



AppleTree Institute
for Education Innovation

THE APPLETREE APPROACH TO SCHOOL READINESS:

A Case Study Using A Longitudinal
Population-Referenced Evaluation Framework

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Center on Health and Education*

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ABSTRACT

This brief provides a synopsis of findings related to the AppleTree approach to School Readiness for children from low-income families. Using a Longitudinal Population-Referenced Evaluation Framework with independent and unbiased assessors and observers, participating children (N=200) showed substantial benefits in the key school readiness predictors of language, mathematics, and literacy skills. Children who had two years of AppleTree showed approximately twice the amount of benefit as children who had only one year of the program. Children who had two years of AppleTree scored substantially above national average on critical measures of school readiness after entering with scores between the 16th and 27th percentile.

It is noteworthy that the classrooms were observed to be of high-quality using independent CLASS and ELLCO observations. These academic gains were made in a program characterized by warmth and student engagement. These results are consistent with AppleTree's use of quantitative analysis of classrooms and children's progress as an integral feature of their ongoing professional development program and tiered instruction. These results are discussed in relation to policy recommendations for early childhood education programs for children from low-income and undereducated families.

BACKGROUND

Pre-K programs are a social and educational innovative strategy to promote school readiness for children from undereducated and poor families. Effective pre-K programs typically need to accomplish the following goals with respect to key skill areas that predict future school performance:

- 1) To increase the rate of learning and cognitive growth over the rate that preceded pre-K participation in basic cognitive skills and;
- 2) To increase the rate of growth for language and pre-literacy skills.

It has been shown in randomized controlled trial (RCT) research that disadvantaged children who achieve significantly higher levels of school readiness by participating in high-quality pre-K are more likely to do better academically later in school than comparable children who did not have high-quality pre-K exposure. Emerging trends suggest a dose-response effect with multiple years of pre-K exposure producing larger and longer lasting academic effects than single year exposure. Communities with high numbers of children in poverty stand to reap large benefits by combining effective pre-K programs with strong elementary and secondary classrooms.

Washington, D.C. has a high rate of childhood poverty and no pre-K programs of demonstrated effectiveness in increasing the likelihood of school readiness and subsequent school performance. The AppleTree Institute for Education Innovation seeks to ensure that young children in the District of Columbia have access to early childhood education programs of sufficient quality and intensity to close the achievement gap between socioeconomically disparate sectors of the community. The focus of this paper is to describe the Institute's program for 3 and 4-year-olds and to present independently collected and analyzed evidence of the program's impact on school readiness.



THE PRE-K PROGRAM

The pre-K program has been built in a manner consistent with the existing evidence from earlier effective experimental programs and with recommendations from leading scientific and educational organizations.

These include:

- Lead teachers with a bachelor's degree;
- Highly qualified assistants, as defined by No Child Left Behind;
- Low child-to-teacher ratios, ranging from 5:1 to 7:1;
- Full-day program from 8:00 a.m. to 3:15 p.m., with nap and outdoor play;
- Screening and support services for children, including availability of social workers; and
- Provision of at least two meals per day.

All classrooms are supplied with rich, engaging materials and the content-centered curriculum, *Opening the World of Learning*, a thematic, comprehensive early childhood program with specific academic learning objectives along with well-defined daily activities and content to support children's attainment of objectives. Teachers, apprentice teachers, and teaching aides are all trained to use the curriculum and they receive support throughout the year in the form of professional development workshops and in-classroom coaching.

What sets AppleTree apart from many early education programs is the regular use of data to monitor each child's academic progress, the classroom environment, and teacher behavior. Adjustments are made in instruction and professional development in accordance with the data. Included in the periodic data collection are:

1. Regular assessments of instructional quality using two classroom observation systems-CLASS and ELLCO.
2. Regular assessments of children's academic progress to differentiate instruction in a three-tiered model: (1) Regular classroom (2) Intensive small group supplemental instruction, and (3) Supplemental individual support often provided in cooperation with a specialist.
3. Fall and Spring assessment of children's language, literacy, and mathematics skills.

The impact of the overall program is being analyzed using a practitioner-oriented evaluation framework that we developed based on a systems theory approach to human development that organizes relevant data into a model of:



We call the analytic approach a Longitudinal Population Referenced Evaluation Framework or Long PRE Framework, for short. The longitudinal aspect (Long) emphasizes repeated measurements of key concepts, Population (P) refers to a known distribution of a trait; (R) refers to the reference of an individual to the population distribution; (E) refers to evaluation as a systematic approach to program impact.

Key concepts in a Long PRE Framework include:

- Trained and competent assessors who are valid and reliable in their scoring
- Active protection from bias by having independent assessments for each domain and round of data collection
- Independence of assessors from program administration

RESULTS

Participants (Inputs)

Of the 180 children enrolled in one of the 10 AppleTree classrooms, three-quarters came from families in poverty (as measured by qualifying for free or reduced lunch). Half the children were newly entered 3-year olds, about a quarter were returning 4-year olds, and about a quarter were newly entered 4-year olds. Just over a fifth (21%) of the children were identified as English Language Learners. Fifty-four percent of the children were girls and 46% were boys.

Classroom Quality (Educational Process)

Classrooms were assessed by trained professional observers using two popular and widely used measures of classroom quality. These assessments represent quantitative measurements of the educational "process" measures. These measures are described briefly on the following pages.



1. Early Language and Literacy Classroom Observation (ELLCO), which has a scale from a low of 1 to a high of 5 in each of two areas:
 - General Classroom Environment
 - Language and Literacy Environment.

AppleTree classrooms were compared to two recently reported successful programs: More at 4, and Literacy Environment Enrichment Program (LEEP).

2. The Classroom Assessment Scoring Systems (CLASS) which has a scale of 1 to 7 in each of three teacher behavioral domains:
 - Emotional support
 - Classroom organization
 - Instructional support.

AppleTree classrooms were compared to recent data from successful programs in North Carolina and Tulsa, Oklahoma.

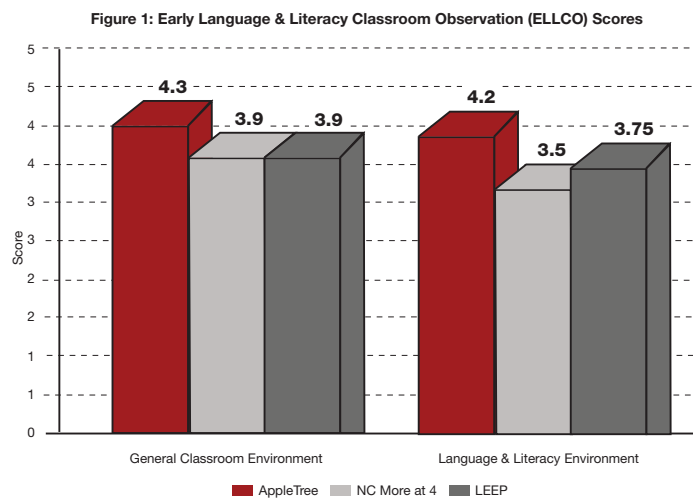


Figure 1 shows the ELLCO results. AppleTree classrooms meet or exceed the quality measures in these other two major programs.

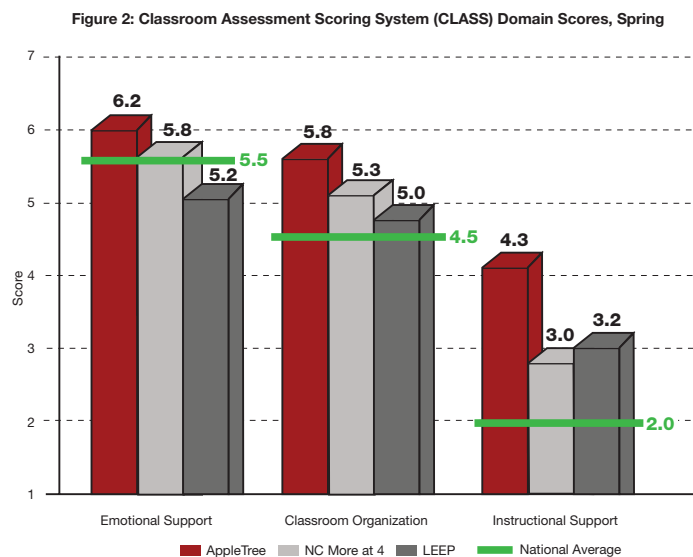


Figure 2 shows the CLASS results. AppleTree classrooms scored higher than the national average in the 3 major teacher behavioral domains and higher than two other recently reported successful programs (NC More at Four and Tulsa Pre-K). Our conclusion from the classroom (educational process) data is that the AppleTree results indicate that its classrooms are of relatively high quality compared to other successful pre-K programs and higher than national average quality.



CHILD OUTCOMES

Peabody Vocabulary Scores

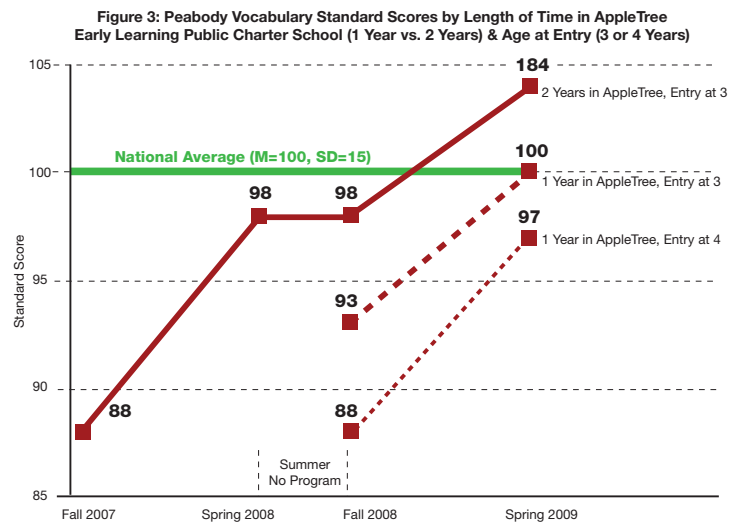


Figure 3 shows growth of vocabulary for children who entered as 3 or 4-year olds and who received either 1 or 2 years of AppleTree education. All three groups show increased rates of progress over expected rates associated with higher standard scores – which means that the groups are rising relative to the national standardization sample. The 3-year-olds are going from scores of 92 to 100 and the 4-year-olds are going from 88 to 97. The 3-year-olds who received two years of AppleTree are making almost twice as much progress (16 standard score points) as the 3 and 4-year olds who only had one year of the program.

Phonological Awareness

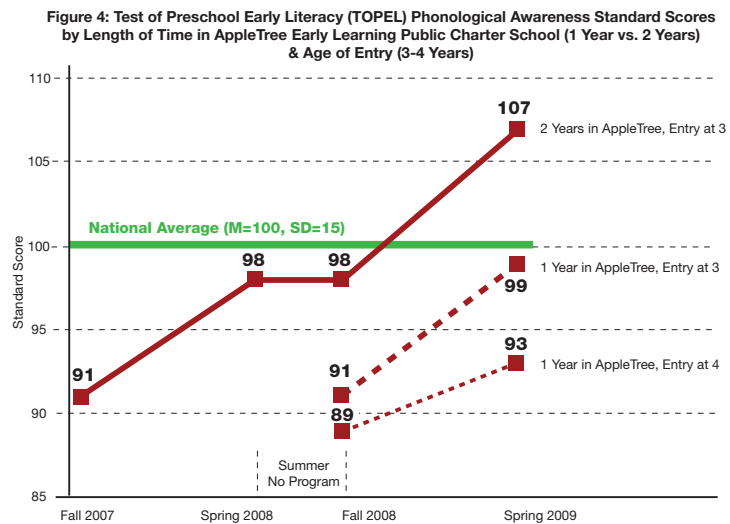


Figure 4 shows results from a critical pre-literacy skill in standard score format – phonological awareness. The results show impressive gains for both 3 and 4-year olds but about twice the gains from two years in the program versus one year, with spring of the second year resulting in scores above national average, again, and a full standard deviation plus (16 point gain) above their entrance exam scores.



Upper Case Letter Knowledge

Figure 5: Number of Upper Case Letters Identified by Length of Time in AppleTree Early Learning Public Charter School (1 Year vs. 2 Years) & Age of Entry (3-4 Years)

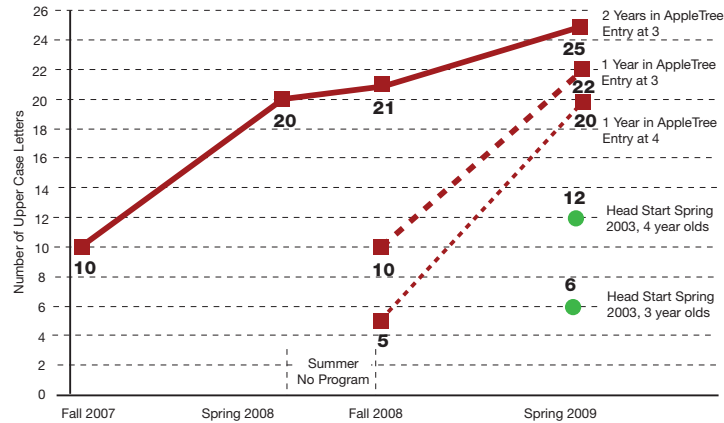


Figure 5 shows the number of letters correctly identified by the children in the three groups. One year of the program resulted in an average of 20-22 letters being correctly recognized; whereas two years resulted in virtually all 26 letters being correctly identified. We contrast this with the 6 and 12 letters correctly recognized by 3- and 4-year olds, respectively, as part of the recently released Head Start National Impact Study.

Mathematics

Figure 6: Test of Early Mathematics Abilities (TEMA) Standard Scores by Length of Time in AppleTree Early Learning Public Charter School (1 Year vs. 2 Years) & Age of Entry (3-4 Years)

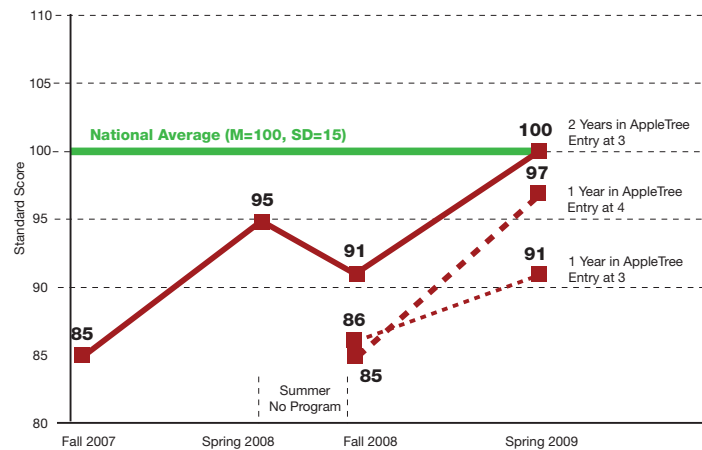


Figure 6 shows the independent assessments of the three groups of children using the Test of Early Mathematics Abilities (TEMA). The results from two years of the program are highly similar to what was found for the language and literacy measures—a gain from 85 to 100. The 4-year-olds, however, made a greater rate of gain than the 3-year-olds. This may be due to a greater maturational readiness for math concepts since the 3 and 4-year olds began at about the same age-relative starting point, 85 and 86. Overall, the rate of progress in math as well as language and literacy is much greater than would have been expected given the children’s entry standard scores.



SUMMARY & CONCLUSIONS

The Long PRE Framework for the AppleTree Innovation project has revealed sizeable advancements in key developmental domains that have been identified in previous research as critical for school readiness. Two years of the program raised the children's performance by more than a full standard deviation (Effect size = 1.1) placing the AppleTree program among the most effective of which we are aware. Because AppleTree is continuing to refine and improve its program, it should not be assumed these results are the largest that this model can be expected to attain. Nevertheless, it is clear that the AppleTree approach to early childhood education could be an important factor in closing the achievement gap in Washington, D.C. and, perhaps, in other parts of the United States.

The growth in child academic skills in AppleTree classrooms indicates that there is no dichotomy between a focus on academic outcomes for young children and learning in a "child friendly" environment in which children have choices, are engaged, and have fun learning. AppleTree classrooms had very high scores on student engagement (6.4 out of 7.0) and teacher sensitivity (6.0 out of 7.0), two items from the CLASS, and on opportunities for child choice of activities inside the classroom (4.4 out of 5.0) from the ELLCO.

Future Directions

Based on the Long PRE evaluation of AppleTree three courses of action seem prudent and worthy of pursuit:

1. Replicate the AppleTree Model with at least one more cohort of comparable children and look for similar results.
2. If the findings are replicated, then move to a small to mid-size multisite randomized controlled trial.
3. If the second step is positive, then consider a direct comparison of the AppleTree Model with other effective early childhood programs to determine comparative effectiveness.

Implications for early childhood educational policy

The AppleTree results reveal that an effective structured educational program is not at odds with children's positive engagement (having fun) or with teacher sensitivity. In our opinion, having fun while learning basic skills and language from sensitive teachers are complimentary facets of effective early childhood education for children from disadvantaged circumstances. Finally, we should be reminded that although the teachers were warm, sensitive and effective, they continued to participate in professional development to improve their knowledge and skills about teaching. It is refreshing to realize that high standards, clear goals, continuous professional development and increased rates of children's development can be encapsulated within a single program. Would that more children in need had access to programs with these characteristics.

