

Lessons from Research and the Classroom:

Implementing High-Quality Pre-K that
Makes a Difference for Young Children

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Introduction

In the United States today, a degree beyond high school paves the way for young people to support themselves, engage in their communities, and achieve their dreams. The Bill & Melinda Gates Foundation supports innovative approaches in K-12 public schools and higher education to ensure that students graduate from high school ready to succeed in postsecondary education and beyond.

Yet the path to a postsecondary degree begins before a child enters high school. High-quality early learning helps children enter kindergarten ready to learn and prepared to thrive in elementary school and beyond. Since 2005, the foundation has worked with public, private, and community partners to strengthen early learning in Washington State.

EARLY LEARNING IN WASHINGTON STATE

We support policy development, research, and program implementation to improve the quality of early learning and strengthen the connections with K-12 schools, including:

- Evidence-based home visiting programs that pair at-risk families with trained professionals to provide support for pregnant mothers and families with infants and young children;
- Statewide implementation of Early Achievers, which offers coaching, support, and incentives for early learning providers to improve program quality;
- WaKIDS, which includes a whole-child, observational assessment and increased collaboration among early learning educators, families, and kindergarten teachers as children enter kindergarten; and
- PreK-3rd investments in Washington State school and educational service districts and their early learning partners to align quality instruction and promote deep engagement of educational leaders across the early learning/early elementary continuum—so that the gains young learners make are sustained and deepened as they advance into upper elementary grades and beyond.

Through close collaboration among policymakers, providers, and early childhood advocates, Washington State is building an early learning system that is focused on improving quality and helping young children enter kindergarten ready to learn.

Washington State is not alone. Over the past two decades, dozens of states have expanded early learning opportunities by providing pre-K to three- and four-year olds, launching home visiting services to expectant and new parents, and offering training and support to help child care providers increase the quality of their care. Since 2002, the percentage of four-year-old children participating in Head Start and state-funded pre-K increased from 26 to 38 percent.¹

While access to pre-K and other early learning programs has increased, a growing body of research shows that the quality of these programs has a significant impact on student outcomes. At the same time, the definition of what makes a program “high-quality” is far from settled.

¹ Barnett, W.S., Carolan, M.E., Squires, J.H., Clarke Brown, K. (2013). *The State of Preschool 2013: State preschool yearbook*. New Brunswick, NJ: National Institute for Early Education Research. http://nieer.org/sites/nieer/files/yearbook2013_executivesummary.pdf. Barnett, W.S., Robin, K.B., Hustedt, J.T., Schulman, K.L. (2003). *The State of Preschool: 2003 State preschool yearbook*. New Brunswick, NJ: National Institute for Early Education Research. <http://nieer.org/sites/nieer/files/2003%20unsecured%20executive%20summary.pdf>

EARLY LEARNING THAT STICKS

Beginning in 2012, the foundation commissioned a series of research papers to better understand the changing early learning landscape. Specifically, these papers addressed whether pre-K programs produced gains in student achievement that persisted into the early elementary grades; whether high-quality programs could be cost sustainable; and what program features contribute to strong interactions between teachers and children, the central ingredient in high-quality programs.

The result is the research presented here, along with a companion piece on the early childhood workforce. These three papers are based on published research, program evaluations, and extensive consultation with experts in the early childhood field. The research was iterative. As a result, conclusions about the components of high-quality—including the importance of B.A. degrees for lead teachers—evolved based on new information. The papers are presented sequentially to show the evolution of the project over approximately 18 months, and should be read together.

- *Quality in Center-Based Early Learning: High-Level Findings and Trends* (January 2013)
- *Early Learning: The New Fact Base and Cost Sustainability* (September 2013)
- *The Essential Elements of High-Quality Pre-K: An Analysis of Four Exemplar Programs* (January 2014)

The research shows that select pre-K programs are producing significant and sustained gains for young children at a lower cost-per-child than previously attained. How these programs succeed is not a mystery. Exemplar programs focus on improving the interactions between teachers and children. They share a set of common features that foster high-quality instruction, support educators and young learners, and benefit from a positive enabling environment.

For some in the early childhood education field, these findings may not seem surprising. After all, research dating to the 1960s has found that high-quality early learning has long-term benefits for children, especially those from low-income families. However, the valuable lessons learned from high-quality programs can and should inform efforts to expand access to pre-K and help all children enter school ready to learn.

NEXT STEPS

Looking ahead, the foundation will focus on listening and learning from the funders, advocates, teachers, parents, and early childhood leaders who have worked on these issues for many years. We intend to share our research broadly and collaborate with a wide range of partners to build on the work already underway to expand high-quality pre-K in Washington State and nationally.

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Quality in Center-Based Early Learning: High-Level Findings and Trends

Jim Minervino, *Ready On Day One*
January 2013²

The purpose of this paper is to present high-level findings and trends from a review of the literature and discussions with experts on the quality of early learning in center-based early care. This review focuses primarily on children from low-income families.³

This work addresses seven questions:

- What level of quality must early learning⁴ deliver in order to achieve improved school-readiness outcomes for children?
- Is there an upper threshold beyond which increasing the quality of early learning stops producing increasing results?
- Do the immediate benefits of high-quality early learning always fade-out?
- Does having children spend more time in early learning programs yield any benefits?
- Do children in low-income families benefit more from high-quality early learning than their more advantaged peers?
- What are the features and environments that constitute high-quality early learning?
- Is the relationship between the quality of early learning programs and school readiness linear? Does it matter? What are the implications for increasing school readiness in Washington?

HIGH-LEVEL FINDINGS AND TRENDS

Research examining the effects of quality early learning and its impact on school readiness is very active.

Over the past five years, the amount of high-quality research and program evaluations impacting this field has been substantial. It is not an overreach to say that a review of the literature from even as recently as 2007 would be out-of-date.

² Recently published references have been added in some parts of this paper. The conclusions have not changed since the original January 2013 paper.

³ Low-income families are defined as those families with total family income from all sources equal to 185 percent-or-less of current federal poverty guidelines. This income level coincides with federal eligibility requirements for low-income children to receive free- or reduced-price lunch.

⁴ For the purposes of this paper, the term “early learning” stands for all center-based care with an emphasis on children who will attend kindergarten the following year.

There appear to be three levels of early learning quality, each driving different levels of school readiness.

Qualitatively, these ranges are poor-/low-, moderate-, and high-quality.^{5 6}

Poor- or low-quality programs can have a negative impact on children's school readiness or, at best, no impact on school readiness.

The detrimental effects (or no effect) of poor- or low-quality center-based early learning for children living in poverty has been established for preschool children, as well as for younger children. The literature is fairly definitive on this point. (Votruba-Drzal et al., 2004; Loeb et al., 2004; Vandell et al., 1990; Phillips et al., 1994; NICHD, 1997).

Moderate-quality programs generally have little impact on children's school readiness.

It is believed that most children in the U.S. in center-based programs are in moderate-quality care. For children from low-income families and those who are at-risk of not being prepared for kindergarten, this level of quality has been consistently shown to have very little impact on children's school readiness. It must be concluded that, while this level of care may increase school readiness for a child here and there, the incremental number of children moved from not being school-ready to being school-ready appears to be very small. Moderate-quality care maintains the status quo, thereby perpetuating low rates of kindergarten-readiness among low-income children—despite the fact that providing moderate-quality care is not an inexpensive proposition.

High-quality is the minimum necessary to reliably increase children's school readiness.

Where the quality of center-based early learning is high, increases in school readiness generally follow. In experimental research on high-quality programs, effect sizes typically ranging from $d = 0.05$ to 0.30 . In state program evaluations where quality delivery was high, effect sizes have been reported beyond this range and, at times, significantly beyond this range.⁷

Therefore high-quality is the minimum level of quality that early learning must deliver in order to achieve improved school-readiness outcomes for children.

Having children spend more time (dosage) in high-quality settings also appears to yield improved academic outcomes for children.⁸

There is no evidence of a very high quality threshold beyond which further improvements in early learning quality yield diminishing school readiness returns.

Available evidence suggests that “higher-quality is better” at all points along the care-quality continuum. (Burchinal et al., 2010; Blau et al., 2000). This is considered a settled fact and not an active area of exploration or research.

⁵ The field has struggled to identify specific cut-points on specific measures to delineate between these qualitative levels of quality. While there is a growing consensus in the field as to what features of care constitute poor-, moderate-, and high-quality, quantitatively measured and derived cut-points or thresholds have yet to be fixed.

⁶ See *The Essential Elements of High-Quality Pre-K* paper for more information on the elements that comprise high-quality early learning.

⁷ The effectiveness of high-quality state and city early learning programs is discussed in a subsequent paper: *Early Learning: The New Fact Base and Cost Sustainability*.

⁸ Note that at-risk children spending multiple years in high-quality early learning is a rare occurrence today, not just in Washington State, but nationwide.

High-quality early learning has shown significant impacts not only on children’s school readiness but on later life outcomes as well.

Most of the evidence covering high-quality early learning and longer-term outcomes has focused on relatively high-cost, comprehensive, difficult-to-scale (expensive) interventions (e.g., Abecedarian, Perry Preschool). These have been widely covered and deeply researched, including studies following participants from these programs into adulthood.

While initial follow-up research indicated that program effects disappeared within a few years of these interventions (fade-out), long-term studies show participants having significantly improved life outcomes—from lower rates of incarceration to higher earnings and life satisfaction when compared to peers who did not participate in these programs. Furthermore, recent results from promising state and city early learning programs indicate that high-quality early learning can transcend fade-out through first grade and beyond.⁹

There is debate among funders and policymakers about whether high-quality early learning programs are cost-prohibitive / non-sustainable relative to the long-term funding appetites of public and private funders.¹⁰

While having children in high-quality programs can facilitate gains in school-readiness, increasing the total time (dosage) children spend in high-quality care may produce significantly improved rates of school-readiness.¹¹

Recent well-designed, rigorous studies—as well as meta-analyses—have examined the impact of dosage of instruction on children’s learning in full- versus half-day kindergarten (Hahn, et al., 2014; Cannon, et al., 2006; Walston, & West, 2004). The findings have shown that children who attend full-day kindergarten programs learn more than their half-day counterparts (Cooper, Allen, Patall, & Dent, 2010; Lee, Burkam, Ready, Honigman, & Meisles, 2006). In a more recent study, Ramey, Ramey, and Stokes (2009) found a similar pattern of effects for full-day versus half-day pre-kindergarten. Children in the full-day programs demonstrated double the literacy gains compared to children who were in half-day programs (Wasik, et al, 2013).¹²

Recent results from Educare conclude that more years of Educare attendance are associated with better school readiness and vocabulary skills (Yazejian, et al., 2012).¹³ It should be noted that higher dosage of early learning programs of lower-quality do not appear to result in school-readiness gains for young children.

In summary, the combination of high-quality care delivered over multiple years shows promise as an accelerant of school-readiness rates.

⁹ The effectiveness of four exemplar high-quality state and city early learning programs—including effects transcending fade-out—is discussed in a subsequent paper: *Early Learning: The New Fact Base and Cost Sustainability*.

¹⁰ The cost of establishing and maintaining high-quality early learning programs is discussed in a subsequent paper: *Early Learning: The New Fact Base and Cost Sustainability*.

¹¹ Research also notes that the prevalence of children—especially children in low-income families—receiving multiple years of high-quality care is a fairly rare occurrence. See *The Essential Elements of High-Quality Pre-K* paper for more on dosage.

¹² “Intervention dosage in early childhood care and education: It’s Complicated” (OPRE Research Brief OPRE 2013-15). Washington, DC: Office of Planning, Research and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services.

¹³ Most research looking at low-income children spending time in high-quality early learning shows that two years of early learning yield better outcomes than one year. However, the gains from two years of early learning are less than 2x the gains from one year of early learning.

Children in low-income families benefit more from high-quality early learning than do children in moderate- and high-income families.

The majority of studies—though not all—as well as most experts examining this issue find that children in low-income families benefit the most from high-quality early learning (versus children from moderate- and high-income families) (Burchinal et al., 2000; Duncan et al., 2003; Gormley, 2007; Dearing et al., 2009).¹⁴

While there is a lack of consensus as to what features and environments constitute high-quality early learning, there appears to be an emerging consensus around key principles and elements of high-quality programs.

This consensus includes recognition that both process quality (experiences children have in early care settings) and structural quality (conditions that must be present, such as appropriate teacher/child ratios) are essential to high-quality care.

Aspects of process quality, especially the frequency, quality, and content focus¹⁵ of teacher-child interactions, guided by proven, well-implemented curriculum, are seen as features of care that have a disproportionately large effect on school-readiness outcomes.¹⁶

It appears that the relationship between care quality and school readiness is not linear. Related to quality of care thresholds, the shape of the care-quality / school-readiness curve impacts the size of school-readiness gains that can be achieved for a given unit of care-quality improvement.

Since research shows that low- and moderate-quality early learning programs do little or nothing to improve school readiness, it appears that readiness impacts accelerate when they reach the threshold of high-quality. As a result, programs that improve from low- to moderate-quality may show little evidence of improved outcomes for children until programs reach the high-quality threshold.

Improvements in the quality of early learning programs in Washington State must be significant and sustained to result in measureable school-readiness gains.

As average program quality starts increasing, initial improvements in school-readiness rates will be negligible. Only when a significant number of programs achieve high-quality will meaningful increases in school-readiness rates result. Therefore, efforts to improve the quality of early learning programs in Washington State must be sustained over time.

CONCLUSION

High-quality early learning is the minimum level of quality required to meaningfully increase children's school readiness. This level of care has also shown significant impacts not only on children's school readiness, but on later life outcomes as well. There is no evidence of a very-high-quality threshold beyond which further improvements in early care quality result in diminishing school-readiness returns.

Given the relationship between children's school readiness and the quality of early learning children receive, it is essential that: 1) Low-quality programs be avoided or immediately improved to moderate-quality; 2) Moderate-quality programs be improved out of the moderate-quality range and into the high-quality range and; 3) High-quality programs continuously improve to yield greater school-readiness outcomes.

¹⁴ Separately, there is research indicating children from low-income families may realize larger cognitive gains when their pre-K classmates come from higher-income families (Schechter, 2007; Henry, 2007). Other research concludes children entering pre-K with more advanced language skills benefit more from sharing a classroom with advanced peers (Mashburn, 2009).

¹⁵ Content focus includes literacy, math, etc.

¹⁶ More detail provided in two papers: *Early Learning: The New Fact Base and Cost Sustainability* and *The Essential Elements of High-Quality Pre-K*.

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Early Learning: The New Fact Base and Cost Sustainability

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INTRODUCTION

Early learning holds enormous promise for young children and especially for young children in low-income families (Burchinal, 2000; Duncan, 2003; Magnuson, 2007; Howes, 2008; Dearing, 2009). However, most investments in early learning have not resulted in both significant and sustained academic gains for children. Where gains have been achieved, too often these gains have faded either in large part or completely within a few years (Barnett, 1995; Puma, 2012). And while a number of programs have transcended academic fade-out (e.g., Abecedarian, Perry Preschool), the cost-per-child of these programs is beyond what policymakers at the federal, state, and local levels can spend and sustain.

However, over the past few years, a new fact base has emerged. The result is a number of early learning programs that demonstrate significant and sustained gains for young children at a lower cost-per-child than previously attained.

This paper focuses on this new fact base and the role high-quality early learning plays in driving and sustaining gains for children—early learning that sticks. Following this, from the academic literature, there is discussion of the most important elements of high-quality early learning programs—those program features that, when present, substantially increase the odds of early learning that sticks. Following this is an analysis of the cost-per-child of successful early learning programs and whether sufficient dollars may already be in the system.

TAXONOMY

This analysis focuses on the approximately 5 million U.S. children, ages 3-5, from low-income families (The Annie E. Casey Foundation, 2013).¹⁷ Other parts of the taxonomy are footnoted.¹⁸

¹⁷ In this paper, low-income families are defined as those families with total family income from all sources equal to 185 percent-or-less of current federal poverty guidelines. This income level coincides with federal eligibility requirements for low-income children to receive free- or reduced-price lunch. Note: Head Start and most state- and city-run early learning programs typically have eligibility guidelines for total family income ranging from 100 percent to 200 percent of federal poverty guidelines. The term “lowest-income” families or children refers to the 3 million children living in families at 100 percent-or-below federal poverty guidelines.

¹⁸ Unless otherwise noted, “children” refers to low-income children as defined above. “Early learning” refers to center-based programs. “Early learning” and “pre-K” may be used interchangeably. Many sources use the terms “programs” and “interventions” to refer to early learning offerings. This paper uses the term “programs.” Unless otherwise noted, “gains” or “outcomes” refer to academic/achievement gains that children have made that increase their chances of being kindergarten-ready and on a trajectory to be ready for future grades. “Sustained gains” or “early learning that sticks” describes achievement gains made at ages 3-5 that, mostly or in significant part, persist at least through 3rd grade.

REVIEWING THE LANDSCAPE

While there have been many experimental successes, there have been few real-world, scaled-up early learning successes showing persistent gains for children. There have been even fewer successes when applying any measure of cost-sustainability. Furthermore:

1. It is estimated that half of low-income children are not ready for the first day of kindergarten (Isaacs, 2012).
2. Head Start academic gains have been very small, have not persisted (Puma, 2012), and cost-per-child is high.¹⁹
3. There has been an inability to shift the substantial, existing dollars in the system to drive better outcomes for children.²⁰

THE NEW FACT BASE

Rather than trotting out the “usual suspects” to show early learning’s persistent impacts (e.g., Abecedarian, Perry Preschool)—none of which are cost-sustainable at scale—it is useful to look to the states, counties, and cities which have served as R&D labs for what works and what is cost-sustainable.

Some programs have operated long enough to measure gains, see these gains resist fade-out, and prove to be either cost-sustainable or cost-sustainable with modifications. The majority of performance data and measurement referenced here is very recent: 2010-2013. There is also a significantly better understanding of the program elements that contribute to early learning that sticks and how to deliver these in a way that is cost-sustainable. A discussion of those program elements, costs, and a cost-sustainability evaluation appears later in this paper.

State/City Programs with Outcomes That Stick²¹

Reviewing high-quality program evaluations of federal, state, and city-run early learning programs, there are at least four that work, stick, and are (or could be made) cost-sustainable:

1. New Jersey (Abbott Pre-K)
2. Boston Pre-K²²
3. Maryland (Extended Elementary Education Program (EEEP) and “Judy Centers”)
4. North Carolina (More at Four)

¹⁹ Head Start’s initial design point was being a safe place offering nurturing care where low-income parents could leave their children while these parents worked. Especially in the last decade, Head Start’s purpose has expanded to include early learning and developmentally appropriate achievement outcomes.

²⁰ Total 2012 annual federal and state spending on early learning for all children ages 3-5 (not including kindergarten) is estimated at \$21-\$27 billion. Were these dollars spent exclusively on lowest-income children, all 3 million of these children in the U.S. could receive high-quality early learning at cost-sustainable levels (in this case \$7,000-\$9,000 per-child).

²¹ Requirements for selection include: 1) Actual programs, not experiments; 2) Program up and running effectively for at least 7 years; 3) Running at scale across a state, county, or large city; 4) Measurability built-in and achieved with high-quality research design; 5) Evidence of marked improvements in achievement for low-income children; 6) Evidence that effects persist through or beyond 3rd grade; 7) Use observation, quality ratings, and cycle those into coaching and professional development.

²² Boston Pre-K is open to all children but is overwhelmingly comprised of children from low-income families.

These programs demonstrate the following impacts:

Impact at a Glance

	Achievement Effect Sizes (<i>d</i>)	Measurable Persistence Through...	Children in Poverty Larger Gains	Year Started	Primary Impacts
New Jersey	0.40 ^{23*}	5th Grade	Yes	1999	See text
Boston	0.44 - 0.62	3rd Grade	Yes	1998	See text
Maryland ²⁴	*	4th Grade	Yes	2001 (Judy Centers)	See text
North Carolina	Moderate- to-Large	3rd Grade	Yes	2001	See text

New Jersey (Abbott Pre-K). Target: Children in high-poverty areas. Large gains have been achieved in classroom quality and quality of instruction. Academic achievement gains at the end of the Abbott year show effect sizes averaging $d=0.40$. Students spending two years in Abbott Pre-K saw 50 percent larger gains at kindergarten entry than did students spending one year in the program. Subsequent program evaluation shows gains stick with Abbott Pre-K participants through 5th grade (latest measured so far) with effect sizes averaging $d=0.24$. Long-term effects are equivalent to a +10 percentile boost in state test scores. Abbott Pre-K is focused on quality improvement with an emphasis on quality of interactions in the classroom (Barnett, 2013).

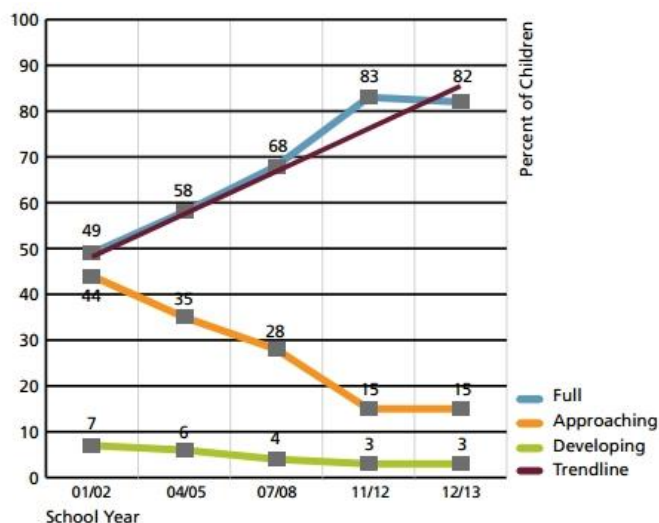
Boston Pre-K. Target: Children in Boston. Two-thirds of enrolled children live in poverty. Boston Pre-K shows increases in children's end of year vocabulary $d=0.44$, early reading $d=0.62$, and numeracy $d=0.59$. These are among the largest impacts measured to date of any public pre-kindergarten operating at scale. Moderate improvements in working memory $d=0.24$ and impulse control $d=0.28$ may also contribute to academic gains. Larger than average gains have been made by children in poverty and by children whose primary language is Spanish. Boston Pre-K impact measured through 3rd grade (latest measured so far) shows math, literacy, and language skills of participants considerably more advanced than those of same-age children who did not attend Boston Pre-K. On Massachusetts' 3rd grade MCAS English Language Arts, 43 percent of program participants scored proficient or advanced compared to 34 percent of non-participants. Boston Pre-K is focused on the importance of quality interactions between teachers and children and a developmentally appropriate educationally-focused curriculum (Weiland, 2013).

Maryland (Extended Elementary Education Program (EEEP) and "Judy Centers.") Target: Primary focus on improving kindergarten readiness among children in poverty. EEEP has shown significant improvements in kindergarten readiness. Statewide, kindergarten "full readiness" is up 33 percentage points in ten years (Maryland State Department of Education, 2013).

²³ Average effect size of vocabulary, literacy, and mathematics gains.

²⁴ Long-term program impact currently under study.

Maryland Kindergarten Readiness: 2001-2012



Source: Maryland State Department of Education

Notes: Figures may not total 100% due to rounding. The "Trendline" indicates the overall upward progression of Maryland's composite full readiness levels.

Long-term program impacts are currently under study. Maryland has made rapid and large, across-the-board gains on all measures of academic achievement through 4th grade.

North Carolina (More at Four). Target: 4-year-old children in poverty, some lower-middle-income children, and children with other risk factors.²⁵ More at Four's program evaluation finds significant academic achievement differences (moderate to large effect sizes) between program participants and non-participants²⁶ with effects persisting into 3rd grade. Participation in the program is associated with higher sustained math and reading test scores for poor children, but not for non-poor children.

These successful programs all have a number of factors in common. They have all systematically improved outcomes for children by improving the elements of high-quality early learning that matter most: teaching quality, observation, measurement, feedback, coaching, professional development, curriculum based on standards that connect to kindergarten and beyond, and structure that supports these improvements.

HIGH-QUALITY

"High-quality" has become mantra for early learning practitioners and policymakers over the past few years. However, the mantra around high-quality begs the question: What is high-quality? For many, the term has become a substitute for the difficult work of determining which program elements must be high-quality in order to have impact and resist fade-out, while being cost-sustainable.

A review of the literature on the elements of high-quality early learning is presented in the next section of this paper.

²⁵ It is estimated that 90 percent of More at Four children qualify for free or reduced-price lunch. Other risk factors include low English proficiency, student disability, or chronic health condition.

²⁶ Forthcoming research by Dr. Ellen Peisner-Feinberg.

Important Elements of High-Quality²⁷

Teachers

Far and away, teachers account for the majority of students' achievement gains in early learning. Increasing teaching quality is the highest-impact investment that can be made.

Quality of Teacher-Child Interactions

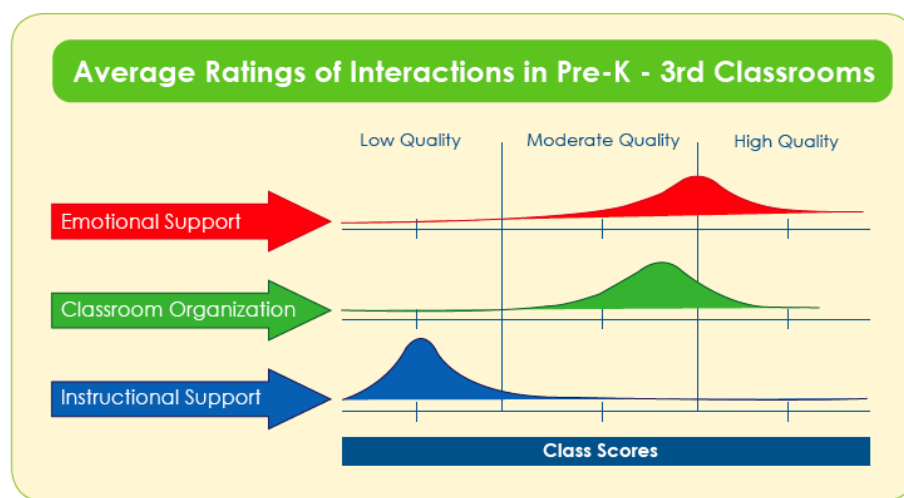
The quality of teacher-child interactions is the mechanism responsible for learning in early care and education settings (Hamre, 2007; Mashburn, 2008).

There is now strong empirical evidence regarding a variety of teaching practices that can, and should, be the focus of classroom observations intended to measure and enhance teacher performance. The key ingredient of any classroom or school environment, with regard to learning and development, is the nature and quality of interaction between adults and children. Through careful research, significant headway has been made in describing and conceptualizing what teachers do in the classroom that results in learning. These can be organized into three broad domains of teaching practice that are linked to positive student outcomes: 1) Social/Emotional Support; 2) Organization/Management Support; and 3) Instructional Support.

Mounting evidence suggests that attending to each of these domains in classroom observations helps to define the impact of classroom experiences on student performance. Most importantly, empirical evidence suggests that when teachers use these types of practices, students learn more (Burchinal, 2010).

Quality of Instructional Support

More specifically, the quality of instruction is the primary mechanism responsible for cognitive and achievement gains in early learning settings (Howes, 2008; Mashburn, 2008). There is now evidence showing teacher-child interactions are generally positive and emotionally supportive. The same evidence shows that classrooms are reasonably organized. What is most concerning is that the level of instructional quality—the kind of cognitive demands teachers embed in their interactions with children—is very low. The histogram below depicts this clearly.²⁸



What's notable in this graph is the low level of developmentally appropriate instructional support present in pre-K classrooms at this level of scale and scope (including Head Start and state-funded pre-K).²⁹ This low level of instructional support means that teachers' interactions with children in pre-K are likely less frequent, and when they do occur, are low on content, with little or no attention to application

²⁷ This section distills the elements of high-quality early learning from the academic literature available at publication. A subsequent paper, *The Essential Elements of High-Quality Pre-K*, describes the essential elements from the point of view of exemplar early learning programs achieving superior results with young children.

²⁸ Findings drawn from observations of over 10,000 pre-K classrooms across the U.S., using the Classroom Assessment Scoring System (CLASS)—the gold standard for observations and for accountability in Head Start and several state programs.

²⁹ There is no difference in observed interactions (in any of the three domains) with regard to teacher experience or educational level. In fact teachers with an A.A./CDA on average look slightly better than those with a B.A./M.A. possibly because of the practical focus of the training.

(problem solving, thinking, reasoning), vocabulary, concepts, and understanding. This has huge (negative) downstream implications for children’s performance in vocabulary, comprehension, and math—and reduces the chance children will be grade-ready or meet standards in future years.³⁰

It is important to note, and will be discussed later, that there are professional development models (online coaching, web-based video library, online and in-person courses) that have been tested and replicated in randomized controlled trials (RCTs) that make teachers effective with great consistency. A number of practices and tools are needed to support these improvements. Surprisingly, many of these practices and tools are further along than most people realize.

Systematizing Quality: Observation, Measurement, and Teacher Feedback via CLASS

Even with young children, the quality of teacher-child interactions and the quality of instruction can be observed and reliably measured with assessments such as CLASS (Hamre, 2007; Pianta 2008a; Pianta, 2009). CLASS is being systematically integrated into pre-K delivery systems throughout the United States and other countries. It recently became the gold standard for quality measurement in Head Start (programs can be required to reapply for Head Start funding because of low CLASS scores) and in a number of state early learning programs. These policy initiatives have created a market for quality, in which CLASS is the standard. Thus it has potential to be a powerful lever for improvement.³¹

All these resources (reliability training, professional development, quality assurance) are self-sustaining and fit in the cost-structure of existing funding streams and delivery models.

Improving Quality through Coaching and Professional Development Using Technology

Numerous studies have documented that professional development (PD) spending on teachers has little-to-no impact on teacher practice or outcomes for children (Yoon, 2007; Garet, 2001).³²

Conversely, results show that professional development for teachers that allows them to see and label effective interactions results in improved quality of instruction and improved academic outcomes for children (Clements, 2008; Hill, 2008; Pianta, 2008b; Powell, 2010). In addition to observing teacher behaviors that matter most for student learning, such observations allow for the design and testing of professional development models that produce those teacher behaviors. This reinforces the notion of focus on defined, observable, and valid examples of effective teaching as a starting point.

As CLASS-specific definitions of interactions provide a target for professional development, three modes of CLASS-based professional development have been created:³³

- Online Coaching – Ongoing analysis/feedback on teacher-child interactions. Scales well and works.
- Web-Based Video Library – Analysis of others’ interactions to see exemplars.
- In-Person and Online Course – Improves teachers’ knowledge and analytic skills.³⁴

³⁰ Associations between teacher-child interactions and children’s gains in school readiness on standardized tests show both linear effects (e.g., more is better) and nonlinear, or threshold effects. With respect to threshold effects, classrooms in which teachers score a three or above on CLASS [Range 1-7] (classrooms in which the teachers’ interactions show signs of cognitive demand and conceptual focus) there is a stronger and significant association with positive outcomes. Importantly, below a score of three, there is no association between teacher behavior and child learning—it’s as if these classrooms add no value. These are the majority of pre-K classrooms.

³¹ Scale-up of CLASS is occurring through a private company, Teachstone, devoted to delivery, scale, quality control, and self-sustaining programs for training observers to score reliably (assessment) and professional development (improvement) of teacher-child interactions.

³² Estimates on the amount of this spending range from \$2,500-\$9,000 per-teacher, per-year.

³³ It appears that the use of technology may increase teacher effectiveness while reducing PD costs-per-teacher.

Each of these modes has been tested and found effective and replicated in RCTs. As with many other elements of quality in early learning, the skills derived from teachers experiencing this professional development benefit children in poverty more than other children.³⁵ Research and practice show that early-in-career teachers benefit even more from this professional development than do other teachers.

CLASS and Outcomes for Children

Evidence exists from more than 10,000 classroom observations³⁶ demonstrating that young children whose teachers rate higher on CLASS are learning at a faster rate. Results consistently show small-to-moderate effect sizes (d = between .10 and .20). Instructional and emotional quality predict more positive achievement and improved social outcomes. There are stronger effects for certain groups of children (effect sizes ~ 0.50), including children from low-income families and children born to mothers with low levels of education. Effects of pre-K interactions persist into later grades.^{37 38}

CLASS is an important development in the quest to improve teaching quality and outcomes for children. However, as a single measure of quality, it cannot account for all aspects of high-quality early learning.

Proven Curriculum

Improving teaching quality and implementing CLASS is essential, but not enough. This improvement must be combined with proven curricula focused on building the right skills in early learners (e.g., literacy, math, behavioral). Curricula should embed optimal classroom practices within it and teachers must be well-trained on the chosen curriculum to ensure it is implemented as designed. This combination of teaching quality, proven curricula, and teachers well-trained on curriculum may yield the biggest gains in student achievement, and the gains most likely to stick.³⁹ Great curricula matters.⁴⁰

³⁴ The CLASS-based course is essentially a standard college course designed for delivery by faculty. There is a standardized manual for instructors and a set of online videos they access. It focuses on building teachers' skills in describing and observing interactions. In an RCT involving trained instructors (two days) across 10 higher education sites (community colleges and state universities), teachers who took the course improved in Instructional Support by more than 1.5 CLASS scale points, on average, at the end of the course, and this effect was still significant one year later. An online version of this course is being piloted as a MOOC, with 10,000 users signed up.

³⁵ Teachers with online coaches grew more sensitive in interactions with students and increased students' engagement in instruction. Improved language stimulation techniques are especially beneficial to high-poverty classrooms. Children with trained teachers made greater gains in tests of early literacy, had lower levels of problem behavior, and demonstrated higher levels of expressive language.

³⁶ Designs isolate effects controlling for other influences, including family demographics, prior performance, and teacher/school effects.

³⁷ Most notably: 1) Children in pre-K classrooms offering higher levels of Instructional Support displayed better language skills at the end of the kindergarten year; 2) Kindergarten Instructional Support scores made an independent contribution to gains in children's language and math abilities; 3) A one-point difference in observed instructional supports appears linked to shifts in child outcomes; 4) Even into first grade, the academic achievement benefits of being in a classroom that rates high on Instructional Support disproportionately benefits children from homes where their mothers have low levels of education.

³⁸ A virtuous circle is possible: standardized quality measures (like CLASS) now being built into pre-K and Head Start create "market signals" demanding that quality scores improve, leading to repurposing of coaching and professional development dollars that will lead to increases in quality, resulting in better outcomes for children in Head Start and pre-K.

³⁹ Engel (2013) illustrates that most early grade (K-3) curricula are not well-designed and not connected to early learning standards. They further note that kindergarten teachers spend most of their time teaching skills most children already know and do not build on gains children made in pre-K. Engel believes this plays at least some role in the fading out of early gains children make.

Early Learning Standards

Over the last decade, almost all states have developed early learning standards or have improved on existing early learning standards (Barnett, 2012). Many states are now focused on connecting these standards to their K-12 systems to ensure a more seamless transition for children.

Standardized Outcomes Measures for Children

Federal- and state-funded early learning programs are coming under increased scrutiny and being pushed toward more accountability. Most states are responding by adopting systematic and proven ways to measure kindergarten-readiness and future-grade readiness that map to early learning standards.⁴¹ These measurements are providing guidance to teachers and administrators as to where kindergarten-readiness gaps exist. In addition to these new measures, states are using a combination of teacher and student observation, teacher-administered tests, and program evaluation scores as input by which achievement outcomes are being measured.

Structural Quality

Pre-K programs exhibit two categories of quality: process quality and structural quality. Process quality refers to elements of quality, such as teacher-child interactions, and the quality of instruction—issues covered earlier in this paper. Structural quality refers to classroom characteristics such as group size, teacher-child ratios, teacher and staff education/training/certification, and length of the early learning day.

Understanding which elements of structural quality most impact child outcomes is critical in two ways. First, it increases the chances that desired outcomes will be achieved. Second, elements of structural quality are far and away the most significant cost drivers in early learning. Those costs are discussed in the next section.

Summarizing the academic literature on elements of structural quality in early learning:

1. Pre-K and kindergarten class sizes above 20 students are generally associated with poorer outcomes for children (Barnett, 2004).⁴²
2. Likewise, teacher-child ratios above 2:20 (one lead teacher, one aide, and 20 children in a classroom) are associated with poorer outcomes for young children. Almost all high-quality early learning programs, including all of the programs featured in this paper with outcomes that stick, have teacher-child ratios of 2:20 or better.⁴³

Class size and teacher-child ratios tie to the earlier discussion about teaching quality. These elements make it possible (necessary, but not sufficient) for teachers to have the time available for high-quality teacher-child interactions and high-quality instruction, while allowing children to explore and play either independently or in small groups.

1. The data on the importance of teacher degree attainment and certification is murkier. As far as lead teachers are concerned, credible research supports the “B.A. is required for high-quality teaching

⁴⁰ Pre-K curricula such as Dr. Doug Clements’ (University of Denver) “Building Blocks” (numeracy/math) have proven themselves in RCTs and such examples are embedded in successful early learning programs.

⁴¹ Most states are (appropriately) choosing to view kindergarten-readiness via a comprehensive set of domains. These domains generally include health and physical well-being, social and emotional skills, and cognitive skills. Increasingly, states are further segmenting these domains into finer classification (e.g., cognitive skills, including approaches to learning, language, and literacy).

⁴² Even after controlling for factors that might correlate with large class sizes (e.g., family income in pre-K area, teaching quality, etc.).

⁴³ Excepting Boston Pre-K which has a teacher-child ratio of 2:22. New Jersey’s Abbott pre-K operates with a 2:15 teacher-child ratio.

hypothesis” (Bueno, 2010), as well as the “B.A. is not required and is very weakly correlated with better outcomes than teachers with lesser credentials can achieve” hypothesis (Early, 2007).^{44 45}

2. The formal education and degree attainment required of teacher aides/paraprofessionals is much lower.⁴⁶
3. High-quality programs, including the ones highlighted in this analysis, typically offer 6-6.5 hours of early learning per day, five days a week, 180 days a year.

Given that the majority of the costs of providing early learning are the costs of teacher/aide salaries and benefits, the required elements of structural quality—even assuming a teacher-child ratio of 2:20 and a lead teacher with an associate degree—place a floor on how low cost-per-child costs can be driven in early learning while still achieving outcomes that stick for children.

Costs (All Costs Are Per-Child, Per-Year)

Well-known, effective programs, not cost-sustainable, not broadly-delivered:⁴⁷

Educare ⁴⁸	\$11,000 - \$23,000
Abecedarian	\$16,000 - \$40,000
Perry Preschool	\$20,000

Large programs of mixed quality have broader cost ranges:

Head Start (e.g., WA)	\$9,000
U.S. State-Run Pre-K Avg.	\$7,800 ⁴⁹
WA State-Run Pre-K (ECEAP)	\$7,000
Full-Time Licensed Care (WA)	\$5,000-\$12,000 ⁵⁰

⁴⁴ While the academic literature may be split, all of the programs reviewed in this paper require lead teachers to have a B.A. Boston Pre-K goes a step further, requiring their teachers to have an M.A. within five years of commencing teaching.

⁴⁵ Rather than focusing on degree attainment, it may be most important that early learning teachers be trained and proficient in establishing social-emotional warmth, creating high-quality teacher-child interactions, and delivering high-quality instruction based on established standards and proven curricula. There is widespread recognition that teacher preparation programs need to be strengthened (regardless of degree earned). Ongoing research suggests components of teacher preparation (e.g., revamped courses and online pre-service coaching) can be improved and yield more effective teachers—though these components have yet to achieve scale.

⁴⁶ A Child Development Associate (CDA) is standard and requires a high school diploma/GED, 120 hours of formal early childhood education training, and 480 hours of professional experience with pre-K children ages 3-5.

⁴⁷ All costs in 2012 dollars unless otherwise specified.

⁴⁸ Educare’s cost per child per year varies according to location and includes extensive, comprehensive services and longer hours of care than most other early learning programs.

⁴⁹ The definitive study is Levin and Schwartz, 2007. Costs are in 2013 dollars.

⁵⁰ Early learning is less expensive in rural areas, but more likely to be traditional day care without an instructional component.

Aforementioned early learning programs that work, stick, and are (or could be made) cost-sustainable.⁵¹

New Jersey (Abbott Pre-K)	\$12,000 - \$14,900 ⁵²
Boston Pre-K	\$12,000 ⁵³
Maryland (EEEP Initiative)	\$9,800
North Carolina (More at Four)	\$8,500

Cost Analysis: Sustainability and Implications

Given the previously discussed elements of quality required for early learning success, and given what federal, state and local governments are already spending on early learning, a cost-sustainability target averaging \$8,000-\$10,000 per-child, per-year is feasible.⁵⁴

The table below shows early learning program cost options, assuming a 48-state average compensation and benefits package, with various assumptions as to lead teacher degree and class size.

Six Hour Pre-K Program: Estimated Annual Per-Child Costs in 2013 Dollars^{55 56}

Teacher Qualifications	Class Size		
	15	17	20
B.A. I	\$10,050	\$9,200	\$8,250
B.A. II ^{57 58}	\$8,950	\$8,200	\$7,400
A.A.	\$7,950	—	—

⁵¹ At a cost-sustainable range of \$8,000-\$10,000/year/child.

⁵² Wage and benefit structure in ~20 states would support a New Jersey (Abbott)-type program at the top of the \$8,000-\$10,000/year/child cost-sustainability target.

⁵³ Wage and benefit structure in ~30 states would support a Boston Pre-K-type program within the \$8,000-\$10,000/year/child cost-sustainability target.

⁵⁴ In some states, early learning teachers with B.A.'s are paid on the same salary and benefits scale as K-3 or K-12 teachers (e.g., New Jersey, Boston/Massachusetts). In high-cost, high-teacher salary/benefits states, *solely the cost of one teacher and one aide in a classroom can exceed \$6,000 per-child, per-year*. In other states, early learning teachers with B.A.'s are paid anywhere from 10 to 40 percent less than K-12 teachers. Early learning teachers with associate degrees or lesser degrees are rarely paid more than \$20/hour outside of high-cost states and cities.

⁵⁵ Source: Gault, 2008. Estimates converted into 2013 dollars.

⁵⁶ For 180-day school year, aide @ \$15/hour inclusive of benefits, compensation – 60 percent+ of program costs.

⁵⁷ B.A. required but paid at 12 percent discount to K-3 staff with B.A. degrees.

⁵⁸ Research and practice indicate that when the pay gap between K-12 teachers with a B.A. and early learning teachers with a B.A. reaches somewhere in the neighborhood of 25 percent or more, early learning teachers often leave the field for jobs in the K-12 system. Large pay disparities between the early learning system and the K-12 system also undermine time and effort invested in the coaching and professional development of early learning teachers—at least as far as children in early learning reaping the benefits of having higher-quality instruction.

The Dollars (in Large Part) Are in the System

As noted earlier, federal, state, and local governments are already making substantial investments in early learning totaling \$21-27 billion annually.⁵⁹ Were those dollars to be strictly focused on early learning for the 3 million lowest-income children in the U.S., \$7,000-\$9,000 per child would be available.⁶⁰ Though repurposing these dollars is no easy matter, the amount of existing dollars in the system would comprise all or a large portion of the early learning cost-sustainability target of \$8,000-\$10,000 per child. This repurposing would also cover all costs to systematically implement all of the observation, measurement, teacher feedback, proven curricula, establishing and connecting standards, and measuring child outcomes noted in this paper.⁶¹

There are two immediate implications: There is substantial money already in the system and the bulk of it could be redirected to deliver high-quality early learning to children in low-income families.⁶² A focus on different practices (i.e., the essential elements of high-quality early learning) will get better results. Redirected dollars should focus on: 1) Systematic improvements in teaching quality via observation, measurement, teacher feedback, coaching, and professional development; 2) Use of proven curricula; 3) Improved teacher preparation focused on improving the quality of teacher-child interactions and quality of instruction; 4) Measuring outcomes for children and using that data to improve individual child outcomes and to inform overall instruction. Any additional money injected into the system should catalyze or go directly toward this same focus.

Progress in Early Learning: The New Fact Base at a Glance

Then (Pre 2010)	Now (2013)
Expensive pre-K programs that don't scale.	Cost-sustainable pre-K programs (\$8,000-\$10,000) with high potential for scaling.
Academic gains in pre-K are not sustained.	Selected exemplar pre-K programs showing academic gains through elementary grades.
No consensus on how to create and deliver high-quality pre-K.	Field coalescing around the elements of high-quality that drive the best outcomes for children.
Low accountability.	More systematic, evidence-based, data-driven approaches. Room for innovation.
Insufficient focus on teacher-child interactions and quality of instruction, generally not measured.	Teachers matter most. Focus: teacher-child interactions and high-quality instruction, broad adoption of CLASS in-progress.
Lack of effective coaching and professional development (PD), no models to get to scale.	Coaching/PD, targeting instruction, using online coaching, video, and in-person and online coursework.
Not enough focus on pre-K student outcomes.	Increased use of data to measure outcomes, kindergarten readiness assessments post-preschool, measuring Head Start grantees and dropping those that are low-quality.
Inconsistent adoption of whole child, comprehensive early learning standards.	Early learning standards now the norm, moving quickly to connect to kindergarten standards.
Lack of proven curricula to boost student achievement.	Proven curricula in literacy and numeracy exist (adoption of proven curricula remains low).

⁵⁹ Head Start and Early Head Start comprise about \$8-9 billion of this total.

⁶⁰ Lowest-income in this case being children in families at 100 percent-or-below federal poverty guidelines.

⁶¹ Startup costs would add an estimated \$400-\$700 per child for the first year only.

⁶² Based on overwhelming evidence that high-quality early learning has the largest positive impacts on children in low-income families.

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The Essential Elements of High-Quality Pre-K: An Analysis of Four Exemplar Programs

Jim Minervino, *Ready On Day One*
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OVERVIEW

This paper examines four state or local pre-K programs that are proven to drive sustained academic outcomes at cost-effective or near cost-effective levels for children in low-income families.⁶³ These programs include Boston Pre-K, New Jersey's Abbott pre-K,⁶⁴ North Carolina's Pre-K (formerly More at Four), and Maryland's Extended Elementary Education Program (EEEP) and "Judy Centers."

This paper is a written summary delineating which elements of high-quality programs are necessary for early learning that sticks.⁶⁵

KEY FINDINGS⁶⁶

High-quality early learning that sticks is the outcome of doing many things well. And it's hard to do all of the essential elements well.⁶⁷ A high-quality early learning system is akin to a long, multi-step supply chain where failure at any point along the chain significantly weakens the entire system. Each element must be executed very well and often in concert with other essential elements. At the highest level, this "doing many things well" requirement results in a high degree of difficulty and is a key reason why high-quality early learning that sticks is so infrequently seen.

The essential elements of quality that must be done well are featured in this paper. In addition, other contributors to high-quality programs are presented. While these other contributors might not be absolutely essential to achieving

⁶³ In this paper, low-income families are defined as those families with total family income from all sources equal to 185 percent-or-less of current federal poverty guidelines. This income level coincides with federal eligibility requirements for low-income children to receive free- or reduced-price lunch. Note: Head Start and most state- and city-run early learning programs typically have eligibility guidelines for total family income ranging from 100 percent to 200 percent of federal poverty guidelines. The term "lowest-income" families or children refers to the 3 million children living in families at 100 percent-or-below federal poverty guidelines.

⁶⁴ Officially, New Jersey no longer refers to Abbott pre-K by that name. However the program is still referred to as Abbott pre-K by administrators and teachers.

⁶⁵ The term "early learning that sticks" describes achievement gains made at ages 3-5 that, mostly or in significant part, persist at least through 3rd grade.

⁶⁶ Through on-site visits and phone interviews with these exemplars it became clear that, while the philosophy regarding the essential elements of high-quality programs are similar across the exemplars, *specific choices* within each essential element (e.g., specific curricula, professional development programs) differ across these exemplars and, in fact, this is an important finding of this paper.

⁶⁷ For the purposes of this paper, the essential elements of high-quality pre-K that make learning stick will often be shortened to simply "the essential elements."

high-quality, these elements are sometimes found (at differing levels of maturation) in early learning programs that stick.⁶⁸

The essential elements described in this paper are not novel, and to those involved in early learning, are unlikely to surprise. But in addition to recognizing the high degree of difficulty in executing all of the essential elements well, there is one finding that stands over the others: *Seeing is believing and understanding*.⁶⁹

By definition, this “seeing” dooms all attempts to fully convey the essential elements in written form. The elements can be named and described and examples of best practices and processes can be documented, but to capture the essence of many of the essential elements—and more importantly to show others what doing each element “well” looks like—the essential elements must be shown in action rather than just described on paper. In that sense, while this paper highlights and describes the essential elements, it does not (and cannot) show them in action.

ESSENTIAL ELEMENTS OF HIGH-QUALITY PRE-K THAT STICKS

As previously noted, high-quality early learning that sticks is the outcome of doing many essential things well. The remainder of this section discusses these essential elements.⁷⁰

1. Political leadership and/or judicial mandate and ongoing cover are necessary ingredients for creating, scaling up, providing resources, and maintaining high-quality early learning programs that stick. Two of the four exemplars—New Jersey and North Carolina—have pre-K systems operating under judicial mandate. As recently as 2010, all four exemplars had strong political support for high-quality early learning—with the most important leadership coming from state governors (in the case of three state exemplars) and from Boston’s mayor (in the case of Boston Pre-K). Support in the state legislatures and city councils of the exemplars has been important, but that importance pales in comparison to the impact of a highly-supportive governor or mayor.

At least three of the exemplars are benefitting from ongoing political leadership. New Jersey was poised to expand the Abbott Pre-K Program in 2013, but budget pressures have delayed that expansion. Still, expansion is supported by New Jersey’s governor and increased funding is expected in future years. Maryland and Boston have continued to expand their early learning programs (spending and slots) at a modest rate, despite overall budgetary pressures.

This paper devotes a relatively large amount of space to political leadership and judicial mandate because this leadership is an absolutely essential ingredient for the creation and continuity of high-quality early learning.

2. A compelling vision coupled with strong leadership exhibited by the senior early learning leaders of these exemplar programs is an essential element in their success. Specific sub-elements include:

- Designing (or redesigning) an early learning program that includes all of the essential elements of high-quality.
- Forethought in program design and supporting elements so that the essential elements work in concert with one another and reinforce one another to create a true early learning *system*.
- Creating and driving a culture of high expectations (at all levels in the system down to and including children) and continuous improvement with a focus on end outcomes for children.
- Hiring and retaining senior leaders who share the same vision and are effective at all levels in the system.
- The ability to communicate compellingly all of the above to appropriate political leaders, as well as to those working within the early learning program. An added bonus is the ability to communicate all of the above to parents of children within the early learning system.

⁶⁸ These other contributors are also included so that the reader can see the list of elements that fall short of making the list of absolute, must-have, essential elements of high-quality early learning.

⁶⁹ “Seeing is believing and seeing is understanding” will often be shortened to “seeing.”

⁷⁰ The previous paper, *Early Learning: The New Fact Base and Cost Sustainability*, notes the importance of teacher-child interactions being positive and emotionally supportive and classrooms being reasonably organized. That same paper notes this is generally what is found in practice. For that reason, this paper takes these as a given and does not call these out as additional essential elements of high-quality early learning.

- Maintaining a strong and positive relationship with the political leaders (typically governors and/or mayors) who provide funding and their own leadership for early learning.⁷¹
- Giving programs the time required to implement the essential elements of high quality before evaluating their success.⁷²

3. Teachers delivering high-quality instruction is a key differentiator between early learning that sticks and early learning that, more than likely, will not stick. Tomes have been written about high-quality instruction in pre-K, so for now, this paper includes a sampling of what the exemplars have to say on the issue:

Teachers with high expectations in a system with high expectations. Asking questions with a mix of simple, single-word answers and longer, more complex answers. Children doing more of the talking-and-doing than the teacher. Teachers guiding at the start of an activity and then facilitating continued student learning. Teachers stretching children's thinking by listening, reflecting, and asking questions, such as, "How do you know that?" Asking compare and contrast questions, letting children form hypotheses, test them out, and report out to the class. Children gathering information using a variety of techniques (e.g., find in the classroom, create—draw, photograph, build—in the classroom and outdoors). Children reporting out on what they find via a story, a song, or a play. Teachers who understand pre-K is about learning but also much more—sensitive and warm interactions, tapping into and extending children's natural curiosity, instilling a love of learning by making learning feel like play, and instilling self-confidence that each child is an excellent learner.

If the words and phrases written above describing teachers delivering high-quality instruction seem to trivialize and not capture well what good teaching looks like, it is because there is no substitute for seeing high-quality instruction in action (live in-person or video). There is also no substitute for seeing and discussing the components of high-quality instruction with skilled teachers, coaches, and evaluators. **Seeing is believing and understanding.**

The following essential elements of high-quality early learning are related to structural elements and enablers that support finding, developing, and retaining the great teachers who drive superior outcomes.⁷³

- 4. All exemplar programs have two adults in the classroom**—one lead teacher and one paraprofessional/aide—at all times.⁷⁴ When individual children need attention (e.g., spilled paint, walk to the bathroom, Band-Aid) the paraprofessional can attend to a child's needs while group activities continue uninterrupted. This leads to more high-quality teacher-child interactions and better outcomes for children.
- 5. All exemplar programs have maximum class size of 22 children or fewer and adult-to-child ratios ranging from 2:15 to 2:22.** Adult-to-child ratios at the lower end of the range are particularly advantageous for classrooms where a significant number of English language learners (ELLs) are present and/or where a significant number of children with special needs are present.

⁷¹ The exemplars note that changes in political leadership generate the most significant changes in funding, structure, and political support for early learning in their respective states and cities.

⁷² At least three exemplars indicated the first two years of implementation of new learning standards, new curriculum, new assessments, etc., were difficult, and it is unlikely that any significant gains in student outcomes were achieved in those years. Programs implementing the essential elements of high-quality pre-K should take this into account when designing overall program evaluations. Leaders at all levels must be willing to wait and provide cover for these programs until their effectiveness is ready to be measured.

⁷³ A safe and stimulating classroom with developmentally appropriate materials tied to the curriculum and instruction is necessary, but has not been given its own section in this paper. "Dosage" is also an essential structural element that is discussed later in this paper.

⁷⁴ A minority of classrooms have three adults in the room. The additional adult is often a student studying early childhood education and working as another aide in the room. In instances where paraprofessionals are on-track to receive a degree and/or credential, they may be allowed to function as lead instructor for a small amount of time per day and always with a fully-credentialed lead teacher in the room.

6. Lead teachers with a B.A. plus suitable early learning credential, paid at same level as K-3 teachers.

While the previous paper,⁷⁵ based on the academic literature in the field, called into question the need for pre-K teachers to have a B.A., all of the exemplars require teachers to have a B.A. as well as early learning-specific credentials and/or experience. Furthermore, all leaders of these exemplar programs noted the B.A. requirement was not a close call for them. The exemplars' B.A. requirement stems from a number of factors:

- First, the “plasticity” required to teach 20+ four-year-olds for 6 hours/day—including the ability to orchestrate the children and classroom, meld standards with curriculum, continually assess young children in 5-7 domains, take-up professional development and apply it well, and combine all of this to deliver consistently high-quality instruction—is significant.
- Second, the exemplars are focused on the trajectories of young children—in particular, setting up children to succeed in reading, writing, math, science, and critical thinking. On average, teachers who have B.A.'s have larger vocabularies, more extensive language skills, better understand the building blocks that get children to higher trajectories, and can translate these into high-quality teacher-child interactions.
- Third, while there are certainly effective pre-K teachers in the U.S. without a B.A., the exemplars report that the odds of successful outcomes for children are higher when teachers have a four-year degree. And the presence of a B.A. and the education that stands for is a simple proxy to apply.
- Fourth, the exemplars believe there is a correlation between higher educational attainment and higher expectations. In other words, teachers with a superior education (B.A. as a proxy) will set higher expectations for themselves and for the children they teach.
- Fifth, regarding early learning credentials, exemplars note that K-12 teacher certification is inadequate for understanding early childhood development and how very young children learn. At least two of the exemplars pay the full cost to send pre-K teachers, effectively, back to school to get the training they need. As with a B.A., exemplars report requiring early learning credentials for pre-K teachers is not a close call.
- Sixth, lead teacher compensation must be set at or very near K-3 teacher compensation in a teacher's respective state.⁷⁶

Finally, as with the other essential elements presented in this paper, implementing one element—in this case hiring teachers with B.A. degrees—is not a silver bullet. High-quality early learning that sticks is the outcome of doing many things (the essential elements) well.⁷⁷

7. Dosage. Three of the four exemplars offer pre-K that runs 6-6.5 hours/day, for 180-205 days/year. The other (Maryland) offers full-day (6.5 hours/day, 180 days/year) and part-day (3 hours/day, 180 days/year) options. It is clear from the exemplars and consistent with research findings that within high-quality pre-K programs the dosage required is related to the size of the achievement gap that must be closed for each low-income child.

For low-income children who enter pre-K already on a trajectory to be kindergarten-ready, a high-quality part-day option may be sufficient. For most low-income children, at least one year in full-day, high-quality pre-K is needed to be kindergarten-ready.

For low-income children for whom English is not spoken at home, children with special needs, and children who are significantly below age-level competency in one or more domains, it is likely that two years of high-quality, full-day pre-K is ideal and, in fact, may be necessary for most of these children to be kindergarten-ready on time.

⁷⁵ See *Early Learning: The New Fact Base and Cost Sustainability*.

⁷⁶ Three of the four exemplars mandate pay for all pre-K teachers, regardless of setting, at the same level as their K-8 counterparts statewide. These exemplars say pay equality is absolutely required for early learning that sticks and for retaining great teachers. However, one exemplar (Maryland) requires pay equality but pre-K teachers receive a benefits package that is significantly less generous than K-8 teachers in that state. Boston Pre-K is currently running an experiment whereby 10 community-based providers (14 classrooms) are running the program but paying teachers about 20 percent less than district-run pre-K.

⁷⁷ It is reasonable to infer that teachers with B.A. degrees in systems absent some of the other essential elements will find it more difficult to have impact than similarly educated teachers in systems having these elements present.

In instances where two years of high-quality pre-K is not available, there are two alternatives for children significantly behind their peers. The first is supplemental instruction (additional time, often one-on-one) for these children during the school year. The second alternative is a summer “wraparound program” that adds another 360 hours (60 days, 6 hours/day) of high-quality learning in the summer before these children enter kindergarten.

The cost of supplemental instruction is highly-variable. The cost of a summer wraparound program typically runs about \$4,000 per child.

The next section adds another five essential elements into the mix. In order to get the most impact from these five elements, they must work in concert with one another. Early learning programs must consciously design each individual element with the other four in mind.

8. All of the exemplars have had **pre-K early learning standards** for many years. The factors that appear to separate somewhat useful standards from excellent standards that drive better outcomes for children include: fewer standards rather than trying to be too comprehensive (fewer standards are more likely to be understood well and be used); standards covering multiple domains (e.g., health, social-emotional, cognitive); and standards that connect pre-K to kindergarten and beyond.
9. All of the exemplars have thought deeply about **curriculum** and believe it is a powerful tool when it is chosen well (i.e., it is research-based and can show proven results), tightly coupled with their early learning standards, connected to their system of professional development, and adhered to with very high fidelity.⁷⁸ In exemplar programs, the quality of teacher-child interactions is high and the content focus of those interactions is guided by the curriculum in use.

There are two different philosophies demonstrated by exemplars’ approach to choosing curricula: a centralized, top-down selection and standardization on curriculum used throughout a pre-K system (Boston and Maryland);⁷⁹ or district- or provider-level choice among a group of three to five curricula vetted by the state (New Jersey and North Carolina). The curriculum selection model used in each program corresponds somewhat with each exemplar’s pre-K delivery system and the power dynamics within those systems.⁸⁰ Overall, the exemplars have been successful with two different approaches to curriculum choice.⁸¹

While the exemplars have been successful in melding their curriculum with their early learning standards, they point out that training teachers thoroughly on new or revised curriculum is a time-consuming process—yet a process absolutely necessary and one that can never be shortchanged.⁸² These exemplars operate with the knowledge that high-fidelity to curriculum can only be achieved through deep training, continuous monitoring, and the provision of actionable feedback directly to teachers. Ongoing professional development (PD) regarding standards, curriculum, child assessment, and improving the quality of instruction are important parts of the mix.

⁷⁸ Exemplars recognize that strong curricula executed well—combined with high-quality instruction—is a very potent force for driving superior outcomes for children.

⁷⁹ Boston Pre-K uses a self-modified version of “Opening the World of Learning” (OWLs) for literacy and “Real Math Building Blocks” for math and numeracy. Maryland has created a custom curriculum.

⁸⁰ The centralized curriculum approach used by Boston and Maryland corresponds with the fact that pre-K in both places is predominately (Maryland) or completely (Boston) delivered through the public school system. The “choice of three to five” approach corresponds with New Jersey’s and North Carolina’s mixed-delivery of pre-K that includes public schools, community providers, and Head Start. Exemplars with mixed delivery systems noted that the reality on the ground was that community providers were already using curriculum before becoming state/district pre-K providers, and the limited choice model recognizes this reality.

⁸¹ It is noteworthy that none of the exemplars use a “free choice of research-based curricula” approach. Exemplars emphasized the difficulty and complexity of this approach regarding administration and implementation of this approach with high fidelity and high quality.

⁸² Boston Pre-K emphasizes that a new curriculum takes, on average, three years to implement fully with high fidelity.

- 10. Professional development (PD)** is a cornerstone of each exemplar’s early learning system and, in this regard, the exemplars share similar characteristics. Primarily:
- The belief that the best proxy for a high-bandwidth teacher—one who is focused on self-improvement, able to understand, synthesize, and apply data, and quickly apply lessons learned from PD—is a teacher with a B.A.
 - PD is most effective when a culture of high expectations for teachers and students is present. This type of culture views PD as an ongoing, never-ending cycle of self-improvement.
 - PD that is focused on teacher-child interactions, quality of instruction, and student outcomes is most effective. This is true whether development is focused on pedagogy or content and is most useful when it addresses gaps in the quality of instruction, past/present student assessment, fidelity to curriculum and, if applicable, early learning standards.
 - PD in the form of observation and one-to-one in-classroom (e.g., watch this, now apply immediately) coaching is most effective.
 - Teachers value informal PD at least as much as—and sometimes more than—formal PD. Teachers in all exemplars note the high value of informal coaching and mentoring they have received from colleagues. Related to this, teachers in single-site, single-classroom settings (where no colleagues are present) highlight the lack of informal PD as the item most holding back their development and effectiveness.
 - The “full-day, one-to-many, sitting down” format of formal PD is generally viewed as low- or no-value among administrators and teachers in the exemplar programs. This type of training is still occasionally used, but has been mostly discontinued or de-emphasized.
 - The exemplars believe the jury is still out regarding the value of online, self-paced PD. No one seems to have “cracked the code” on how to deliver/receive this in a way that has high-impact.

Exemplars note something obvious but worth relaying here: Investments in professional development are most valuable when they are effective (as described above) and when teacher retention is high.⁸³

- 11.** For the exemplars, **assessments and independent program evaluations** are essential contributors to their success. Assessment occurs at every level: statewide/citywide program, district, teacher, and student. At the pre-K level, these assessments are almost exclusively formative, have high instructional validity, and by definition, are used to help actors in the system improve performance and outcomes for children. Independent program evaluation looks at overall program quality, outcomes, and effectiveness for children.

While many pre-K systems conduct assessments, exemplar programs consume them. Consistent with cultures of ongoing self-improvement and a focus on outcomes for children, exemplars make aggressive use of assessments to inform administrators, teachers, and students about what is working well and what needs to be fixed, while identifying teachers and students who need more help to improve.

Likewise, a systematic plan for program evaluation—including monitoring program implementation—is critical. The essential elements of high-quality early learning don’t matter if implementation of these elements is poor. The exemplars recognize this and use program evaluation data to drive continuous improvement at all levels.

Finally, exemplars are focused on follow through. Using assessments and program evaluations to understand issues is one thing, but acting on the data is less common. Exemplar programs prioritize making the time, space, and resources to work directly with teachers and children who need extra support.

- 12.** Overall, exemplars make **aggressive use of data** (e.g., assessment and program evaluation data noted above) and have built **data systems** to supply their early learning systems with the most important and actionable data available. This creates a data-rich environment where data is studied, drives recommendations, and most importantly, is used to drive action and superior outcomes for children.

⁸³ Numerous studies have been done on the primary factors contributing to teacher retention. A unique factor specific to pre-K is the sizable compensation gap between pre-K teachers and K-12 teachers. All of the exemplars stressed the importance of compensating pre-K teachers near or at the same level as K-12 teachers in their systems.

13. The exemplars noted in this paper excel on all of the five elements noted above: standards, curriculum, professional development, assessment, and data/data systems. Furthermore, each exemplar has **tied these together in a system where each supports and reinforces the others**. This is not accidental. Instead, it is the result of leadership, careful planning, and execution of strategies designed with each of the five elements in mind.

The remaining essential elements of high-quality early learning that sticks impact subsets of the pre-K population, but are nonetheless important features of exemplar programs.

14. **English Language Learners (ELLs)** (where applicable). Two exemplars—New Jersey’s Abbott Districts and Boston Pre-K—have a large number of children from families where Spanish is the primary language spoken in the home. Both programs note the importance of having a specific strategy for these children, and both programs have chosen the same basic strategy: instruction that is 80-100 percent in a child’s native language at the start of the school year; transitioning to 20-80 percent by the end of pre-K; and then 100 percent English at the start of the following year (kindergarten).⁸⁴

To execute this strategy, ideally, a bilingual teacher is leading these classrooms. If that is not an option, a bilingual paraprofessional can bridge the gap between Spanish and English.

English language learners speaking languages other than Spanish continue to be a challenge for all of the exemplars.

15. **Special Education**. Exemplars try to mainstream students requiring special education as much as possible. This may take the form of placing these students immediately into mainstream pre-K if they are judged ready,⁸⁵ placing students in mainstream pre-K but pulling them out for one-to-one instruction to help them catch up or stay caught up with their peers, or placement in a special education version of pre-K.

New Jersey’s Abbott Districts have been the most aggressive (but not irresponsibly so) in mainstreaming children into kindergarten who were candidates for special education when entering pre-K. By spending the extra time, effort, and money—as much as \$70,000 per child per year—New Jersey has reduced special education at kindergarten and beyond and has also reduced grade retention of these children significantly.⁸⁶

A REVIEW OF OTHER PROGRAM COMPONENTS

While the 15 essential elements of high-quality early learning are shared across the four exemplar programs, other attributes are less common. Although these features very well may have an impact on program outcomes, they are not present in all four exemplars.

1. Setting⁸⁷
2. Comprehensive health services⁸⁸
3. District and school administration and site directors⁸⁹

⁸⁴ Exemplar programs have shown (as has Educare) that reaching these children at age 3 with instruction in their native language and transitioning to English in the following year results in a larger number of English language learners ready for kindergarten.

⁸⁵ This may include embedding instruction on individualized goals within the mainstream classroom.

⁸⁶ From the APPLIES Evaluation of New Jersey pre-K: “We also found that Abbott pre-K attendance reduced the likelihood of in-grade retention by 40 percent and reduced the necessity of special education placement by 31 percent.” These reductions result in significantly lower per-student costs for all subsequent years and can recapture a good portion of the dollars spent on high-quality pre-K.

⁸⁷ At the highest level, there are two delivery models for early learning programs that stick. One model is entirely situated in and run by the existing public school system (Boston). The second model is a mixed delivery system including public schools and community-based centers (for-profit and non-profit). This second model is run in the other three exemplars.

⁸⁸ Exemplars generally have at least basic health screening and screening for learning disabilities.

⁸⁹ Specifically, exemplars report that having district and school administration (especially principals in pre-K-8 public school systems) and site directors who understand child development and the essential elements of high-quality pre-K is a giant plus.

4. Significant outreach to parents, families, and the community⁹⁰
5. Parent education
6. Reforming teacher education programs
7. Paraprofessional education and significant training
8. Space⁹¹
9. Common planning time for pre-K teachers to increase sharing of best practices
10. Quality Rating and Improvement System (QRIS)⁹²
11. High-quality kindergarten⁹³
12. Evidenced-based kindergarten transition practices
13. Classrooms with a mix of low-income children with middle- or high-income children⁹⁴
14. Program accreditation⁹⁵
15. Hiring and training “interventionists”⁹⁶

CONCLUSIONS

This paper analyzed four exemplar pre-K programs and presented the program elements these exemplars share in common.

As noted in the previous paper, the cost to run these exemplar programs ranges from \$8,500-\$9,800 per child per year in North Carolina, and Maryland.⁹⁷ While the costs to run Boston Pre-K and New Jersey (Abbott) are higher, most states could run Boston’s program and a fair number could run New Jersey’s program within an \$8,000-\$10,000 per child per year cost envelope.⁹⁸

In the context of the essential elements presented here, the cost of these exemplar programs is important for at least two reasons. First, this cost range addresses a question policymakers and program designers often ask: Is there some level of funding required to deliver high-quality early learning that sticks? Second, exemplar program cost data

However, most of the exemplars report this is lacking or uneven within their programs. This is an ongoing frustration, but exemplars are succeeding despite this.

⁹⁰ All of the exemplars do outreach, but efforts are fairly scattered. In other words, exemplars are succeeding without doing high-quality outreach. A number of the exemplars are working to improve their outreach efforts and believe this will have a significant, positive impact on outcomes for children.

⁹¹ Finding appropriate space for pre-K programs is an issue for those delivered through the public school system and for programs that had a very fast ramp-up required by law. Finding space for supplemental instruction is also an issue.

⁹² While not citing QRIS as an essential element of pre-K success, all exemplars have QRIS running or under development.

⁹³ All exemplars lamented the current quality of their kindergarten programs relative to their pre-K programs. Some of the exemplars—most notably Boston Pre-K—are directly involved in up-leveling the quality of kindergarten and the early years of their K-12 systems. Not surprisingly, great teachers are the centerpiece regardless of grade.

⁹⁴ Boston and New Jersey are strong advocates for this. They believe this boosts the vocabulary of low-income children in pre-K.

⁹⁵ Boston Pre-K pays \$6,000 per classroom per site for an average of three years to have each pre-K and kindergarten site accredited by NAEYC. Boston believes this forces added discipline to get their pre-K sites (all within the public school system) to high-quality. None of our other exemplars do this.

⁹⁶ This is a promising idea pioneered by Boston Pre-K. Interventionists are used to spot and address problems—health, language, social-emotional, learning disabilities—immediately upon children’s entry into pre-K. Boston likens this to “triage” in that those with the most pressing needs get immediate help and attention.

⁹⁷ See *Early Learning: The New Fact Base and Cost Sustainability*.

⁹⁸ The cost per child per year of Boston Pre-K is approximately \$12,000; New Jersey (Abbott) is \$12,000-\$14,900, with the primary cost driver being relatively high wages and benefits in those locations. If lead pre-K teachers were paid at their states’ K-3 pay scale, 30 states could run Boston Pre-K and 20 states could run New Jersey’s (Abbott) program.

provides a yardstick against which to judge the costs and benefits of other existing or proposed early learning programs.⁹⁹

What is noted at the outset of this paper is worth repeating: High-quality early learning that sticks is the outcome of doing many essential things well. And it's hard to do all of these essential elements well. However, it can be done, and the exemplars provide examples of how this can be done cost-effectively at scale resulting in superior outcomes for children.

⁹⁹ For example, at an average cost per child that falls squarely in the range of the exemplars, Head Start lacks a number of these essential elements, academic outcomes have been very small, and those outcomes have not persisted. Recently, Head Start has taken a number of steps to address these issues, including increasing classroom quality and measuring quality via CLASS, defunding grantees judged to be operating below expectations, and rewriting Head Start Performance Standards. When complete, Head Start's new standards will embrace most if not all of the essential elements presented in this paper.

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