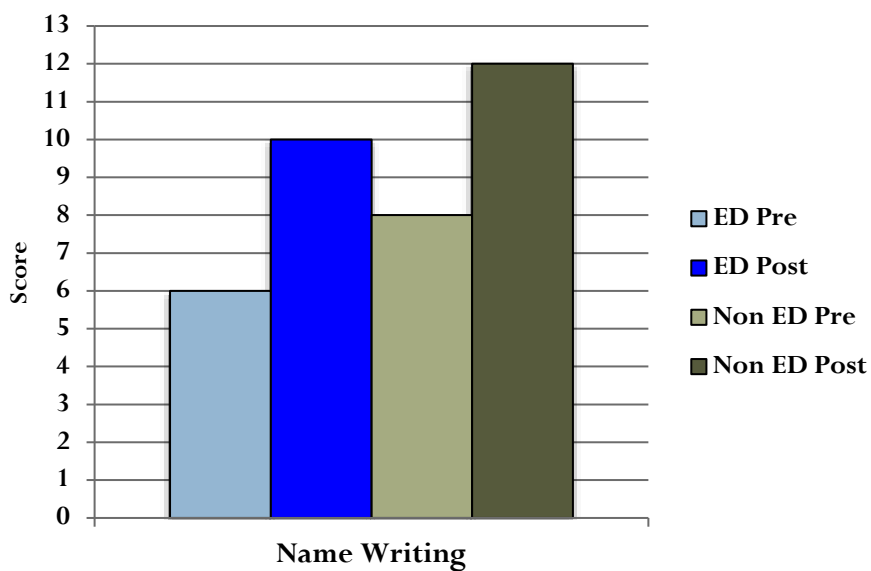## Language and Literacy Skills
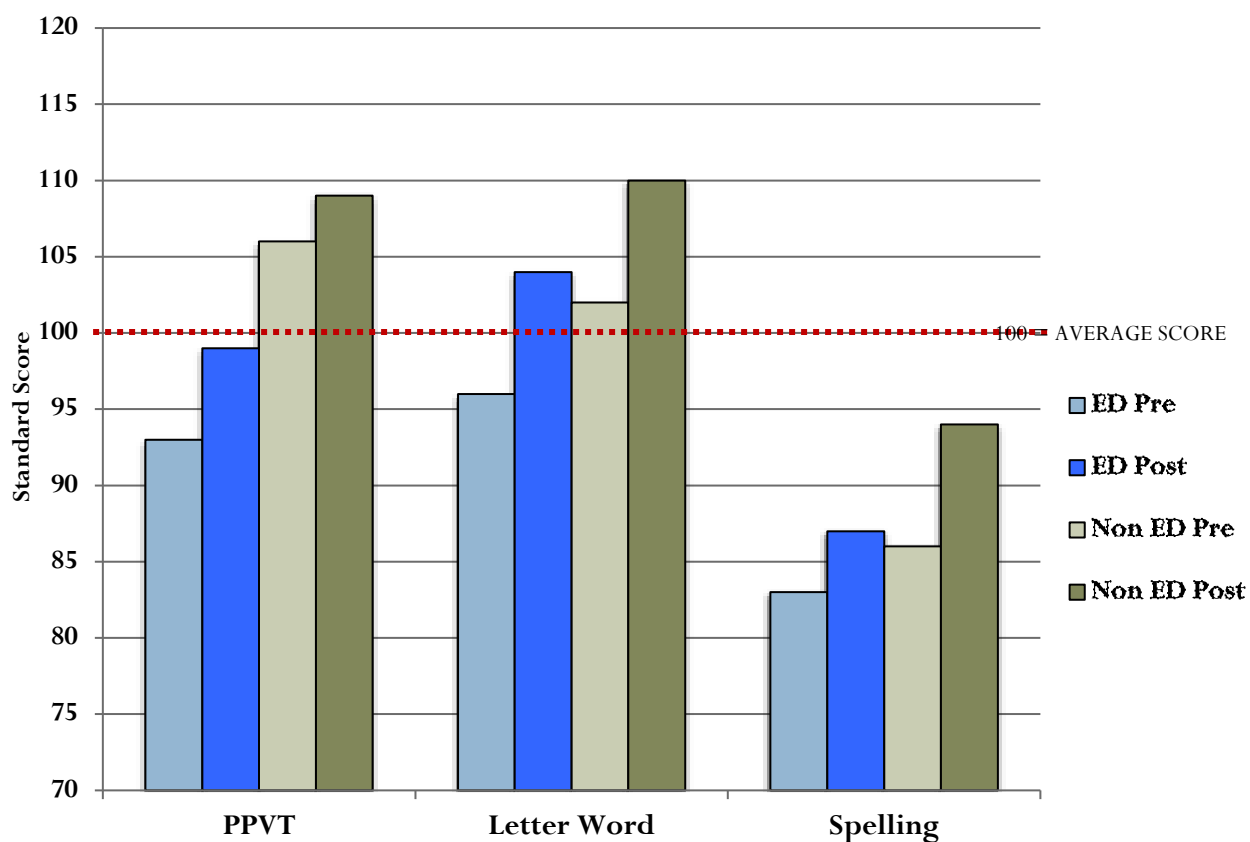
Economically Disadvantaged and Non ED Children's
Pre-Post Scores, 2017-18:
Mathematics Skills
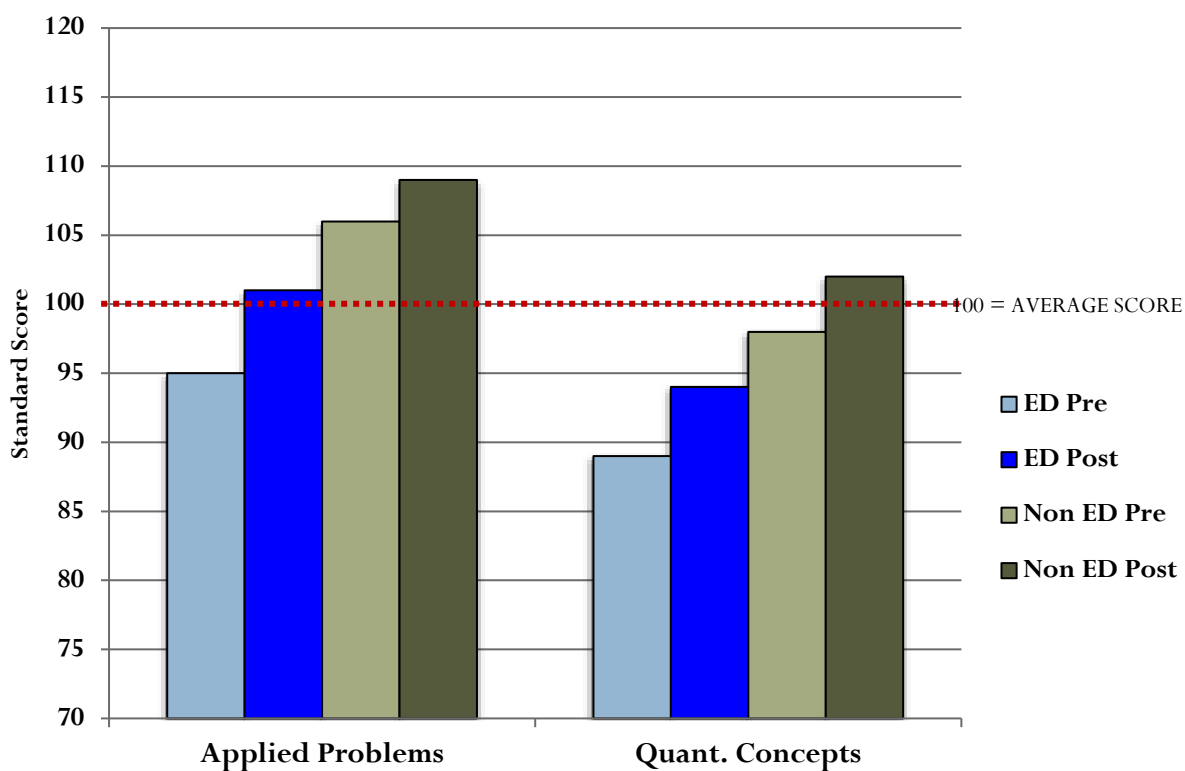
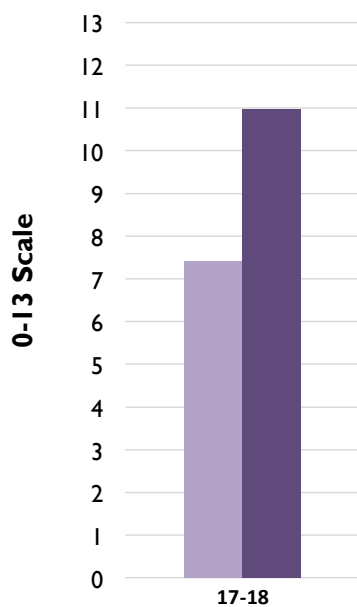## Economically Disadvantaged and Non ED Children's Pre-Post Scores, 2017-18: Self-Regulation Skills (-1–16)

Economically Disadvantaged and Non ED Children's Pre-Post Scores, 2017-18: Name Writing Skills (0-13)
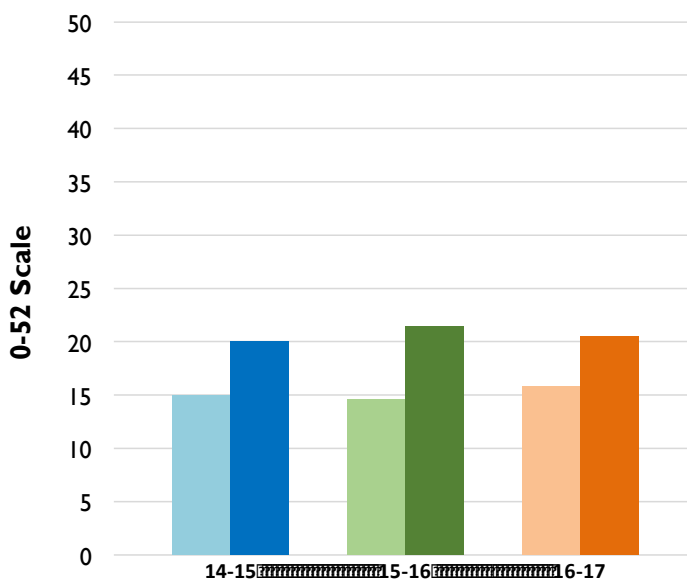
APPENDIX B
MEASURES NOT ASSESSED EACH OF THE 4 YEARS

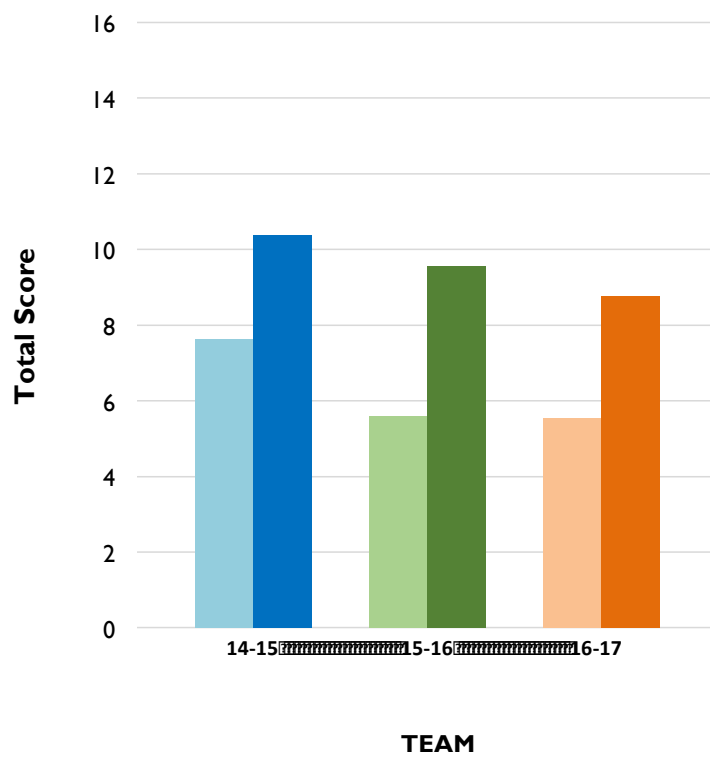# Children's Readiness for Kindergarten:
Early Writing and Narrative Recall

0-13 Scale

Name Writing Total Scores

17-18

0-52 Scale

Renfrew Bus Story

14-15   15-16   16-17
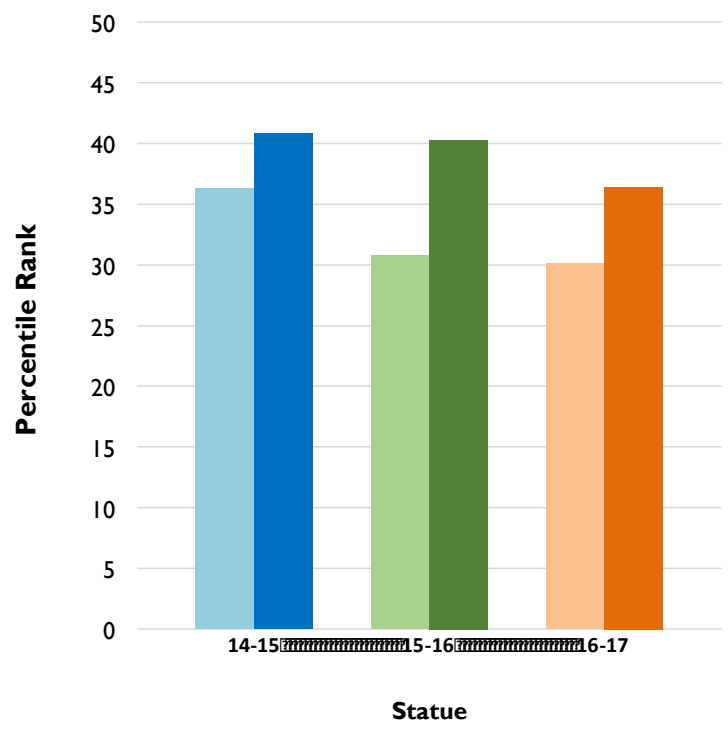
Children's Readiness for Kindergarten:
Math Skills

Children's Readiness for Kindergarten:
Self-regulation skills

Ability to Resist Distraction

Children's Readiness for Kindergarten:
Teacher-reported social and self-regulation skills

Interpersonal Skills

Work-related Skills