NEPC
NATIONAL EDUCATION POLICY CENTER

Review of *Seeds of Achievement*

Reviewed By

W. Steven Barnett and Cynthia E. Lamy
National Institute for Early Education Research

September 2014

Summary of Review

This report argues that a particular charter school preschool model is successful and that, therefore, charter approaches should be used to expand preschool access, recommending that states develop large numbers of charter preschools. But the report fails to make the case that the model is unusually effective or that charter status is critical to any success it does have. While the AppleTree model may well be as effective as the Pioneer authors suggest, this report lacks rigorous evidence regarding the model's development, implementation, cost, and effectiveness. The report uses a pre-test, post-test design to argue the program is effective, but lacks a comparison group that could show if the test results are impressive or disappointing. It also provides no evidence that the children served are comparable to children served by other preschool programs. Sample sizes, attrition, and statistical methods are unreported, and no statistical tests of significance appear to have been conducted. Preschool models with rigorous evidence of high levels of effectiveness have been developed and are currently implemented by public school systems where adequate funding has been made available. We will not know whether AppleTree can add to the preschool policy debates without more rigorous evaluation of the program and its effects.

Kevin Welner

Project Director

William Mathis

Managing Director

Erik Gunn

Managing Editor

National Education Policy Center

School of Education, University of Colorado
Boulder, CO 80309-0249
Telephone: (802) 383-0058

Email: NEPC@colorado.edu
http://nepc.colorado.edu

Publishing Director: Alex Molnar

This is one of a series of Think Twice think tank reviews made possible in part by funding from the Great Lakes Center for Education Research and Practice. It is also available at http://greatlakescenter.org.

Review of *Seeds of Achievement*

W. Steven Barnett and Cynthia E. Lamy,
National Institute for Early Education Research

I. Introduction

A substantial body of research finds that high-quality preschool education can produce substantive impacts on learning and development, especially for disadvantaged children, and can contribute to a reduction in achievement gaps.[1] However, all preschool programs have not been equally successful, and a major challenge for policy is how to scale-up highly effective preschool programs.[2] *Seeds of Achievement: AppleTree's Early Childhood D.C. Charter Schools*, a white paper funded by the Pioneer Institute and written by Cara Stillings Candal,[3] presents very basic data and anecdotes as evidence that the AppleTree model is unusually effective. Following on these claims, the paper recommends that states develop large numbers of charter preschools in order to provide high-quality preschool education on a large scale.

AppleTree is a well-regarded early childhood program in the Washington, D.C., area that over the past 15 or so years has developed from a small laboratory school to a network of programs across seven charter preschools and a large Head Start agency. This model was developed within a charter school setting and has many positive attributes. The AppleTree model more strongly resembles the research-based approaches found to be highly effective than do the vast majority of publicly funded preschool programs.[4] It offers children two years of preschool beginning at age 3. The program incorporates key structural supports for quality, including two degreed teachers and a well-qualified assistant (though class size is not reported), competitive salaries, substantial administrative and supervisory support, and sustained, substantive coaching and other professional development. This is made possible by relatively high level of per-pupil funding for preschool that Washington, D.C., provides (exceeding $13,000 annually) and any additional funds that AppleTree raises that might be devoted to services.

The program's educational model, *Every Child Ready (ECR)*, was developed in partnership with AppleTree teachers as well as curriculum experts. *ECR* includes a standards-based curriculum with 10 thematic units reported to backward map to what children need to know to succeed in third grade, align with the Common Core, and incorporate a balance of instructional approaches (though it is unclear the extent to which child-initiated exploration and dramatic play are included). It also includes a system of child assessments administered four times per year to inform teaching, and evaluation tools for use by

teachers, coaches and others to guide teaching and program improvement. ECR's emphasis on intentional teaching informed by the specific needs of each child, and its system for continuous improvement based on child-progress data and teacher observation, are highly consistent with evidence regarding effective practice.[5] In addition, teachers receive intensive training and coaching. However, most AppleTree teachers begin as teaching fellows: recent college graduates who may or may not have attended college-level teacher preparation or child development courses or attained the relevant teaching certifications.

Despite the descriptive evidence the report provides of AppleTree's high-quality model, the recommendation to replicate charter preschools on a large scale in order to develop the capacity for high-quality preschool across the country does not follow from the evidence presented. *Seeds of Achievement* offers an interesting case study, but some serious limitations must be addressed before it can make significant contributions to policy development. We review the paper in some detail and consider how it might be improved.

II. Findings and Conclusions of the Report

The report describes the development of the ECR model, its components, and its implementation, before moving on to report on AppleTree preschool outcomes. The report concludes that AppleTree students are making "*significant* growth on all measures from year to year" and that the program is "helping students to close the achievement gap" (p.20) (italics in the original). On measures of language, literacy, and math skills, children are reported to move from well below average when they enter at age 3 to well above average when they leave after two years of preschool. The report also cites "anecdotal evidence" that the model may have a more powerful impact than most other preschool programs in Washington, DC (p. 22). Surprisingly, *Seeds* reports that not one AppleTree student ever has been placed in Special Education or retained in grade, while about 22% of students are placed in special education districtwide in Washington, DC (pp. 19-20).

Although the report recognizes some of the limitations of the data presented as evidence that the model is unusually effective, it nevertheless characterizes AppleTree as a model that works and can be taken to scale as a "high-quality delivery system (p.23). The report identifies three potential keys to AppleTree's success: federal and private grants to build out the model; Washington, D.C.'s support for universal pre-K; and AppleTree's autonomy as a charter school (p.23). Greatest emphasis is placed on the last key, and in its conclusions and recommendations section, *Seeds* sets out four levers for change: charter schools as "the right mechanisms for delivery" when given true autonomy and accountability; a focus on outcomes in designing curriculum and for accountability; public investments that allow the development of educational innovations; and continued conversation in which high-quality early childhood programs are part of broader policy initiatives to close the achievement gap (pp. 25-26).

III. The Report's Rationale for Its Findings and Conclusions

The report's presumption for its findings and conclusions is that AppleTree/ECR is a high-quality model that can only be effectively operated at scale as a charter school. The rationale for this presumption is linked to the perceived exceptional flexibility of charter schools and an emphasis on children's outcomes. *Seeds* also reports "barriers" to replicating the model where charter schools are not possible (p.23), such as government overregulation and "onerous standards that focus on inputs and compliance as opposed to outputs" (p. 25).

IV. The Report's Use of Research Literature

The report's statement of the policy problem—that the country needs an infusion of a large number of high-quality preschools to help improve achievement, particularly for disadvantaged children—is reasonably well-supported by citations to the literature. It opens with a succinct discussion of the current status of preschool policy and practice in the United States, noting both the current federal initiative to increase access to high-quality preschool and the continuing lack of access to high-quality programs across most of the country. *Seeds* cites broad reviews of the relevant research of as well as seminal longitudinal studies. Multiple points of view and both positive and negative findings are reported, including recent findings from the follow-up of the national randomized trial of Head Start.

Better use could have been made of the voluminous literature on charter schools. The report cites just one publication on charter schools, the recent CREDO review, as evidence that with true autonomy and true accountability "charter schools work" (p.25).[6] Our reading of the CREDO report is that it strongly emphasizes closing low-performing charter schools as the path to "what works" because the vast majority of charter schools perform no better or worse than comparison traditional public schools.[7] There is considerable debate about the interpretation and policy implications of charter school research.[8] One point of widespread agreement is that charter school research is in great need of methodological improvement.[9] A review of the limitations of past research could have prevented the serious methodological shortcomings in the *Seeds* report discussed below.

V. Review of the Report's Methods

The primary evidence that the AppleTree model is effective consists of mean standard scores measured at the beginning and end of each school year on a handful of well-known instruments: the Peabody Picture Vocabulary Test (PPVT), the Test of Preschool Early Literacy (TOPEL), and the Test of Early Math Ability (TEMA). Corresponding change scores are reported separately for preschool children: from ages 3 to 4 and from 4 to 5. Scores are reported separately for children identified as having free, reduced-price, and

paid status in the federally subsidized school lunch program. Data are presented on both age groups for the 2011 and 2012 school years. Unfortunately, the report provides no information on sampling or sample sizes overall or for any subgroup. There is no information on attrition, and it is not possible to determine how many of the children at age 4 attended the previous year at age 3. Nor is any information provided regarding the reliability and validity of the measures generally or in this application.

The absence of a comparison group and statistical tests precludes any conclusions regarding the effectiveness of the AppleTree model from the data presented.

The report presents no statistics other than means (e.g., no standard deviations) and does not report any statistical tests of significance. The report refers to gains of more than 4 standard score points (about one-fourth of a standard deviation) as "significant" (p. 20). While a case can be made that such gains are significant in the sense that they are meaningful, there is no evidence presented that they are *statistically significant*—that a statistical test has indicated we can be confident that any reported gains did not simply occur by chance. From the information presented, it is impossible to know the confidence intervals surrounding the reported gain scores. The reader has no way of knowing whether a gain of 4 or even 10 standard score points can be considered larger than zero, or even whether such gains are larger than gains typically produced by public, non-charter preschool programs or by other preschool programs.

The study provides no evidence regarding a counterfactual—that is, there are no data on comparable children who did not attend AppleTree. Without a counterfactual, it is impossible to know how much the children in the study would have gained had they attended either no preschool program or a program other than AppleTree. It is possible to make informal comparisons between gains in the AppleTree preschools and gains in other programs or between later educational outcomes for AppleTree graduates and for other children in Washington, DC. However, the study provides no basis to assess or account for selection (who chooses to enter and stay in AppleTree preschools), which would influence test scores at entry, test score trajectory, and other schooling outcomes independent of any effects of AppleTree. Without such information, it is unclear who could fairly be compared with the AppleTree students.

VI. Review of the Validity of the Findings and Conclusions

From the report's description, AppleTree offers a high-quality model for preschool education in many respects. As noted earlier the description aligns well with the program features that research has found to be associated with educational effectiveness. However, no data are presented regarding what actually happens in the classroom. One cannot verify from data in the report that the model is actually implemented as described. AppleTree

probably has such data, because the organization conducts regular observations; it would have been useful to report that information.

The absence of a comparison group and statistical tests precludes any conclusions regarding the effectiveness of the AppleTree model from the data presented. We can consider what one might speculate from those data. First, on several measures, including the widely used PPVT (a test of receptive vocabulary), children score unexpectedly well at age 3 entry; the free-lunch group in particular scores higher than is typical of low-income children at entry to Head Start.[10] This suggests that the children who attend AppleTree are not comparable to the low-income population generally. Second, the reported gain on the PPVT in the 2011 school year for the free-lunch group is similar to the Head Start national average in 2009.[11] As PPVT gains for 2012 are somewhat higher, AppleTree appears to perform like an average to somewhat-above-average Head Start program.

On other measures, fall standard scores at age 3 are more in line with expectations. For the measures of math (TEMA), definitional vocabulary, phonological awareness, and print knowledge (TOPEL), reported gains are sometimes much larger than for the PPVT. Yet, similarly large gains have been found for large-scale public school preschool programs on similar outcome measures.[12] There are also large variations in the average scores and gains on these measures as we look across income subgroups and across the two years (e.g., from a small decline to a gain of a full standard deviation). Unfortunately, with no information on reliability of the tests or the numbers of children for whom scores are reported, the data presented raise more questions than they answer.

The source of the report that not one AppleTree student ever has been placed in Special Education or retained in grade is not clear. With no methodology described—whether the information comes from informal sources or some systematic follow-up, for example—the validity of the claim cannot be assessed. However, not even the most widely heralded preschool models have achieved such total success. This suggests that children with disabilities and those at the highest risk of school failure do not enter AppleTree preschools. If this is true, selection, rather than program effectiveness, is the most plausible explanation for this remarkable outcome.

The report's conclusions regarding policy are not well supported by the evidence presented. With respect to the AppleTree model *per se*, access to a relatively high level of adequate funding is essential. Head Start and state preschool programs are not funded at levels that would permit full implementation of the AppleTree model; adequacy of public funding to support high-quality preschool generally is a challenge.[13] However, even the high level of funding Washington, D.C. provides may not be adequate for AppleTree, which also relies on additional funding sources. A rigorous cost analysis, including a full specification of the ingredients, is needed to know how much funding is required. It also seems reasonable that the model requires considerable local control and flexibility. However, the report indicates that the model has been implemented in Head Start in D.C., and the report itself notes that Head Start has 2,300 regulations relating to process or "inputs" (p.13). This undercuts the argument that the freedom and flexibility of a charter mechanism is a key to success.

The report's emphasis on charter policy as key to expanding quality preschool education more generally founders on not just the limitations cited above, but on a lack of evidence that the resources and flexibility required for high-quality pre-K are only, or best, provided through the charter mechanism. Charters are neither necessary nor sufficient for obtaining adequate funding or for flexibility. Head Start is subject to a remarkable number of regulations, but Head Start has substantial flexibility in hiring, firing, and professional development, as do most state-funded pre-K programs.[14] The biggest constraint on hiring and retaining good teachers for preschools is budgetary. And, many of the models with rigorous evidence that they are highly effective have been developed and implemented by public schools, albeit with higher levels of funding than have generally been available.[15]

VII. Usefulness of the Report for Guidance of Policy and Practice

Unfortunately, this report contributes little evidence on the efficacy of the AppleTree model or the preschool charter mechanism generally for the delivery of high-quality preschool to large numbers of children and families. It provides some intriguing anecdotes and data on test scores. However, no data are presented on actual implementation of the model, and we do not know its cost. Neither the research design nor the statistical analysis are sufficiently rigorous to substantiate any claim that the AppleTree model is particularly effective. Perhaps future reports on the AppleTree model will provide a rigorous analysis of the fidelity of implementation, cost, and impacts on children, relying on strong quasi-experimental methods if not a randomized trial. We would certainly look forward to learning more, but for now it would be highly premature to adopt either the model or the report's broader policy recommendations.

Notes and References

1 Camilli, G., Vargas, S., Ryan, S., & Barnett, W.S. (2010). Meta-analysis of the effects of early education interventions on cognitive and social development. *Teachers College Record, 112*(3), 579-620.

2 Barnett, W.S. (2011). Effectiveness of early educational intervention. *Science, 333*, 975-978.

3 Candal, C. S. (2014). *Seeds of Achievement: AppleTree's Early Childhood D.C. Charter Schools*. Washington, DC: Pioneer Institute.

4 Reynolds, A. J. (1998). Developing early childhood programs for children and families at risk: Research-based principles to promote long-term effectiveness. *Children and Youth Services Review*, *20*(6), 503-523.

Barnett, W.S., Carolan, M.E., Squires, J.H. & Brown, K.C. (2013). *The state of preschool 2013: State preschool yearbook*. New Brunswick, NJ: National Institute for Early Education Research.

5 Pianta, R. C., Barnett, W. S., Burchinal, M., & Thornburg, K. (2009). The effects of preschool education: What we know, how public policy is or is not aligned with the evidence base, and what we need to know. *Psychological Science in the Public Interest*, *10*(2), 49-88.

6 Center for Research on Education Outcomes (CREDO) (2013, June). *National Charter School Study*. Palo Alto: CREDO, Stanford University. Retrieved August 29, 2014, from https://credo.stanford.edu/documents/NCSS%202013%20Final%20Draft.pdf.

7 Maul, A. & McClelland, A. (2013, July). *Review of "National Charter School Study 2013"*. Boulder, CO: National Education Policy Center. Retrieved September 2, 2014, from http://nepc.colorafo.edu/thinktank/review-credo-2013.

8 Glass, G.V. (2014). *Review of "The Productivity of Public Charter Schools."* Boulder, CO: National Education Policy Center. Retrieved August 29, 2014, from http://nepc.colorado.edu/thinktank/review-productivity-public-charter.

9 Betts, J.R., & Atkinson, R.C. (2012). Better research needed on the impact of charter schools. *Science*, *355*, 171-172.

10 Aikens, N., Kopack Klein, A., Tarullo, L., & West, J. (2013). *Getting Ready for Kindergarten: Children's Progress During Head Start* (FACES 2009 Report. OPRE Report 2013-21a). Washington, DC: Office of Planning, Research and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services.

11 Aikens, N., Kopack Klein, A., Tarullo, L., & West, J. (2013). *Getting Ready for Kindergarten: Children's Progress During Head Start* (FACES 2009 Report. OPRE Report 2013-21a). Washington, DC: Office of Planning, Research and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services.

12 Gormley, W. T., Gayer, T., Phillips, D., & Dawson, B. (2005). The effects of universal pre-k on cognitive development. *Developmental Psychology, 41*(6), 872-884.

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

13 Barnett, W.S., Carolan, M.E., Squires, J.H., & Brown, K.C. (2013). *The state of preschool 2011: State preschool yearbook*. New Brunswick, NJ: National Institute for Early Education Research.

14 U.S. Department of Health and Human Services, Administration for Children and Families, Office of Head Start (2009) Head Start Program Performance Standards, 45 CFR Chapter XIII , (10-1-09 Edition). Retrieved September 3, 2014, from http://eclkc.ohs.acf.hhs.gov/hslc/standards/hspps/45-cfr-chapter-xiii/45-cfr-chap-xiii-eng.pdf.

Barnett, W.S., Carolan, M.E., Squires, J.H. & Brown, K.C. (2013). *The state of preschool 2013: State preschool yearbook*. New Brunswick, NJ: National Institute for Early Education Research.

15 Reynolds, A. J., Magnuson, K. A., & Ou, S. (2010). Preschool to third grade programs and practices: A review of research. *Children and Youth Services Review, 32*, 1121-1131.

Document Reviewed:	**Seeds of Achievement: AppleTree's Early Childhood D.C. Charter Schools**
Author:	C. Stillings Candal
Publisher/Think Tank:	Pioneer Institute
Document Release Dates:	July 2014
Review Date:	September 16, 2014
Reviewers:	W. Steven Barnett and Cynthia E. Lamy, NIEER
E-mail Addresses:	sbarnett@nieer.org; celamy4@gmail.com
Phone Number:	(732) 445-9320

Suggested Citation:

Barnett, W.S. & Lamy, C.E. (2014). *Review of "Seeds of Achievement: AppleTree's Early Childhood D.C. Charter Schools."* Boulder, CO: National Education Policy Center. Retrieved [date] from http://nepc.colorado.edu/thinktank/review-seeds-of-achievement.