Lifting Pre-K Quality:
Caring and Effective Teachers

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Pre-k programs show enormous promise but yield uneven benefits for America's diverse children. Improving the quality of local Pre-k efforts – including public and private programs – is essential if we are to elevate the school readiness and long term success of all young children. This research report describes the latest evidence on how policy makers and early educators can best improve quality inside classrooms. Historically, policy makers and local early educators have attempted to improve quality through structural and program regulations, such as class size, teacher credentialing, and teacher-child ratios. Recent research, however, suggests that regulating quality through state regulation and structural change yields limited effects on teacher and child outcomes. Therefore, rather than relying only on state regulation to improve quality, the authors demonstrate stronger effects from recent efforts to raise quality by focusing on teacher development at the local level. Locally rooted teacher development models enrich instructional activities and relationships between children and teachers. The authors describe core elements of two promising teacher development programs, summarize new research on their benefits, and show how two states are nurturing implementation of these quality initiatives. This report speaks to early childhood educators, policy makers and advocates.

Acknowledgments

The Untapped Potential of Pre-K

Parents and government now spend over $48 billion each year on early childhood services – a robust industry that continues to expand.[1] Two-thirds of the nation's 4 year-olds attend a preschool center.[2] A half-century of research shows that pre-kindergarten organizations – when offering vibrant, high-quality programs – yield strong and sustained benefits for children from low-income families.[3]

But the quality of pre-k programs remains uneven. Even mediocre programs, of course, allow millions of parents to enter the labor force. But these programs often fail to appreciably leverage children's early learning outcomes. After tracking children through Head Start– a massive program serving low-income families – and into elementary school, federal evaluators found few lasting benefits for children.[4] Nor have researchers been able to detect consistent benefits for middle-class children from the average pre-k center, even after attending for two years.[5] Until consistent results across wider swaths of children are seen – lifting their health, social skills, and early school achievement – other priorities may eclipse public concern for young children.

We already know that more pre-k programs could pack a bigger punch if they displayed stronger quality. But how can we best improve pre-k quality? What are recent scientific discoveries teaching us about the surest ways for lifting children's growth? How can government and local early educators elevate quality across diverse public and private programs, serving an equally colorful range of families?

This report informs these questions, first detailing the pre-k quality problem, then reporting on the new science that points to effective ways of raising quality and boosting results for children. We address these topics:

- Recent studies show that more intense *regulation* by state governments – especially mandating higher credentials for pre-k teachers – yields few developmental benefits for children.

- Stronger gains for children stem from sensitive and demanding *relationships* between teachers and young children, and by organizing *learning tasks* that invoke rich language and build preliteracy skills.

- New *classroom interventions* – assessing teacher practices, building stronger skills, and tracking children's progress – are showing promising results.

- *Taking these models to scale* – nurturing stronger classroom practices, offering ongoing mentoring, and providing feedback on teacher performance and child development – is unfolding successfully in a handful of states. Early lessons can inform state and federal policy leaders.

Uneven Pre-K Quality – Bad News, Good News

Pre-k enrollments grew dramatically over the past half-century, as women moved into the labor force and government invested heavily in early childhood programs. In 1970 just 28% of the nation's 4 year-olds were attending a preschool center; only 12% of 3 year-olds were enrolled. These percentages climbed to 68% among 4 year-olds by 2005, and 41% for 3 year-olds.[6] More work remains to equalize family access to pre-k programs, especially widening affordable access to low-income Latino parents.

Yet as pre-k enrollments – and public spending – have climbed it's natural that parents and policy makers would worry over shortfalls in quality and the extent to which programs advance children's development. From the scientific world, the news has been mixed.

Parents' concerns spiked in the 1990s when a four-state study – receiving a wave of media attention – concluded that two-thirds of all pre-k programs were of poor to mediocre quality.[7] This inference stemmed from a single quality-assessment tool, although the team also found highly uneven education levels among classroom staff. Other studies would reveal that quality often lagged in blue-collar and middle-class suburbs, where pre-k programs depended on parent fees and poorly educated teachers. Whereas, federal and state pre-k programs are often better funded and tend to hire better prepared teachers.[8]
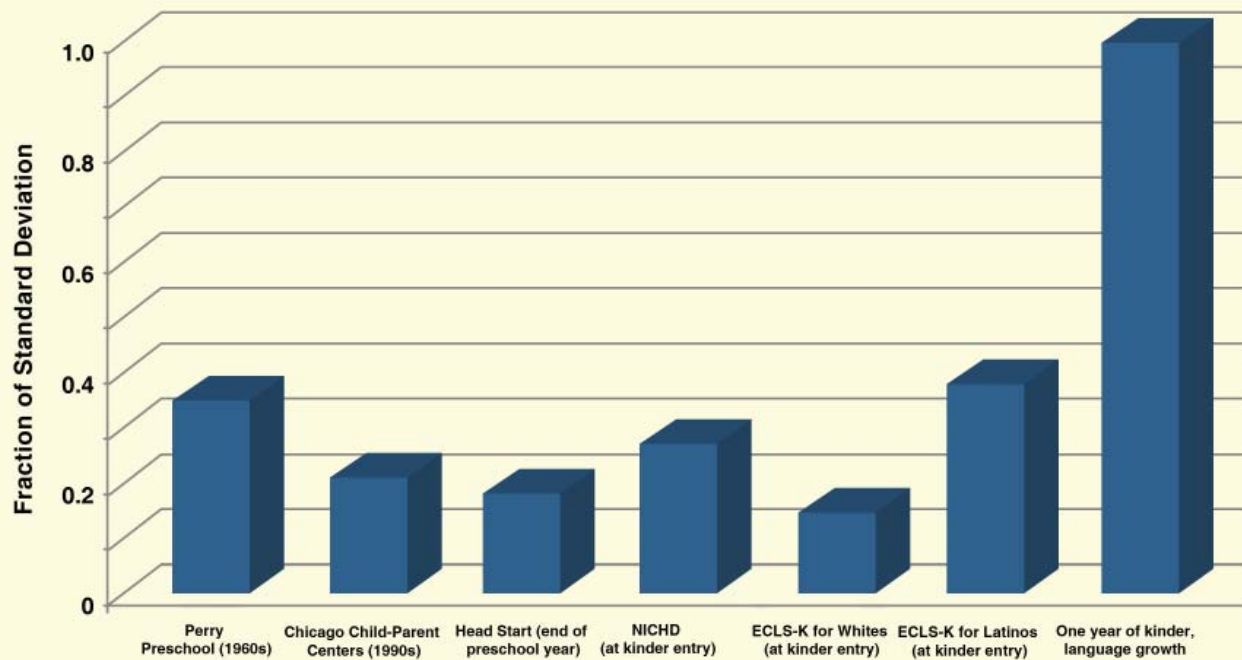
Two specific gaps in quality were later revealed in larger-scale studies. First, the average pre-k program serving children from middle-class families was found to yield tepid benefits at best. One careful investigation – mounted by the National Institute of Child Health and Human Development (NICHD) – tracked children from birth through a variety of child care and preschool settings. The sample of 1,364

Key Terms - Focus on Pre-K

Young children, typically 3-5 years of age, attend a variety of pre-k or child care settings, situated in centers, schools, or homes. This brief focuses on the quality of programs in public and private pre-k centers or schools.

- **Head Start**: Federally financed pre-k programs for 3-5 year olds.

- **State-funded Pre-K**: Centers serving young children from lower-income families, except in two states with universal pre-k programs. The majority of pre-k centers nationwide are supported by parent fees.

- **Standard Deviation (SD) Fractions**: A common way to gauge effects from pre-k programs. For comparsion purposes, kindergarteners show gains of about 1.0 SD in vocabulary and pre-reading skills during the school year.

- **Quality:** Features of pre-k programs and teacher practices that advance children's academic and social development.

Figure 1: Quality Worries: Uneven Cognitive Gains When Children Attend Pre-K Programs

Fraction of Standard Deviation

Perry Preschool (1960s) · Chicago Child-Parent Centers (1990s) · Head Start (end of preschool year) · NICHD (at kinder entry) · ECLS-K for Whites (at kinder entry) · ECLS-K for Latinos (at kinder entry) · One year of kinder, language growth

children was drawn mostly from middle-class families, as poorer families left the sample. The NICHD team found that attending a preschool center at age 3 or 4 was associated with a modest gain in cognitive growth, net a variety of prior family background factors (about 0.27 standard deviation, SD).[9] But by third grade this benefit essentially disappeared. Drawing on a more recent national data set, two independent groups of scholars have found similarly disappointing short-term effects for middle-class children who attend pre-k programs, with short-term benefits dissipating soon after entering elementary school.[10]

The second quality problem relates to pre-k's disappointing returns for many poor children. Washington now spends $8 billion each year to enroll almost 1 million children in Head Start programs. Rigorous studies in the 1990s showed modest yet lasting effects from attending Head Start.[11] But the federal evaluation, released in early 2010, which involved random assignment of children to Head Start or a control group, found slight benefits for children that persisted into the first grade.[12] The research team tracked nearly 5,000 children, ages 3 and 4, through Head Start programs and into elementary school. After one or two years in these programs, the Head Start children did display significantly higher levels of cognitive development and positive social behaviors. But few of these benefits lasted into elementary school, compared with children in the control group. About one-fourth of children in the control group

did attend a non-Head Start program or other form of nonparental care, blurring the findings a bit. Still, we would expect to see more robust benefits for poor children attending Head Start – if programs had displayed robust quality.

Next, let's turn to how government historically attempts to raise the quality of state pre-k programs. And why traditional regulatory tools are proving to be insufficient in lifting quality and enhancing the benefits experienced by young children.

Regulating Quality – An Insufficient First Step

Government holds K-12 schools accountable by gauging actual student achievement levels not by regulating inputs. In contrast, pre-k programs are regulated by state governments based on inputs and organizational features, not on their efficacy in raising kids' developmental outcomes. This is an historical accident in part. Public child care and preschool settings were originally run by health and welfare agencies, which still rely on easy-to-count indicators of quality – from monitoring hospitals or foster-care homes, to early childhood programs. The intensity of regulation from afar, as exercised from state capitals, has become the currency by which advocacy groups define their own efficacy in allegedly raising pre-k quality. So, reducing maximum class sizes or increasing teacher credential requirements comes to be defined as a policy win.

Indeed, certain regulated proxies of pre-k quality may contribute indirectly to appreciable gains in children's growth. Gains for children at times are higher for those who attend classrooms that display lower ratios of kids per adult. Richer staffing ratios are related to more frequent exposure to adult language and greater responsiveness from teachers.[13] But even staffing ratios are just weakly related to child development. No single "silver bullet" policy will likely boost child outcomes.

We know that when minimal regulatory standards are not in place, preschool quality can sink quite low, minimizing developmental benefits for children.[14] A handful of studies have discovered that better educated teachers and more carefully organized learning activities tend to be situated in states that regulate more aggressively.[15] But this association could be explained by confounding factors. For instance, one study found that preschool teachers are better educated and earn more in states that spend more per child on pre-k. But after taking into account state pre-k spending levels, regulatory intensity exerted no additional benefits on teacher quality.[16]

Andrew Mashburn at the University of Virginia directed a study that examined the extent to which 671 pre-k classrooms complied with nine regulatory standards advocated by the National Institute for Early Education Research (e.g., children in a single classroom, teacher credential levels).[17] Regulatory indicators were not associated with stronger child development among 2,439 four year-olds. One possible exception is that specialized training in child development, including at the community college level, may contribute to preschoolers' growth, on average.

Still, some pre-k advocates push policy makers to mandate that all pre-k teachers, in public and private settings, obtain a bachelor's degree. The Congress has moved in this direction, hoping to lift the quality of Head Start programs. But evidence remains weak that this regulatory mandate pays-off for children. The most exhaustive study to date was led by Diane Early and colleagues, who reanalyzed data from seven independent studies, each including near-identical measures of teacher education levels.[18] The statistical analysis was similar across data sets, and stringent controls were used to take into account the prior attributes of children and teachers. Five of the seven original studies drew on nationally representative data.

Early's team found few associations between teachers' education attainment, including whether they held a bachelor's degree, with the quality of care they provided. Data from two of the seven studies found that holding a four-year degree was predictive of stronger caregiving or teaching behavior; but analysis of the remaining five data sets found negative or no effects. And, most important, measured benefits for children were no more promising. When estimating children's early language or math proficiencies, the majority of studies found no significant effect from being in a classroom with a teacher who held a bachelor's degree.

Other studies confirm Early's findings. One tracked children who attended Head Start programs and came to the identical conclusion, even when looking at the trajectories of twins, just one of whom experienced Head Start (methodologically taking into account confounding factors that might drive selection of pre-k and child outcomes).[19]

Lifting Pre-K Quality: Caring and Effective Teachers

Figure 2: How States Regulate Quality – Do Rules Advance Children's Development?

Over the past half-century government has intensified rules setting minimal standards for a variety of caregiving organizations – from child care centers and hospitals, to foster-care homes. When it comes to pre-k settings, state governments focus on specific facets of quality –

- Safe and clean facilities with minimal risks for young children.
- Health and nutrition requirements, such as free meals and screening for health or physiological problems.
- Maximum class size and the ratio of children per adult.
- Preservice training requirements and credentials for teachers and classroom aides. Some states also require continuing education.

Early-childhood advocates often adhere to such regulatory indicators when lobbying policy makers to lift the "quality" of pre-k programs. The National Institute for Early Education Research (NIEER), for example, ranks states each year on how they stack-up against 10 such benchmarks. This includes the share of pre-k teachers with a bachelor's degree, maximum class sizes of no more than 20 children, and a child:staff ratio of 10:1 or lower.

But Andrew Mashburn and his colleagues recently found low to insignificant correlations between the NIEER index and classroom-level measures of teachers' emotional support, instructional organization, and availability of rich materials and teacher-child relations. The regulatory indicators held no predictive power in terms of boosting children's developmental gains.

Similarly, Diane Early at the Frank Porter Graham Center at the University of North Carolina reanalyzed data from seven independently conducted studies which included near-identical measures of preservice training and credential levels for Pre-K teachers. She and her colleagues found no consistent relationship between obtaining a bachelor's degree and children's growth while attending a Pre-K program.

The question for policy makers: How to advance momentum in lifting pre-k quality without relying on regulatory levers that do little to enrich teaching practices and children's growth?

Sources: Early, D. et al. (2007). Teachers' education, classroom quality, and young children's academic skills: Results from seven studies of preschool programs. Child Development, 78, 558-580. Mashburn, A. et al. (2008). Measures of classroom quality in prekindergarten and children's development of academic, language, and social skills. Child Development, 79, 732-749.

It would be unwise to roll-back state regulations, especially when they ensure minimal health and safety standards for pre-k facilities. But no consistent evidence suggests that intensifying these regulations would elevate child development. No evidence suggests that requiring teachers to have bachelor's degrees will lift child outcomes, especially when credentials require little training in child development or teaching practices.

Discovering the Quality Nexus – Teachers Who Nurture and Organize Early Learning

The quality of pre-k classrooms is a mix of various ingredients. The count of children in classrooms, for instance, shapes the frequency of interaction with adults. The language skills of teachers affect children's cognitive growth. The organization of learning tasks, variably infused with rich language and sound feedback to children, offers another crucial dimension of quality.

Recent scientific work inside pre-k classrooms illuminates a new nexus – a pair of interwoven, human-scale practices that can lift children's development. First, the encouragement, feedback, and steady emotional support offered by pre-k teachers is predictive of a variety of positive outcomes for children.

Yet attention to the youngster's social and emotional growth alone does not necessarily advance development in cognitive and preliteracy domains. This nexus of effective practice also must include well structured learning tasks and child-teacher interactions that facilitate cognitive growth.[20] Pre-k programs aim to advance young children's competencies, as active learners within complex social environments, like classrooms or households. Learning and cognitive facilitation by adults is facilitated by close, respectful, and encouraging relationships – with adults and the child's peers. So, for example, when a pre-k teacher sensitively mediates a dispute between two 4 year-olds, nudging them to reason about the problem and weigh possible remedies, a trusting relationship acts to advance cognitive and linguistic skills.[21] In short, sound relationships are intertwined with learning.

We also emphasize that this nexus of emotional support and instructional organization is necessarily nested within cultural and linguistic boundaries. Children's acquired norms for being assertive, vocal, and independent in pre-k classrooms may stem from a particular upbringing, defined by the class and

cultural heritage of the family. The child's pursuit of competence – learning to fit into a social setting and acquiring requisite cognitive and linguistic skills –is situated in roles and culturally expected behaviors that are internalized before entering pre-k.[22] So, as interventions are crafted to advance this nexus between emotional support and instructional organization, they must be adapted to cultural and linguistic norms.

The power of emotional support and social skills. Artful teaching practices can advance the child's feeling of belonging and motivation to learn in several ways –

- Sensitive teachers listen to the child carefully, encourage more precise language, and reason through problems together. This serves to build trust and offers cognitive challenges, scaffolding-up from what the child already knows.

- Teachers can model warm and trusting relationships. When this spills over to peer relations, children are more likely to engage, converse, and learn from one another, and display fewer social conflicts. This, in turn, allows the child to engage in learning tasks with greater self-regulation and less dependence upon adult direction.

- When children experience teachers as responsive and encouraging of positive task performance, youngsters are more motivated to engage new cognitive challenges and novel peer relations.

- Language, imaginative ideas, and new discoveries travel more readily across stronger social ties. Put another way: rich and colorful materials will do little to facilitate cognitive growth unless animated by strong relationships among children and adults.

In short, the child's eagerness to engage in learning tasks, working in conjunction with adults and peers, is conditioned by whether underlying social relations manifest warm and engaging qualities. Otherwise, the child feels little motivation to work cooperatively or to trust that new cognitive challenges will yield a sense of efficacy and enjoyment.

Developmental scientists have devised a variety of classroom measures to describe and study variation in a range of nurturing behaviors displayed by pre-k teachers. These measures illuminate these practices and offer pre-k staff useful tools for improving programs (Figure 3).

Interweaving support with challenging learning tasks. The new science on pre-k quality finds that the emotional support of young children, often displayed by teachers, is necessary but insufficient to advance children's growth in the cognitive domain, especially growth in oral language and preliteracy skills. One reason that pre-k programs continue to show little benefits for some children may stem from the disproportionate attention paid to emotional support by teachers, accompanied by insufficient attention

to instructional practices. Several dimensions of classroom management and learning tasks are predictive of positive child development –

- Classroom tasks that have clear learning goals, managed carefully to ensure that children understand how they are expected to participate.

- Established, well understood classroom routines, offering a structure for children in which they understand a predictable sequence of steps.

- Close and sensitive monitoring by the teacher, with steady feedback, to help children feel confident in completing the learning task.

- Some learning tasks should engage children's physical energy and emerging motor skills to motivate them more fully.

- Creation of tasks that involve rich oral language, scaffolding-up from children's linguistic skills, and connecting of oral language to written symbols.

- Time spent on challenging and enjoyable learning tasks – compared with time watching television, or roaming about unengaged – is also predictive of cognitive benefits from pre-k. This seems obvious, but several studies reveal sizeable shares of time in which children are not taking-up any task.
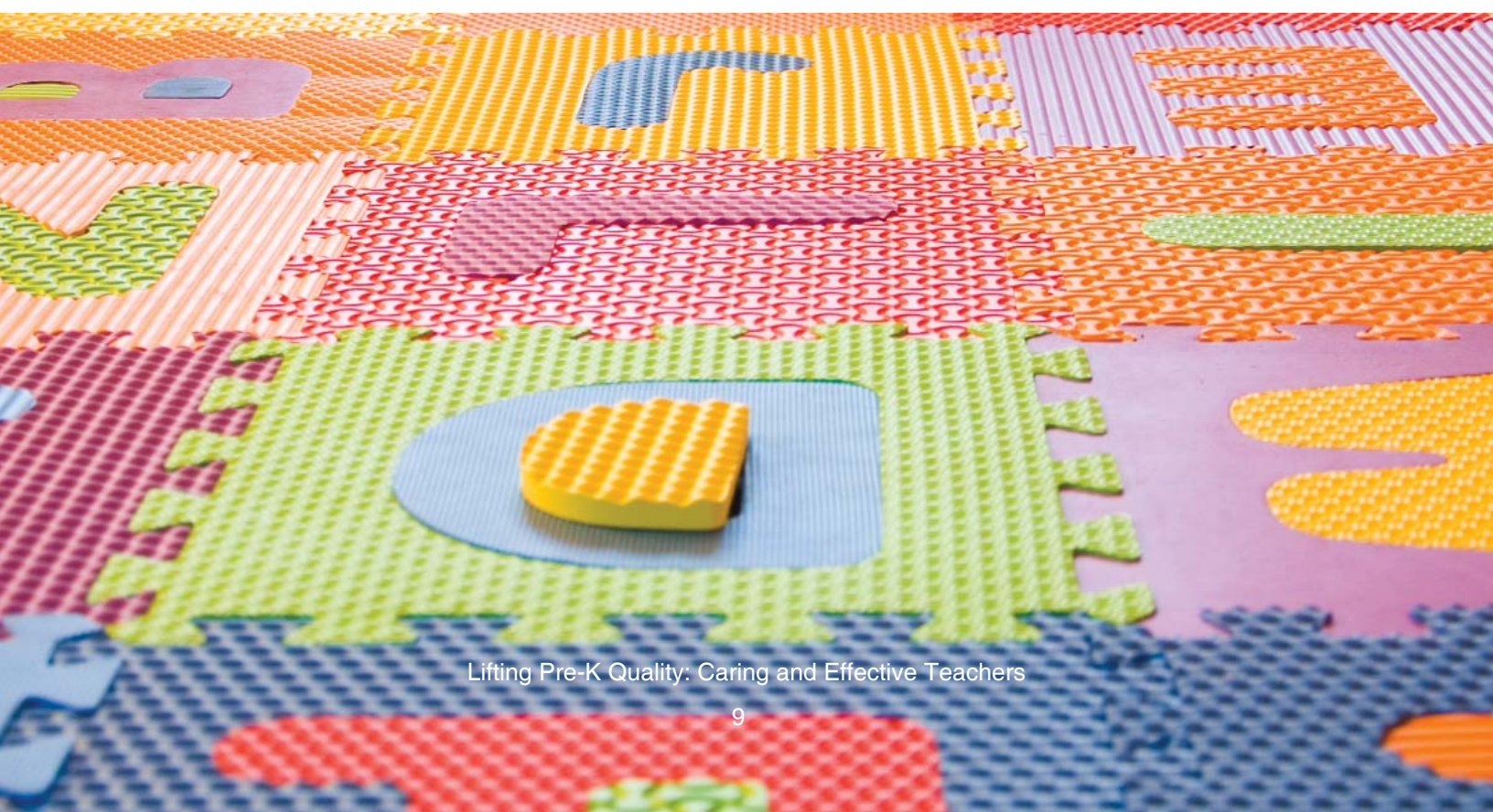
Figure 3: Seeing and Measuring Pre-K Teacher Practices that Lift Early Learning

Pre-k staff work from their beliefs and daily experiences to judge what makes for a caring and effective teacher. Researchers advance this conversation by describing child-adult interactions and ways of organizing learning tasks that predict steeper growth curves for young children.

Great progress has been made over the past quarter-century in specifying, observing, and measuring these elements of efficacious pre-k teachers.

- *Arnett Caregiver Interaction Scale.* Psychologist Jeff Arnett, back in the 1980s, built an instrument for observing the interaction between caregivers and young children, including 26 different scales. This boils-down to four discernable facets of quality interactions: warm and responsive behavior by the teacher or caregiver to the child's utterances; harsh or punitive discipline of misbehavior; the adult's or child's detachment from one another; and the extent to which the adult permits the child to engage in a variety of behaviors, even when disengaged from learning tasks. Scholars using the Arnett measure also find that it taps into the extent to which teachers explain misbehavior or reason with the child to resolve problems, inviting complex language.

- *Child-Caregiver Observation System.* This tool takes snapshots of pre-k settings every five minutes to assess the activity and social actors with whom the child is engaged, learning materials involved, and the caregiver's verbal interaction with the child. Developed by scientists at Mathematica Policy Research, Inc., this tool can track the life of activities over several hours, and children's changing level of engagement. It has revealed that many children in a significant number of Pre-K programs wander about, not engaged over time in any activity.

- *Observational Record of the Caregiving Environment* (ORCE) was initially designed to focus on the quality and content of child-adult interactions in Pre-K and home-based child care. It records behaviors and global ratings of the social environment at regular time intervals. For pre-k teachers, this includes observation of the adult's expression of affection and warmth, responsiveness to the child, avoidance of intrusive or restrictive discipline behaviors. Additional measures now include the teacher's attention to literacy skills and the quality of instructional materials.

- *Classroom Assessment Scoring System (CLASS).* Integrating concepts and scales from the earlier observational measures, the CLASS gauges the pre-k classroom's social-emotional climate, facets of child-teacher interactions, and the management of learning activities, focusing on language and preliteracy skills. This tool records the extent to which teachers offer responsive and encouraging interactions with kids, the overall management of classroom activities and engagement levels, and the attention to language and preliteracy skills through well-structured tasks.

- *Early Childhood Environment Rating Scale (ECERS).* An industry standard, the ECERS is now employed in several states to assess the quality of pre-k classrooms. It emphasizes the nature of physical space, types of activities provided, and the supply of learning materials. The second dimension often identified by researchers relates to the quality of child-adult interactions. Several investigations now demonstrate that the interaction subscales predict strong developmental gains, not the supply of materials.

Sources: Fuller, B., Kagan, S., Loeb, S., & Chang, Y. (2004). Child care quality: Centers and home settings that serve poor families. Early Childhood Research Quarterly, 19, 505-527. Mashburn, A., & Pianta, R. (2006). Social relationships and school readiness. Early Education and Development, 17, 151-176. Pianta, R. (2003). Standardized classroom observations from Pre-K to third grade: A mechanism for improving quality classroom experiences during the P-3 years. Charlottesville: University of Virginia.

Research by Robert Pianta and colleagues at the University of Virginia shows that many pre-k teachers are quite strong on emotional support, attending to children's motivation and social skills, but their classrooms are unevenly organized in terms of offering challenging learning tasks.[23] It's this balance – at the nexus of nurturance and learning– that's key to advancing child development.

As the new science of early learning illuminates this potent mix of supportive relationships and the careful organization of learning activities, how should professional development interventions be designed to maximize benefits for children?

New Models to Enrich Teacher Practices

We know what invigorating and beneficial pre-k classrooms look like. Capturing how vibrant pre-k teachers blend steady support for children with a vigorous array of learning tasks, the University of Virginia team has videotaped illustrative methods. These web-based episodes show how pre-k teachers warmly assist children who are unsure of how to tackle a task, or get down on the floor to help resolve a social snafu between youngsters. At the same time, artful teachers set predictable routines and design motivating tasks which manifest clear cognitive or social aims, understood roles and expected behaviors for each child, and offer feedback that boosts children's feeling of efficacy.

But then how do pre-k teachers come to master these effective practices? How do states and program directors provide the tools, time, and commitment to sustain teacher development? We focus on a pair of teacher-development programs – each being taken-up by a large number of pre-k programs in several states – which are showing significant results. The first model – the Classroom Assessment Scoring System (CLASS) – is designed by Pianta and colleagues at the University of Virginia. The second model is the Texas Early Education Model (TEEM), crafted by Susan Landry and her colleagues at the University of Texas Medical School in Houston.

These pre-k teacher-development models, while different in notable ways, share several core ingredients

- Emphasizing the fusion of teachers who care deeply about their preschoolers, encouraging social development, while carefully organizing instructional activities which advance cognitive growth and preliteracy skills.

- Identifying effective teaching practices, from offering more steady emotional and social support to managing the classroom to advance learning.

- Enriching oral language in the classroom, and linking oral language to phonemic awareness, word usage, and pre-reading skills.

- Building mentoring roles for effective pre-k teachers, who then raise the proficiency of other teachers.

- Experimenting with web-based classroom scenarios and mentoring – illustrating effective practices in concert with live mentors in classrooms.

- Introducing curricular units that advance preliteracy skills and knowledge of mathematical concepts.

- Utilizing tools for assessing improvements in teacher practices.

Next, let's carefully compare the theories of action and core tools employed by each of these promising models of teacher professional development. These teacher-development models differ significantly. CLASS primarily emphasizes the richness of child-teacher relationships. TEEM focuses first on improving instructional practices and learning activities, and then supports teachers to incorporate these practices through rich relationships and play-based strategies.

Figure 4: An Invigorating Pre-K Classroom Looks Like This!

Emotional Support for Children	Rich Environments and Challenging Instruction	Teacher Support and Professional Development
✓ Sensitive teachers who build trust ✓ Encouraging teachers who motivate ✓ Responsive teachers who listen	✓ Well established classroom routines and structure ✓ Rich oral language, phonemic awareness, and pre-reading instruction ✓ Creative, imaginative, and challenging learning tasks	✓ Teachers who refine their practices through ongoing professional development ✓ Mentor teachers who support new teachers and provide helpful feedback ✓ Efficient progress monitoring tools that guide instruction and activities

Classroom Assessment Scoring System (CLASS). Pianta and his team made a crucial discovery a few years ago, as they observed teachers in 671 pre-k classrooms spread across 11 states. They found that most teachers and aides were sensitive and responsive, working effectively to boost their children's confidence and social skills. The extent to which teachers displayed this support did help to predict children's growth during the preschool years. The problem, however, was that teachers' parallel skills in organizing rich, challenging learning tasks – especially in the area of language and literacy – were quite weak on average. Pianta's team observed many children, who were sitting quietly or waiting for the next task, across large numbers of classrooms. These weaknesses in classroom organization, in turn, slowed children's cognitive growth.[24]

To devise an effective remedy to this imbalance, Pianta starts with a classroom assessment tool, the CLASS. His team works with pre-k programs to first use the CLASS to gauge the extent to which they (1) create a warm and encouraging climate in the classroom, showing sensitivity to kids and offering emotional support, (2) organize clear routines and structures in which children expect to engage learning tasks, and (3) offer rich language and preliteracy skills, providing children clear feedback on their performance. Pianta's theory of action is that learning and socialization stems from variably rich interactions between children and adults, and among peers, in pre-k settings – and these interactions should be emotionally supportive and facilitate cognitive challenges related to language *and* preliteracy skills.

The CLASS intervention also involves videotaping classrooms and facilitating supportive discussions with fellow teachers and a live mentor. These are the first steps in a teacher development process, called

Figure 5: TEEM and CLASS Core Elements

TEEM

Classroom and Teacher Observation Tools	• Teacher Behavior Rating Scale (TBRS): measures quality and quantity. Classroom Environment Checklist; Classroom Observation Tool (COT)
Professional Development	• 2-day CIRCLE training. • eCIRCLE: web-based professional development with a facilitator. Nine comprehensive courses. • Mentoring: Ongoing mentoring and feedback throughout the year.
Curriculum	• Research-based emergent literacy, mathematics and social emotional skills
Student Assessment and Feedback	• Technology-driven progress monitoring with a Personal Digital Assistant (PDA), netbooks or laptops which display guided prompts children, assessment results and provides immediate feedback.
Program Evaluation	• *Texas School Ready! Certification* System (SRCS)

CLASS

Classroom and Teacher Observation Tools	• Classroom Assessment Scoring System (CLASS): measures effective teacher-child interactions and instructional organization.
Professional Development	• MyTeachingPartner (MTP): web-based professional development. • Video library of high-quality teacher-child interactions.
Curriculum	• MyTeachingPartner Language and Literacy Curriculum: literacy development. • Promoting Alternative Thinking Strategies, Preschool (PATHS): social emotional development.
Student Assessment and Feedback	• MTP coaching cycle: consultation process with ongoing targeted feedback via face-to-face web-chat.

My Teaching Partner (MTP). This includes a library of videotaped classrooms in which teachers show exemplary proficiency in emotional support or classroom organization. Pianta's team is presently studying the comparative effects of mentoring with a live master teacher compared with relying on video clips to learn more effective forms of interaction and classroom organization.

The CLASS model includes a new curriculum that focuses on child development in the language and literacy domain. This innovative curriculum is paired with Preschool PATHS (Promoting Alternative Thinking Strategies), which focuses on children's social and emotional growth. But remember that the core theory is that improved child-teacher interactions – for emotional support and instructional management – drive child development, not codified curricular materials per se. And gauging change in classroom interactions takes pre-k staff back to the CLASS assessment tool, yielding feedback on their progress in changing their own practices.

Peer-reviewed evaluations of the CLASS model now are appearing– gauging effects on improved teaching practices and accelerating child development. When carefully implemented, the CLASS intervention – including the core elements of My Teaching Partner – appears to improve the observed sensitivity of pre-k teachers. Gains also have been observed in the richness of teachers' language stimulation.[25] Work remains on estimating the magnitude of these intervention effects on teacher behavior, and whether the amount of change is sufficient to lift children's cognitive and social development. Findings are quite clear that the forms of classroom interaction and instructional organization gauged by the CLASS are predictive of developmental outcomes for kids at modest levels of magnitude, after taking into account their family background.

Texas Early Education Model (TEEM). The second teacher-development model stems from a different theory of action – but is yielding equally encouraging results. The designers of CLASS start with the question, what forms of interaction inside pre-k classrooms will yield more robust child development in terms of social, linguistic, and preliteracy skills. The architects of TEEM instead focus directly on the use of curriculum and the acquisition of preliteracy, math and social skills.

Susan Landry, the pediatric researcher who led the design of TEEM, emphasizes, "An alarming number of American preschool children lack sufficient language and literacy skills to succeed in kindergarten."[26] To address this gap, pre-k teachers must rethink their *role and pedagogical priorities*, according to TEEM designers in Houston. "One belief that can interfere with teachers making use of professional development is the long standing belief that children need to construct their own knowledge through self-directed discovery and... the teacher's role is supporting that discovery."[27] Nurturing children's own curiosity is not necessarily in conflict with stronger organization of classroom activities that foster cognitive growth.

So, the TEEM intervention – similar to elements of CLASS – shows pre-k teachers how they can "provide explicit information about vocabulary, number concepts, and letters in a more intentional approach." Landry and colleagues then build from core principles regarding *how adults learn*, including pre-k teachers. This leads to a teacher-development model that (1) situates learning in authentic contexts where teachers are working daily, (2) creates situations where the teachers can learn and practice new methods

side-by-side with their colleagues, and (3) develops stronger practices over a stretch of time, rather than being sporadically. In addition strong mentoring – on the web and with onsite trainers – helps to implement these principles inside pre-k classrooms.

The TEEM model begins with an intensive two-day training, called CIRCLE, then launches a web-based teacher development program called eCIRCLE. This involves nine courses – conducted with fellow teachers and inviting demonstration of best practices by expert mentors – which cover classroom management, responsive teaching behaviors, and how to create learning activities based on the local programs' own curricular materials.

A TEEM mentor helps teachers move through the web-based material, practice in small groups, and then implement new behaviors and learning activities for children into their classrooms. TEEM requires local public and private programs to work in partnership and utilize state approved curriculum aims in order to advance growth in children's oral language, phonological awareness, knowledge of print materials, and number and math concepts. TEEM also provides classroom-based school readiness and classroom management kits that provide teachers with hands-on manipulatives to guide instructional activities.

On the social-development side, TEEM mentors encourage teachers to work with children on self-regulation and cooperation with peers, allowing them to steadily engage rich learning tasks, along with getting kids to talk about their emotions and conflicts when they arise. Similar to CLASS, the TEEM sees children's social-emotional vitality as interwoven with their capacity to engage instructional activities. And TEEM mentors demonstrate how these learning activities can be implemented with children in "a purposeful, planful, and playful way".

TEEM also provides regular feedback to teachers – both how children are progressing and how well teachers are implementing stronger pedagogical practices and supportive interactions with their kids. Teachers periodically assess child progress through use of a hand-held technology device, netbook or laptop– related to phonological awareness, letter knowledge, word recognition, pre-writing skills, math and social behaviors. These data are then uploaded to vendor-based data repositories, and tailored reports go back to each teacher on children's progress over time. Mentors and teachers then work closely together to adjust instructional approaches and activities based on the needs of individual children. In addition, TEEM provides a tool for observing teachers and offering feedback on implementation of best practices and nurturing interactions with children, called the Teacher Behavior Rating Scale (TBRS), and requires all programs to participate in the *Texas School Ready!* Certification System, a unique quality rating system.

Peer-reviewed evaluations of the TEEM model are now published in the scientific literature – showing consistent benefits for teachers and children. One study randomly assigned 220 pre-k teachers to the comprehensive teacher-development program or to a control group. Those participating in TEEM displayed moderate to strong changes in pedagogical practices, including greater attention to well organized activities in book reading, phonological awareness, written expression, and children's use of print materials. Lesson planning was more carefully done among teachers assigned to the TEEM intervention, and they displayed greater responsiveness to children, compared with the control group.[28] Teacher effects were stronger when a second clinical trial compared the combination of web-based training, progress monitoring, and direct mentoring versus just one method.

TEEM researchers have detected significant effects on children's preliteracy skills, including letter recognition, oral vocabulary, and phonological awareness, assessed in English or Spanish. Effect sizes were impressive in some cases, ranging from 0.16 to 0.84 of a standard deviation (SD), depending on the outcome measure and whether children were with TEEM teachers for one or two years.[29] The preliteracy skill scores of kindergarteners climbed about 1.0 SD on average, so TEEM effects are moderate to large in some cases.

Some benefits regarding teacher practices and classroom organization were stronger, after one or two years of involvement with TEEM. These estimates may be somewhat inflated, given that teachers, but not children, were randomly assigned to the treatment conditions. Family background controls were not included in estimation models, which may lead to understating home effects, although each child's pre-test score was taken into account.

Going to Scale – Lifting Teachers in Diverse Pre-K Systems

It's a key first step, testing whether these innovative teacher development models work in samples of classrooms. While TEEM has been taken to scale in Texas, implementing these models across other states is no easy task given the diversity of local programs and their families. Let's turn to how pre-k programs vary, and how this organizational kaleidoscope holds implications for taking models, like CLASS and TEEM, to scale.

Organizational variability. The first source of local variation – into which teacher-development models are dropped – pertains to the type of organized setting which young children enter. Let's take the case of Texas and the range of child care and pre-k organizations, supported via parent fees or government aid. Figure 6 displays the count of organizations, including remunerated home-based settings, which populate the field. The high bar dominates the graph, indicating that over 200,000 children are being served in public school pre-k settings. Well over 60,000 young children are being served in Head Start programs, and approximately 130,000 children are being served in federally subsidized child care centers and home-based settings. As teacher development models are introduced, these vast organizational differences must be taken into account.

Philosophy, networks, resources. The various types of pre-k programs manifest differing beliefs about what's best for raising young children. For decades many early educators, being versed in "developmentally appropriate practices," emphasized how young children learn through play. Adherents

Figure 6: Colorful Spectrum of Texas Pre-K Programs
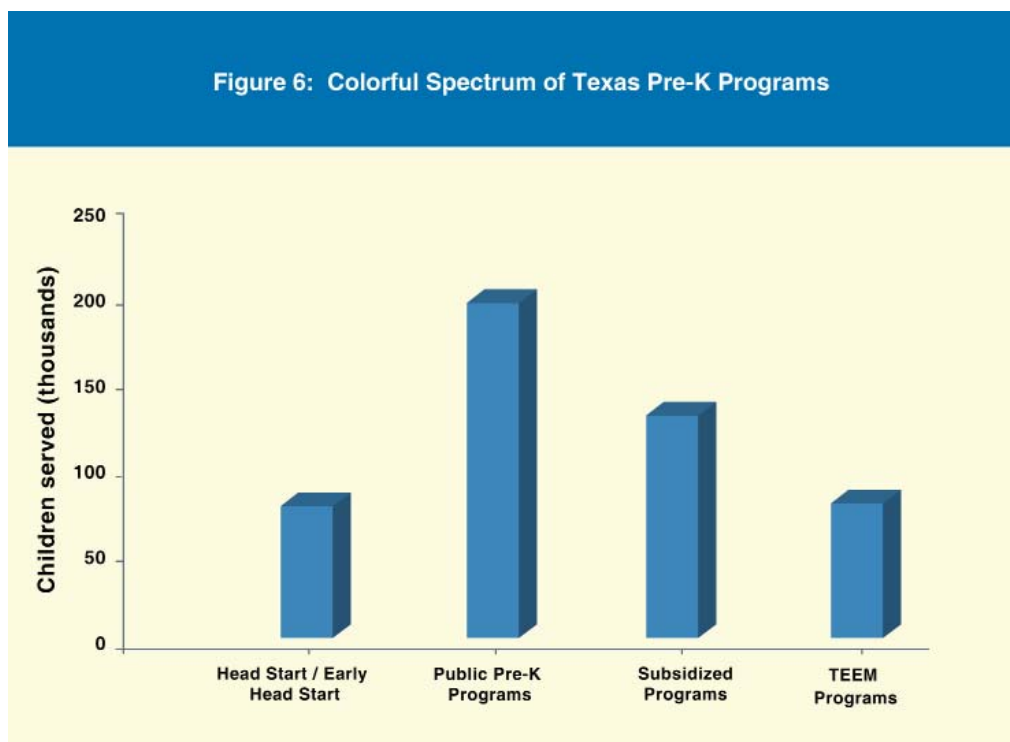
to this philosophical frame, reinforced by professional associations, at times discounted preliteracy activities and structured learning activities. At the same time, the rise of standards-based accountability in the public schools lent strength to those who advocated for pre-k programs that look more like elementary-school classrooms, at times not asking how the motivation and curiosities of young children may differ from older youngsters.

Different pre-k programs are linked to differing funding streams and networks that advance competing philosophies and ways of organizing classrooms – be it to encourage imaginary play or phonemic awareness. But this nexus between emotional support and instructional organization helps to bridge these differing perspectives. In this light, the dual-pronged agenda for pre-k classrooms – nurturing support and better organized learning tasks – helps to bridge the old philosophical divide.

Figure 7: Growing Population of Latino Children Under 18 Thru 2021
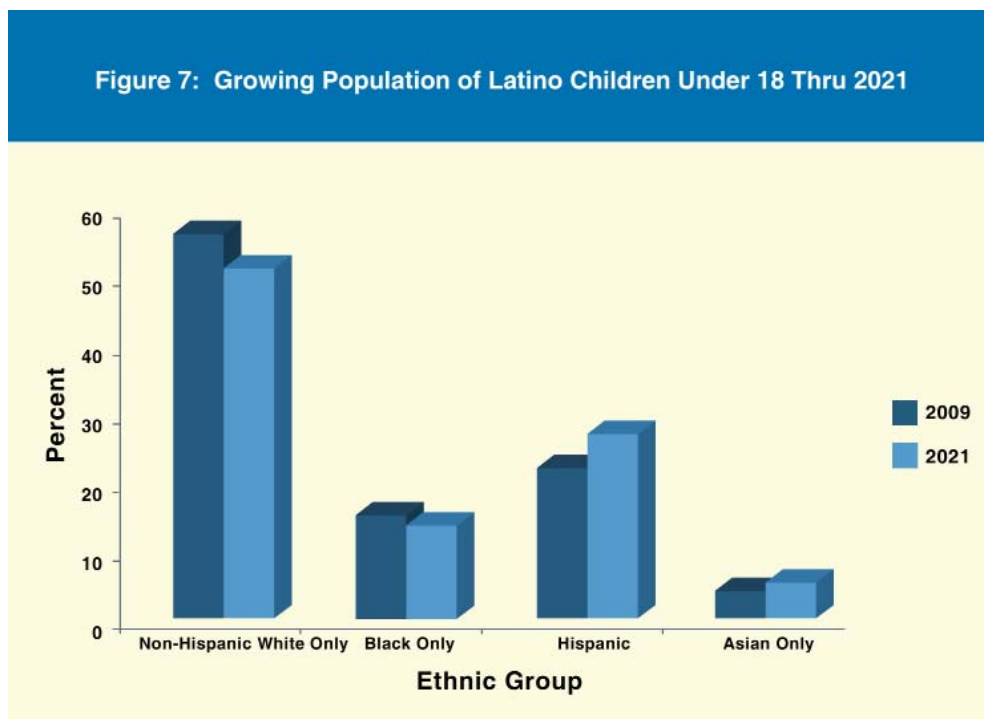
Demographic diversity. Many early educators are quite familiar with the rising diversity of the families served by pre-k programs. Figure 7 shows the large and growing share of the nation's children of Latino heritage. Today, just over one-fifth of children under 18 years of age are Latino; this will grow to 27% over the coming decade. English is not the home language of over two-fifths of all California families. One-third of all Texans speak Spanish or another non-English language at home.

Just beneath this linguistic diversity lay a variety of social norms and cognitive requirements that vary among cultural groups. We know, for instance, that Latino children arrive at kindergarten with cooperative skills that rival their (economically) better-off White peers. But the former group also comes with less familiarity with children's books and more restricted vocabularies.[30]

Young children learn quite early about how they should behave to become a competent member of the social group, be it within the family or classroom. Several studies have found that Latino children are more likely to abide by their parents' authority, less frequently invited to reason about problems, and often put others' interests ahead of their own.[31] This may go against how mainstream developmentalists encourage children to become more "autonomous," or to constantly verbalize and ask lots of questions in pre-k classrooms. We are not arguing that one cultural pattern is better than the other. But these findings do illustrate how nurturing support and social agility – if teachers are to scaffold-up from what children already know must take into account cultural differences. It's difficult to see how pre-k teachers could effectively offer emotional support, or set useful social rules for class activities, without first understanding the norms of interaction that children bring from home.

Similarly, pre-k teachers may define the quality of social interaction differently, stemming from their particular linguistic or cultural heritage. UCLA's Alison Wishard and Carollee Howes followed a multi-ethnic array of pre-k teachers over time and concluded that "practices, more than (structural indicators of) quality, appear to be deeply embedded within value and belief systems that are rooted in ethnicity, community, and social class."[32] This team found that African-American pre-k teachers, on average, favored more direct instructional methods and the acquisition of oral language proficiency in English, compared with White teachers. The former also included more curricular content from the Black community, and less frequent references to cultural heritage made by White teachers.

Weak incentives, uneven commitments. Pre-k programs vary greatly in terms of staff turnover and long-term commitment to the field. This is understandable given salaries that too often are low and the lack of advancement options. Yet states have devised incentives for teachers to pursue additional training, remain

in the field, and build a stronger professional identity. North Carolina's TEACH program has offered wage supplements for pre-k teachers who complete strong doses of inservice training over the past 15 years. This effort has significantly improved teaching practices, but with less discernible effects on child outcomes.[33] The policy question is how do we incentivize teacher training and classroom practices that are empirically related to child outcomes?

Several states now advance similar models to incentivize professional advancement. California's Child Care Retention Incentive Program provides wage supplements to pre-k teachers and aides to engage two- and four-year college opportunities, provided that they stay in the early-childhood field. A recent study tracking 2,783 participants found significant positive effects in lowering staff turnover and (slowly) completing college-level courses.[34] Whether competencies are acquired that advance child development remains unknown.

Promising teacher-development models – such as CLASS and TEEM – fit well within statewide incentive efforts. Rather than creating new inservice training outside pre-k settings or relying on community colleges, these models provide a mentorship and training within pre-k classrooms (not out of context), and supplement the training with helpful assessment tools for ongoing reflection and improvement. At the same time, if linked to wage or professional-growth incentives, more programs and teachers are likely to engage comprehensive models like CLASS and TEEM.

The architects of TEEM mindfully tested core elements, then initially (in 2003) ramped-up modestly in 11 diverse Texas communities. They articulate a clear strategy for "going to scale" while guarding against any erosion in the quality of teaching and professional development activities. "The current intervention includes a highly specified framework… without scripting the program and flexibility that allows administrators' and teachers' input into implementation," writes Susan Landry and colleagues[35]. This strategy explicitly takes into account what's known about local implementation that's relevant and motivating across widely varying pre-k settings and the families they serve.

After seven years of small-scale development and testing of the TEEM model through clinical trials, the Children's Learning Institute at the University of Texas Medical School at Houston has now scaled-

up, taking the program across the state. The *Texas School Ready! Project*, TEEM's new brand, is implemented in more than 3,000 classrooms across 38 communities in 200 cities across the state, including public school, private child care, and federal Head Start centers. Central to the Texas School Ready! strategy is to form collaborative partnerships among these various programs within each local community. All types of early care and education settings are valued, and the model is sufficiently flexible to serve center and home-based programs. In this way, the local web of stakeholders and resources for young children are mobilized, and these programs become more keenly focused on quality improvement with the novel tools delivered by *Texas School Ready!* staff.[36]

The Virginia-based CLASS team began over a decade ago with extensive research inside pre-k classrooms, identifying teaching practices and interaction styles that yielded robust developmental effects for children. So, it's natural that going-to-scale for CLASS currently focuses more on classroom assessment tools, illuminating strengths and weaknesses for teachers, and then delivering professional development. At the same time, the CLASS team is studying which elements of the model pay off more for teachers and children.

Georgia offers an initial proving ground for the statewide implementation of the CLASS model. The classroom assessment is being conducted across 4,000-plus pre-k classrooms, a new thrust in the state's quality improvement effort. Georgia's early childhood agency has utilized other observation tools, aiming to better focus professional development activities. But the CLASS holds great appeal, given its emphasis on child-teacher interaction and the instructional organization of classrooms. Georgia's universal preschool program now serves over 84,000 children statewide, a little more than the *Texas School Ready! Project* serves across Texas.

Summary – Sticking to Guiding Principles

Several lessons are emerging from the new science on pre-k quality:

- The benefits of pre-k for children remain constrained by uneven levels of quality.
- Tightening state regulation of quality does not necessarily enrich learning inside classrooms.
- No "silver bullets" exist; no single change in policy or practice will lift classroom quality.
- Improving child-teacher relationships and enriching learning activities yield the most promising benefits for children, advancing cognitive and social development.
- New models of teacher development — focusing on candid assessment of practices, attention to relationships and instruction, and ongoing mentoring — can effectively be taken to a statewide scale.
- Steady research and development further advances the effectiveness of these promising models for pre-k teacher development.

We have seen how two states — Georgia and Texas — have moved from these empirical findings to build statewide strategies for lifting pre-k quality. Success depends upon building strong partnerships among local early-childhood leaders and the diverse array of organizations serving young children.

At the same time, the policy conversation must move beyond simply advocating for more state regulation. Minimal health and safety standards are essential for children's well-being. But advocates and policy makers must go further, recognizing that progress depends upon elevating the skills of teachers and enriching relationships and instruction inside classrooms.

Parents and taxpayers invest heavily in the development of young children. President Obama and a bipartisan array of governors support even stronger public investment. But the benefits felt by many young children attending pre-k programs remain limited by uneven quality. The rich policy discussion of pre-k should not impoverish local strategies. Instead, it can build from the new science on quality, focusing on caring and effective teachers.

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Fuller's most recent books speak to this intersection of pluralism on the ground and the universalist instincts of the state, including Inside Charter Schools (Harvard, 2000), Standardized Childhood (Stanford, 2007), and Government Confronts Culture (Taylor & Francis, 1999). His work on Latino families, parenting, and the role of early schooling appears in academic journals. Before coming to Berkeley, Fuller taught at Harvard University. He has served as a research sociologist at the World Bank and USAID, a legislative aide and education advisor to a California governor.

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