SECTION 2

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SECTION 2, CHAPTER 4

MAKING PREKINDERGARTEN CLASSROOMS BETTER PLACES FOR CHILDREN'S DEVELOPMENT

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In this paper, I review four classroom elements that my own work and many other studies have found to be related positively to children's outcomes in prekindergarten classrooms: teachers' listening to children, quality of instruction, emotional climate in the classroom, and level of children's engagement. These aspects of classroom functioning all involve interactions between children and teachers, and they are somewhat independent of both the curriculum and other structural features of the classroom. We need to develop practical observational tools to assess these behaviors so that we can improve the environments in which vulnerable young children learn.

In 2016, according to the National Center for Education Statistics, 66% of 4-year-old U.S. children not in kindergarten were enrolled in pre-primary programs. As in years past, higher-income families were more likely than lower-income families to enroll their children in center-based care. Children from higher-income families often attend privately operated center-based child care programs, while children from lower-income families are likely to be enrolled in publicly funded programs such as Head Start and, more recently, state-funded prekindergarten programs (McFarland et al., 2017).

One consequence of this division is that segregation of experiences by income begins in preschool. Moreover, privately and publicly funded programs have very different expectations and regulations. The fundamental motivation for the two sets of programs differs as well: private child care programs are more concerned with "care" and being of service to parents, while the public programs are more concerned with compensatory education to remediate presumed deficits in children's preparation for school. This desire to offer compensatory education can lead to a greater emphasis on academic preparation and to more prekindergarten programs in public schools. An academic emphasis can have the unfortunate consequence of increased reliance on the sort of didactic instruction that may not lead to long-term child success (Lipsey, Farran, & Durkin, 2018).

COMPENSATION ORIENTATION

Beginning in 1965 with Head Start, a number of public programs for young children before formal school entry focused on compensatory education (Farran, 2007; Scarr & Weinberg, 1986). This trend continued with a 1987 amendment to the Elementary and Secondary Education Act that allowed Title I funds to be used for whole-school program improvement, ushering in the creation of Title I–funded prekindergarten classes in many school districts (Ewen, Mezey, & Matthews, 2005). Although they are administered through different agencies, Head Start and Title I are similar in that neither was intended to provide full-day care; they usually operate on the same schedule as public schools. Although some programs offer before- or after-school care that working families may need, many do not.

Over time, as many states either have begun providing state funds for early intervention prekindergarten programs for children from low-income families or have started to coordinate sources of funding for these programs at the state level, the number of children served has increased. In 2016, most states were funding prekindergarten programs, and a few were offering universal prekindergarten for all 4-year-olds (Barnett et al., 2017). These state-funded programs are primarily intended as compensatory education for children from poor families; all but a few of the states have income requirements for enrollment.

An ethical commitment to using education to remediate or prevent the effects of poverty was put into action in the late 1950s and early 1960s with a number of small experimental programs focused on young children from poor families (Darlington, Royce, Snipper, Murray, & Lazar, 1980). A belief in the efficacy of early education intervention remains a driving force behind the growth in prekindergarten programs (see Parker, Workman, & Atchison, 2016), as more recent data indicate that poverty is still associated with long-term poor school outcomes starting at kindergarten entry (Reardon, 2011).

Since their inception, however, the long-term effectiveness of these small experimental pre-school programs has been debated. Four decades ago, Darlington, Lazar, and others recruited eight of these early experimental programs, including the Perry Preschool Project, and organized a follow-up investigation of their effects (Darlington et al., 1980). The results of their work continue to shape expectations for prekindergarten programs today. They found that the large effects seen on tests given immediately after the programs faded over the next three to four years. However, they found longer-term effects on what they termed "meeting the requirements of school"; that is, students from these programs avoided both special education placement and grade retention at higher rates than did students who had not participated in such programs; the reduction in special education placement was the more robust finding. Expectations of decreased retention and lower use of special education services are featured in such current initiatives as Pay for Success, a program seeking private investment in prekindergarten programs (Isaacs, Massey, & Kreeger, 2016).

Perry Preschool, which began in 1962, is now referred to as a model. The other model frequently cited as evidence for the positive effects of prekindergarten is the Abecedarian program, which began in 1972. The long-term effects from these two programs are the ones most often cited to argue that cost savings will result from extensive investments in preschool (e.g., Heckman, 2006). Both programs served a small number of African American children from low-income families in a single location. Neither has been implemented in any version of a scaled-up statewide program. Each would cost much more per child than any state currently allocates. In today's dollars, Perry would cost $20,000 per child per year, and Abecedarian would cost between $16,000 and $40,000 (Minervino & Pianta, 2014). Moreover, these programs had features that are unlikely to be duplicated. For example, Abecedarian began when children were 6 weeks old, continued until kindergarten, and provided full-day care for 50 weeks of the year; Perry had a 1:7 teacher-child ratio and required that teachers conduct 90-minute weekly visits with families.

These model programs are also hard to replicate because it is not clear which of their components led to the effects. The most robust long-term outcomes for Abecedarian were positive health effects once the children became adults (Conti, Heckman, & Pinto, 2017). This is not surprising, given that two pediatricians and two nurse practitioners were housed in the same building as the preschool, on the same floor as the infant and toddler classrooms. We know less about other components of the treatment offered by the model programs. The HighScope curriculum emerged from the Perry Preschool program but was not solidified until some years after Perry was implemented (Weikart, 2004). Many of the early programs followed a general enrichment philosophy, providing an environment with lots of materials and caring adults. Abecedarian was a pioneer in group care for infants and toddlers, and the staff created a set of activities for teachers to follow with the youngest children (Sparling & Lewis, 1979).

Even when programs are well defined, have a coherent vision, and have more recent evidence of effectiveness, there are problems taking them to scale (Granger, 2011). In the case of statewide prekindergarten programs, for example, states are trying to scale up an idea, not a well-tested practice (Mitchell, 2001). The idea is that an intervention provided to poor children before kindergarten entry will change their developmental trajectories in major, positive ways, both immediately and into adulthood. Less well defined are the exact processes through which that intervention should be carried out.

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Having the goal of helping children from poor families be successful in school does not really constitute a vision for prekindergarten program practices (Farran, 2017). All states and the District of Columbia have adopted early learning standards for their state-funded prekindergarten programs (DeBruin-Parecki & Slutzky, 2016). These standards are meant to create a bridge between the prekindergarten and the K-12 system, driving and focusing instruction. Learning outcomes can be achieved in a variety of ways, and the standards do not dictate specific practices. States typically set other general requirements for districts that receive state funding to run prekindergarten classrooms. They must meet a certain adult-child ratio, implement a curriculum chosen from an array of possibilities, provide meals for the children and, in some states, provide a certain number of "hours of instruction." These types of requirements are known as structural features; I will review them next along with alternative indicators.

CLASSROOM QUALITY INDICATORS

▶ Structural characteristics

Programmatic structural characteristics are the easiest to regulate and monitor, and this is where child care quality rating and improvement systems, Head Start programs, and publicly funded state prekindergarten programs overlap the most. Benchmarks specified by the National Institute for Early Education Research (NIEER), which many states use in expanding state funded prekindergarten programs, have historically emphasized these regulatory features. None of these benchmarks—for example, level of teacher education and number of formal degrees—relates to child outcomes either collectively or separately (Early et al., 2007; Mashburn et al., 2008). A recent thorough investigation of credentialing and early childhood education coursework for teachers (Lin and Magnuson, 2018) found negative effects on classroom quality and child outcomes if teachers had only a high school degree and no early childhood education coursework. However, they found no variation in quality linked to the higher end of preparation—that is, having a bachelor's degree and taking many early childhood education courses. Belief in teacher preparation as a key to providing better classrooms with better outcomes persists, however; new Head Start regulations specified in the 2007 reauthorization of the program required that at least 50% of all Head Start teachers have a bachelor's degree by 2013. Many but not all state prekindergarten programs require a teacher to have a B.A. and to be certified.

> **Without measurable alternatives, scaled-up early childhood programs have little guidance for creating quality classrooms, despite calls for the early childhood policy field to focus more on increasing quality.**

What makes these structural characteristics so appealing to law- and policymakers is that they are concrete and measurable: for example, if the rule is a 10:1 child to teacher ratio for 4-year-olds' classrooms, programs can implement that and regulators can check on it. Even though these features are unrelated to children's outcomes, without measurable alternatives, scaled-up early childhood programs have little guidance for creating quality classrooms, despite calls for the early childhood policy field to focus more on increasing quality (Hamre, 2014).

▶ Early childhood curricula

Many quality rating and improvement systems, the NIEER benchmarks, and state-funded prekindergarten programs require a specified curriculum. Many states have lists of curricula that programs can choose; they range greatly both in content and pedagogical strategies (Farran & Lipsey, 2016). When it established its Preschool Curriculum Evaluation Research Consortium in 2001, the Institute of Education Sciences energized the belief that curricula could encompass both the content to be taught and the approaches to learning important for children's growth.

This large experimental research endeavor found few differences in children's outcomes among the curricula assessed or between using a formal curriculum and conducting early childhood classrooms as usual (Preschool Curriculum Evaluation Research Consortium, 2008). The few short-term differences found were positive effects for more targeted curricula—specifically for the outcomes on which they were focused.

Researchers continue to assert the relative advantage of a targeted curriculum over a more global one (the latter often termed "developmental") (Coley, Votruba-Drzal, Collins & Cook, 2016; Nguyen, 2016). However, even targeted curricular approaches often fail to demonstrate effectiveness. The recent large-scale randomized controlled trial of the Building Blocks preschool mathematics curriculum in New York City found few positive effects compared to control classrooms at the end of the prekindergarten year (Mattera, Jacob, & Morris, 2018). Similarly, another comprehensive review identified few targeted approaches with positive effects that lasted into kindergarten (Chambers Cheung, & Slavin, 2016).

One reason that such curricula may have only short-term effects on the skills they target is that they do not change more fundamental classroom practices. Though teachers may conduct very different activities, as with the Tools of the Mind curriculum, their interactions with their students, the amount of positive feedback they give, and even the amount of time they spend talking and listening to children may be equivalent across different curricula (Nesbitt, Farran, & Fuhs, 2015). Importantly, those interactive elements are the classroom practices linked to children's outcomes in various domains and across curriculum conditions. By itself, no curriculum is likely to effectively or sufficiently drive the kinds of classroom practices that matter most for young children.

▶ Process characteristics

So what should early childhood classrooms, especially scaled-up prekindergarten classrooms, focus on to encourage quality learning? Burchinal reviews global ratings of classroom practices elsewhere in this volume; her research and several other reviews have consistently found little relation between global measures of classroom quality and how children develop over the prekindergarten year. Experimental and descriptive work is currently being done in prekindergarten classrooms to identify more specific behavioral practices as an alternative to such global ratings (e.g., Farran, Meador, Christopher, Nesbitt, & Bilbrey, 2017). Many of the practices identified are components of such global instruments as the Classroom Assessment Scoring System (CLASS; Pianta, La Paro, & Hamre, 2008), but this new research disaggregates them from an overall rating of a dimension. Moreover, these approaches are often counts of certain behaviors rather than ratings. A record of the frequency of actual behaviors may offer coaches a clearer way to understand how to help teachers improve their practices.

The work reported by my colleagues and I (Farran, Meador, Christopher, Nesbitt, & Bilbrey, 2017) is the result of my four-year partnership among myself, a group of researchers in the Peabody Research Institute at Vanderbilt

University, and the Metro Nashville Public Schools. This work derived from an observation system developed for research purposes in the 1990s (Farran, Silveri, & Culp, 1991). Highly trained and reliable observers remained in classrooms for a full day, taking data throughout the day, several times a year. The system yielded important information about practices that mattered most for young children's growth over the year and even into kindergarten and first grade. The practices determined to be important for children's growth over the preschool year came to be called "the Magic 8" by teachers and coaches in the school system. The appendix contains an example of how one of the practices, reducing transitions, was translated into a tool for coaches to use in our continuing partnership with the district.

Four areas among the eight—teachers' listening to children, quality of instruction, positive climate, and child engagement—have also been investigated and found promising in several other studies.

> *Teachers' listening to children matters more than their talking to them.* Language development, and specifically vocabulary, has been one of the hardest areas to improve in early childhood classrooms. In general, however, few links have been found between teacher talk and child outcomes. Our research has shown that the amount of time teachers spent listening to children was actually the stronger predictor of children's growth. While our various studies involving observations of teacher talk show that teachers routinely talk 70% of the time on average, and some talk even more, they spend only about 14% of their time listening to children, on average. Variations in that proportion were important— the more listening teachers did, the more children gained in both academic and social domains. Interestingly, in Dickinson and Porche's (2011) longitudinal study from prekindergarten to fourth grade, it was the ratio of teacher talk to child talk during free play that related to positive outcomes for both kindergarteners and fourth graders. A more even ratio indicated more actual conversations, in which teachers listened to children as well as talked.

> In a very complex analysis of the linguistic environment in prekindergarten classrooms (Justice, Jiang, & Strasser, 2018), teachers' linguistic responsiveness—specifically, their facilitation of children's communication—was the only language dimension associated with children's gains in vocabulary. CLASS ratings, also collected, were not related to child outcomes. Justice and colleagues (2018) concluded that rather than trying to improve the global nature of a preschool classroom through such measures as CLASS, "professional development efforts provided to early educators should focus most intensively on helping them to both elevate and execute the precise, proximal behaviors that serve to engage children in productive conversations" (p. 89). They used transcripts of interactions with children to describe many dimensions of teacher language; their analysis indicated that teacher language, including grammatical complexity and linguistic diversity, was not related to children's gains across the year. Only the teachers' verbal interactions with and encouragement of children's language contributions mattered.

One issue with investigating the effects of teacher language may be the emphasis on teacher talk. Most research focuses on analyzing components of teacher language such as the richness and type of language the teacher uses in such activities as book reading. Books and literature constitute one obvious way to introduce varied and more complex vocabulary to children. Thus, many researchers have devoted considerable effort to investigating whether various strategies for book reading might be an effective mechanism for effecting gains in children's language development. One thorough review of book reading's effects concluded that the variation among the studies was too great to yield many recommendations for practice (Wasik, Hindman, & Snell, 2016).

The teacher's quality of instruction is as important as the student's acquisition of basic skills. "Productive conversations," especially teachers' asking questions and listening to children's answers, are components of a more general factor related to the quality of instruction. In a recent book, William Gormley (2017) makes a persuasive argument that encouraging critical thinking through inferential teacher-student interactions may be one of the most important experiences in helping children be successful. He also argues that children from disadvantaged backgrounds are less likely to have these kinds of experiences.

An extensive reanalysis of data from the State-Wide Early Education Programs Study and the National Center for Early Development and Learning Multi-State Study of Prekindergarten found that children from poor families were more likely to experience didactic teaching in prekindergarten classrooms (Valentino, 2017). Didactic teaching is characterized by "known-answer" questions, or "basic concepts" (Farran et al., 2017), such as "What color is this?" and "What letter is this?" Valentino (2017) has suggested that "while there is some evidence that directive instruction could actually improve achievement and narrow achievement gaps in the short term . . . , it is arguable that such an approach is still unfavorable in the long term" (p. 29). Indeed, results from a randomized controlled trial evaluation of the statewide Tennessee Voluntary Prekindergarten program support this hypothesis; despite significantly improved achievement upon entering kindergarten, by the third grade, children who had attended prekindergarten programs, primarily in the public schools, were performing less well than children who had not attended (Lipsey et al., 2018).

Quality of instruction has proven extremely difficult to change; in our four-year study, we were unable to change the level of instruction beyond an average of 1.9 on a 4-point scale. Our observational coding system, Teacher Observation in Preschool (TOP, Bilbrey, Vorhaus & Farran, 2007, revised in 2014) records instances of teacher instruction, defined in early childhood settings as any time teachers are engaged with children around a learning focus. In an early childhood classroom, this could include singing songs and helping with pasting and gluing, as well as reading books and practicing counting, among other activities.

When the teachers' task was coded as "instruction," the instructional level was rated on a scale from 1 to 4. Our definition of instructional quality is derived from research conducted by Tizard and colleagues (1980) and confirmed by classroom observations reported by Durden and Dangel (2008) and Hayes and Matusov (2005). A rating of 1 meant that a teacher was working with materials but not specifically teaching content (e.g., sprinkling glitter); a rating of 2 indicated basic skills instruction (e.g., "What color is the glitter?"); a rating of 3 indicated some inferential instruction, with the teacher asking at least one open-ended question ("This glue is sticky. What else is sticky?"); and a rating of 4 indicated a high degree of inferential instruction, in which the teacher used open-ended questions to sustain focus on a topic that resulted in several conversational turns between teacher and children (a discussion of multiple sticky things). Hayes and Matusov (2005) similarly defined conversational partnerships—our levels 3 and 4—as verbal exchanges of genuine inquiries, where the teacher does not know the answer ahead of time. They found these types of exchanges to be rare in classrooms for young children.

> **For more inferential (higher-quality) interactions to take place, teachers have to create interesting learning activities that stimulate children's thinking.**

The rating of 1.9—which we found in all four years of our partnership work with 26 classrooms—is characteristic of instruction at a basic skills level. For more inferential (higher-quality) interactions to take place, teachers have to create interesting learning activities that stimulate children's thinking. They have to interact with children for longer than one conversational round, and they have to be genuinely interested in the sense that children are making of the world (Durden & Dangel, 2008). These kinds of interactions are difficult if not impossible to carry out during whole group instruction, a common pedagogical practice in these classrooms, and teachers were not observed using center times or small groups as opportunities to initiate higher-level instructional interactions. From their observations in similar classrooms, Darden and Dangel concluded:

When the kind of activity is (a) guided rather than directed by the teacher, (b) authentic, and (c) exploratory, then the teachers' language changes. In these circumstances, the teacher's language (a) is more open-ended, (b) uses higher cognitive demands, and (c) includes functions such as encouraging thinking, making the nature of the conversation more child-initiated, reciprocal and genuine (p. 261).

Unfortunately, it would be difficult to help teachers create these kinds of authentic learning opportunities in many of the early childhood classrooms we have observed. Perhaps teachers interpret the increased focus on academic preparedness for kindergarten to mean that they should continually and specifically direct student learning. Engaging children in open-ended inquiry might seem counterproductive to the school readiness goal. In our partnership, we made little progress in this area despite working on it for four years.

Positive classroom climates promote learning, and the importance of a positive learning environment cannot be overestimated, especially for young, vulnerable children who may be having their first educational experience in a formal setting. The classroom climate is particularly important for at-risk children, who typically have had a higher than average number of adverse childhood experiences. To promote resiliency in such children, the classroom must promote a sense of belonging, with caring and nurturing adults (Sciaraffa, Zeanah, & Zeanah, 2017). A highly negative classroom can actually function as an additional adverse experience, contributing to rather than buffering the cumulative stress that results in long-term negative health and social outcomes.

Barbara Fredrickson's broaden-and-build theory of positive emotions asserts that a mindset broadened by positive approvals is linked to discovery—"discovery of new knowledge, new alliances, and new skills" (2013, p. 815)—the kinds of discoveries likely to be important for longer-term school success. Harsh, demanding environments can lead to increased immediate learning of concrete skills but not to the fostering of connections among ideas or to the delight in solving problems that are so important for learning in depth. In early childhood classrooms, children are also developing expectations for what being a student means and how learning occurs, and those expectations can color their attitudes toward school for years.

Other studies have also shown that a positive emotional climate is an important contributor to children's growth, especially their social-emotional development. At the end of prekindergarten, children who had been in classrooms with the "warmest" profile were rated the most socially competent (Curby et al., 2009). In a study of 60 prekindergarten classrooms in Tennessee and North Carolina, more teacher approvals, fewer disapprovals, and a more positive teacher emotional tone were collectively related to gains in children's self-regulation (executive function) skills over the prekindergarten year (Fuhs, Farran, & Turner, 2013). In our partnership observations, the same constellation of behaviors was linked to children's gains in academic areas as well. In more positive classrooms, children learned more across the year (Farran et al., 2017).

Recent neurological investigations of brain development in young children from differing socioeconomic backgrounds have found early and alarming differences among children from high-poverty backgrounds in brain regions related to language, memory, executive functioning and socioemotional processing (Ursache & Noble, 2016). These differences were apparent at three years of age. Ursache and Noble (2016) have posited that a causal factor is the stress young children experience in low-income families and neighborhoods. Experiencing frequent disapproval of their behavior in the classroom adds to that stress. In a study of the emotional climate in 139 classrooms serving children from low-income families, recently funded by the Preschool Development Grant Expansion, Durkin and I found high rates of

behavior disapproval—about three times the rate of approval (Farran and Durkin, 2017). Disapproval was especially frequent in classrooms in older public-school buildings without close bathroom or meal facilities. In those types of facilities, the amount of time spent in transitions or down time was greatly increased, and more time in transition was linked to more negative behavioral control (Farran and Durkin, 2017).

The effects of a positive or negative prekindergarten classroom extend into the early grades of school. Two longitudinal studies have demonstrated that the emotional climate of the prekindergarten classroom affects children's social skills into kindergarten and first grade (Broekhuizen et al., 2016; Spivak & Farran, 2016). Reducing behavior disapproval and increasing positive interactions will likely require intense coaching and intervention, as the levels of disapproval are currently quite high in most public prekindergarten classrooms.

Children's active engagement in learning is key, and engagement should not be confused with compliance. Children can be quiet and nondisruptive without being engaged. When children are actively involved in learning, they can be noisy (in a productive way). When young children are engaged, they are excited and highly attentive to the learning activity. Engagement is intertwined with all the other components described so far. For example, the level of positive emotional support in a classroom predicted children's level of classroom engagement (Castro, Granlund, & Almqvist, 2017).

Children's active engagement varies across classroom activities. When my colleagues and I observed children in the 26 prekindergarten partnership classrooms (Farran et al., 2017), we found a generally low level of engagement, particularly during whole group instruction. Greater engagement was observed during center-based activities. These findings were echoed in a study of Portuguese pre-schools that also served low-income children; engagement (or involvement) in learning was relatively low for all children (Coelho & Pinto, 2016). Powell and colleagues (2008) carried out extensive research on children's involvement in learning in an "eco-behavioral" investigation. Children were most engaged when teachers were positively affirming and children were with a peer group; they were least engaged during whole group instruction. Vitiello and colleagues (2012) found similar associations between context and child engagement; children were more engaged in situations that gave them some choice over their activities and learning processes.

These findings are important because children in prekindergarten classrooms spend quite a lot of time in whole group instruction and other activities such as transitions where they are under the direction of the teacher. The academic and basic skills orientation of a classroom is linked to greater reliance on whole group instruction and much less to discovery learning. Yet discovery learning is most likely to engage children's attention and keep them focused and involved. Setting up situations where children can be productively engaged in interesting activities requires teachers to act differently as well as to abandon their current understanding of learning.

CONCLUSION

Only recently has public education expanded to offer classrooms for 4-year-olds (McCabe & Sipple, 2011), often housed in public elementary schools. This extension of public education into the prekindergarten years for children from low-income families means that for many children, early childhood settings are now their first introduction to the world of more formal learning and to learning in a group. These early experiences are critical for establishing learning and dispositional patterns that may affect children's interactions with classrooms for many years. The transition to more public school prekindergarten classrooms has happened at the same time that the goal of kindergarten readiness has increasingly come to mean a focus on the mastery of concrete basic skills. Those skills are the very ones most likely to fade quickly in importance in the early grades (Bailey et al., 2016). The kinds of practices outlined in this chapter should be linked both to the mastery of basic skills and to developing more lasting dispositions to learning that will not fade.

In most states, scaled-up publicly funded prekindergarten programs target children from low-income families. Targeting has the unintended consequence of segregating children by income and often by race in their earliest school experience. School districts face a dilemma. They want to place prekindergarten classrooms where the need is—in neighborhoods with a high proportion of poor families and also in underperforming, high-poverty schools—because they believe that better prekindergarten preparation will help children succeed. Such classrooms, housed in buildings not set up for young learners, may then be highly stressful for both teachers and children, leading to more difficult interactions for the children (Gilliam & Reyes, 2018) and unanticipated long-term negative effects on later learning (Lipsey et al., 2018).

Recently, prekindergarten programs have begun moving away from a reliance on regulatory structural features to an emphasis on classroom processes. Yet we lack reliable, easily administered, valid measures for assessing classroom process quality. Many of the quality rating systems that states use, as well as those of current Head Start regulations, include a requirement that classrooms be observed with a rating system like the revised Early Childhood Environment Rating Scale or CLASS. These ratings can be consequential, causing Head Start programs to have to compete again and determining the number of "stars" a private program will receive in a state evaluation. Unfortunately, neither of the most commonly used systems has been shown to predict children's academic or social-emotional growth (Burchinal, 2017).

More recent efforts have focused on specifying the types of classroom interactions that are likely to be most important for children, primarily through behavioral counts instead of ratings. Those efforts have been reported here. They have led to the identification of a number of specific classroom practices that are beneficial for children's learning. The observational system used in the research is not easily exported for use by coaches, principals, or prekindergarten directors. It is complex and requires extensive training. However, the findings can be used to construct more practical and easy-to-use measures. Advances in the digital age should facilitate the collection of critical classroom information. As prekindergarten programs expand, it will become increasingly important to have a system that is practical and can be readily used by coaches, early childhood directors, and principals to assure that children's experiences in these settings are positive and likely to produce long-term benefits.

References

Bailey, D. H., Nguyen, T., Jenkins, J. M., Domina, T., Clements, D. H., & Sarama, J. S. (2016). Fadeout in an early mathematics intervention: Constraining content or preexisting differences? *Developmental Psychology, 52*(9), 1457-69. https://doi.org/10.1037/dev0000188

Barnett, S., Friedman-Krauss, A., Gomez, R., Weisenfeld, G., Horowitz, M., Kasmin, R., & Squires, J. (2017). *The state of preschool 2016: State preschool yearbook.* New Brunswick, NJ: Rutgers University, National Institute for Early Education Research.

Bilbrey, C., Vorhaus, E., & Farran, D. (2007, revised, 2014). Teacher Observation in Preschool [Unpublished scale]. https://my.vanderbilt.edu/mnpspartnership/research-resources/methods-and-measures

Broekhuizen, M., Mokrova, I., Burchinal, M., Garrett-Peters, P., & Family Life Project Key Investigators. (2016). Classroom quality at pre-kindergarten and kindergarten and children's social skills and behavior problems. *Early Childhood Research Quarterly, 36*(3), 212-222. https://doi.org/10.1016/j.ecresq.2016.01.005

Burchinal, M. (2017, April). Challenges in using widely used observational quality ratings. In M. Burchinal (Chair), *Measuring quality in early childhood education: Issues and promising new instruments* [Symposium]. Biennial Conference of the Society for Research in Child Development, Austin, TX.

Castro, S., Granlund, M., & Almqvist, L. (2017). The relationship between classroom quality-related variables and engagement levels in Swedish preschool classrooms: A longitudinal study. *European Early Childhood Education Research Journal, 25*(1), 122-135. http://dx.doi.org/10.1080/1350293X.2015.1102413

Chambers, B., Cheung, A., & Slavin, R. (2016). Literacy and language outcomes of comprehensive and developmental-constructivist approaches to early childhood education: A systematic review. *Educational Research Review, 18*, 88-111. https://doi.org/10.1016/j.edurev.2016.03.003

Coelho, V., & Pinto, A. I. (2016, June 8-10). Child engagement and interactive processes in inclusive preschool settings [Paper presentation]. International Society on Early Intervention 2016 Conference, Stockholm, Sweden.

Coley, R., Votruba-Drzal, E., Collins, M., & Cook, K. (2016). Comparing public, private, and informal preschool programs in a national sample of low-income children. *Early Childhood Research Quarterly, 36*(2), 91-105. https://doi.org/10.1016/j.ecresq.2015.11.002

Conti, G., Heckman, J., & Pinto, R. (2016). The effects of two influential early childhood interventions on health and healthy behavior. *The Economic Journal, 126*(596), F28-F65. https://doi.org/10.1111/ecoj.12420

Curby, T., LoCasale-Crouch, J., Konold, T., Pianta, R., Howes, C., Burchinal, M., . . . Barbarin, O. (2009). The relations of observed prekindergarten classroom quality profiles to children's achievement and social competence. *Early Education and Development, 20*(2), 346-372.

Darlington, R., Royce, J., Snipper, A., Murray, H., & Lazar, I. (1980). Preschool programs and later school competence of children from low-income families. *Science, 208*(4440), 202-204.

DeBruin-Parecki, A. & Slutzky, C. (2016). *Exploring prekindergarten age 4 learning standards and their role in early childhood education: Research and policy implications.* Policy Information Report and ETS Research Report Series no. RR-16-14. Princeton, NJ: Educational Testing Service.

Dickinson, D., & Porche, M. (2011). Relation between language experiences in preschool classrooms and children's kindergarten and fourth-grade language and reading abilities. *Child Development, 82*(3), 870-886. https://doi.org/10.1111/j.1467-8624.2011.01576.x

Durden, T., & Dangel, J. (2008). Teacher-involved conversations with young children during small group activity. *Early Years, 28*(3), 251-266. https://doi.org/10.1080/09575140802393793

Early, D., Maxwell, K., Burchinal, M., Alva, S., Bender, R., Bryant, D., . . . Zill, N. (2007). Teachers' education, classroom quality, and young children's academic skills: Results from seven studies of preschool programs. *Child Development, 78*(2), 558–580. https://doi.org/10.1111/j.1467-8624.2007.01014.x

Ewen, D., Mezey, J., & Matthews, H. (2005). *Missed opportunities? The possibilities and challenges of funding high-quality preschool through Title I of the No Child Left Behind Act.* Washington, DC: Center for Law and Social Policy.

Farran, D. C. (2007). Is education the way out of poverty? A reflection on the 40th anniversary of Head Start (with commentaries by James King and Bernard L. Charles). *Monographs of the Center for Research on Children's Development and Learning* (University of South Florida), no. 3.

Farran, D. C. (2017). Characteristics of pre-kindergarten programs that drive positive outcomes. In K. Dodge (Ed.), *The current state of scientific knowledge on pre-kindergarten effects* (pp. 45-50). Durham, NC: Center for Child and Family Policy, Duke University.

Farran, D. C., & Durkin, K. (2017). Prekindergarten classrooms in the public school buildings: Consequences and concerns [Unpublished manuscript]. Peabody College, Vanderbilt University.

Farran, D. C., & Lipsey, M. W. (2016). Evidence for the benefits of state prekindergarten programs: Myth & misrepresentation. *Behavioral Science & Policy, 2*(1), 9-18.

Farran, D. C., Meador, D., Christopher, C., Nesbitt, K., & Bilbrey, L. (2017). Data-driven improvement in prekindergarten classrooms: Report from a partnership in an urban district. *Child Development, 88*(5), 1466-1479. https://doi.org/10.1111/cdev.12906

Farran, D. C., Silveri, B., & Culp, A. (1991). Public school preschools and the disadvantaged. In L. Rescorla, M. Hyson & K. Hirsh-Pasek (Eds.), *Early academics: Challenge or pressure?* (pp. 65-73). New Directions for Child Development Source Book. San Francisco: Jossey-Bass.

Fredrickson, B. (2013). Updated thinking on positivity ratios. *American Psychologist, 68*(9), 814-822. https://doi.org/10.1037/a0033584

Fuhs, M., Farran, D. C., & Turner, K. (2013). Preschool classroom processes as predictors of children's cognitive self-regulation skills development. School *Psychology Quarterly, 28*(4), 347-359. https://doi.org/10.1037/spq0000031

Gormley, W. (2017). *The critical advantage: Developing critical thinking skills in school.* Cambridge, MA: Harvard Education Press.

Gilliam, W., & Reyes, C. (2018). Teacher decision factors that lead to preschool expulsion: The development and preliminary validation of the Preschool Expulsion Risk Measure. *Infants and Young Children, 31*(2), 93-108. http://dx.doi.org/10.1097/IYC.0000000000000113

Granger, R. C. (2011). The big why: A learning agenda for the scale-up movement. *Pathways* (Winter), 28–32.

Hamre, B. (2014). Teachers' daily interactions with children: An essential ingredient in effective early childhood programs. *Child Development Perspectives, 8*(4), 223-230. https://doi.org/10.1111/cdep.12090

Hayes, R., & Matusov, E. 2005. Designing for dialogue in place of teacher talk and student silence. *Culture and Psychology, 11*(3), 339-357.

Heckman, J. (2006). Skill formation and the economics of investing in disadvantaged children. *Science, 312*(5782), 1900-1902.

Isaacs, J., Massey, M., & Kreeger, A. (2016). *Executive summary: Pay for Success early childhood education toolkit.* Washington, DC: Urban Institute. https://pfs.urban.org/library/ecetoolkit/content/executive-summary-pay-success-early-childhood-education-toolkit

Justice, L., Jiang, H., & Strasser, K. (2018). Linguistic environment of preschool classrooms: What dimensions support children's language growth? *Early Childhood Research Quarterly, 42*(1), 79-92. http://dx.doi.org/10.1016/j.ecresq.2017.09.003

Lin, Y.-C., & Magnuson, K. (2018). Classroom quality and children's academic skills in child care centers: Understanding the role of teacher qualifications. Early Childhood Research Quarterly, 42(1), 215-227. http://dx.doi.org/10.1016/j.ecresq.2017.10.003

Lipsey, M., Farran, D. C., & Durkin, K. (2018). Effects of the Tennessee prekindergarten program on children's achievement and behavior through third grade. Early Childhood Research Quarterly, 45(4), 155-176. https://doi.org/10.1016/j.ecresq.2018.03.005

Mashburn, A., Pianta, R., Hamre, B., Downer, J., Barbarin, O., Bryant, D., . . . Howes, C. (2008). Measures of classroom quality in prekindergarten and children's development of academic, language, and social skills. Child Development, 79(3), 732-749.

Mattera, S., Jacob, R., & Morris, P. (2018). Strengthening children's math skills with enhanced instruction. The impacts of Making Prekindergarten Count and High 5's on kindergarten outcomes. New York: MDRC. https://www.mdrc.org/sites/default/files/MPC-High_5s_Impact_FR_0.pdf.

McCabe, L., & Sipple, J. (2011). Colliding worlds: Practical and political tensions of prekindergarten implementation in public schools. Educational Policy, 25(1), e1-e26. https://doi.org/10.1177/0895904810387415

McFarland, J., Hussar, B., de Brey, C., Snyder, T., Wang, X., Wilkinson-Flicker, S., . . . Hinz, S. (2017). The Condition of Education 2017 (NCES 2017-144). U.S. Department of Education. Washington, DC: National Center for Education Statistics. https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2017144

Minervino, J., & Pianta, R. (2014, September). Early learning: The new fact base and cost sustainability. In J. Minervino (Ed.), Lessons from research and the classroom (pp. 8-20). Seattle, WA: Bill and Melinda Gates Foundation.

Mitchell, A. (2001, July). Prekindergarten programs in the States: Trends and issues. (ED454948). ERIC. https://eric.ed.gov/?id=ED454948

Nesbitt, K., Farran, D. C., & Fuhs, M. (2015). Executive function skills and academic achievement gains in prekindergarten: Contributions of learning-related behaviors. Developmental Psychology, 51(7), 865-878. http://dx.doi.org/10.1037/dev0000021

Nguyen, T. (2016, September). Impacts of targeted and global preschool curricula on children's school readiness: A meta-analytic review (Working paper). University of California, Irvine.

Parker, E., Workman, E., & Atchison, B. (2016, January). 50 state review: States prekindergarten funding for 2015-16 fiscal year. Denver, CO: Education Commission of the States.

Pianta, R.C., La Paro, K., & Hamre, B. (2008). Classroom Assessment Scoring System (CLASS) manual, prekindergarten. Baltimore, MD: Paul Brookes.

Powell, D., Burchinal, M., File, N., & Kontos, S. (2008). An eco-behavioral analysis of children's engagement in urban public school preschool classrooms. Early Childhood Research Quarterly, 23(1), 108-123. https://doi.org/10.1016/j.ecresq.2007.04.001

Preschool Curriculum Evaluation Research Consortium (2008). Effects of preschool curriculum programs on school readiness. NCER 2008-2009. Washington, DC: U.S. Government Printing Office.

Reardon, S. (2011). The widening academic achievement gap between the rich and the poor: New evidence and possible explanations. In G. Duncan & R. Murnane, (Eds), Whither opportunity? Rising inequality, schools, and children's life chances (pp. 91-116). New York: Russell Sage Foundation.

Scarr, S., & Weinberg, R. (1986). The early childhood enterprise: Care and education of the young. American Psychologist, 41(10), 1140-1146.

Sciaraffa, M., Zeanah, P., & Zeanah, C. (2018). Understanding and promoting resilience in the context of adverse childhood experiences. Early Childhood Education Journal, 46(3), 343-353. https://doi.org/10.1007/s10643-017-0869-3

Sparling, J., & Lewis, I. (1979). Learning games for the first three years: A guide to parent-child play. New York: Walker.

Spivak, A., & Farran, D. C. (2016). Predicting first graders' social competence from their pre-school classroom interpersonal context. *Early Education and Development, 27*(6), 735-750. https://doi.org/10.1080/10409289.2016.1138825

Tizard, B., Hughes, M., Pinkerton, G., & Carmichael, H. (1982). Adults' cognitive demands at home and at nursery school. *Journal of Child Psychology and Psychiatry, 23*(2), 105-116. https://doi.org/10.1111/j.1469-7610.1982.tb00056.x

Ursache, A., & Noble, K. (2016). Neurocognitive development in socioeconomic context: Multiple mechanisms and implications for measuring socioeconomic status. *Psychophysiology, 53*(1), 71-82. https://doi.org/10.1111/psyp.12547

Valentino, R. (2017). Will public prekindergarten really close achievement gaps? Gaps in prekindergarten quality between students and across states. *American Educational Research Journal, 55*(1), 79-116. https://doi.org/10.3102/0002831217732000

Vitiello, V., Booren, L., Downer, J., & Williford, A. (2012). Variation in children's classroom engagement throughout a day in preschool: Relations to classroom and child factors. *Early Childhood Research Quarterly, 27*(2), 210-220. https://doi.org/10.1016/j.ecresq.2011.08.005

Wasik, B., Hindman, A., & Snell, E. (2016). Book reading and vocabulary development: A systematic review. *Early Childhood Research Quarterly, 37*(4), 39-57. https://dx.doi.org/10.1016/j.ecresq.2016.04.003

Weikart, D. (2004). *How High/Scope grew: A memoir.* Ypsilanti, MI: High/Scope Press.

Appendix

Reducing time spent in transition: What is a transition?

A "transition" is a prolonged period in which most of the class is not involved in a learning activity.
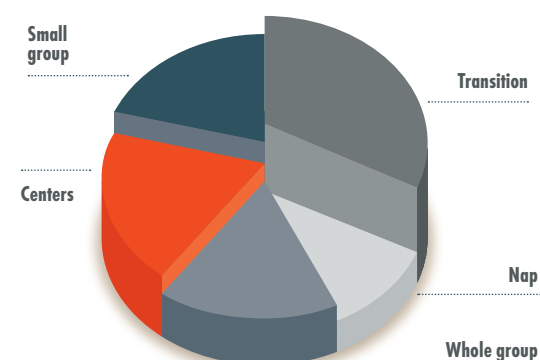

Common Types of Transitions

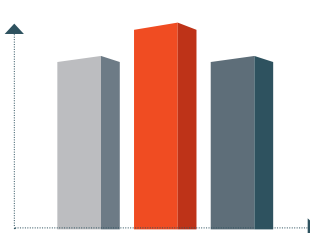Breaks when **one activity has ended but another has not yet begun.**

Interruptions of activities that result from teachers **gathering materials or correcting behavior.**

Times that children can't begin an activity because they are **awaiting instructions or materials.**

Times that children are **moving to a new location** (i.e., going outside, lining up for restroom breaks)

Think of the time spent in a classroom as a pie chart in which every moment is accounted for. If a large "slice" of the day is spent transitioning, less time is available for other learning activities.

Small group
Transition
Centers
Nap
Whole group

Reducing time spent in transition leads to:

1. Fewer instances of problem behavior.
2. Higher levels of involvement in learning.
3. **More time available for instruction.**

Data collected in MNPS Early Learning Center classrooms showed a strong relationship between time spent in instructional activities and children's achievement grains.

Certain parts of the day are beyond the teacher's control (e.g., how far the class needs to travel to the playground or the cafeteria). Intentional planning of transitions allows you to create routines that accommodate the classroom schedule and student needs.

Some transition time during the day is both normal and necessary—the goals for reducing transitions should be to:

1. Decrease the overall "wait time" between activities whenever possible.
2. Incorporate engaging instructional content when a transition is unavoidable.

Practical Strategies for Teaching Transition Routines

- Take time at the beginning of the school year to establish expectations for moving from one activity to another.
- Revisit these procedures periodically.
- Model appropriate cleanup behaviors.
- Act out a scenario in which you are cleaning up your area while thinking aloud and allowing children to help you problem solve. Try getting parts of the routine wrong on purpose—children will LOVE to "correct" you!

Troubleshooting Transitions

If you notice things are still not going smoothly, it may be a good idea to play detective! Sit back and watch as your students transition from one activity to the next. What do you notice?

Ask yourself:

- Do I spend a lot of time addressing behavior during transitions?

  – *Do I unnecessarily spend time redirecting harmless or minor behaviors?*

- Do children who finish transitioning first seem bored while they wait for their peers?
- Do we need to reset or review?
- Are there particular transitions that are stressful for me or for my students?

  – *Before the transition* ➜ *Self-care (take a deep breath)*
  – *During the transition* ➜ *Try the Practical Strategies to help minimize time spent in transition*
  – *After the transition* ➜ *Make mental notes about what worked or didn't work*

IMPROVING QUALITY AND IMPACT THROUGH WORKFORCE DEVELOPMENT AND IMPLEMENTATION SYSTEMS

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INTRODUCTION

It is evident that the benefits of publicly funded early education and care programs, while significant, are not sufficiently large to close the notable gaps in children's learning and development at the start of school. Most efforts to increase program benefits have focused on workforce development, whether through traditional teacher preparation in higher education or through professional development (PD) for practicing teachers. Overall, workforce development has demonstrated mixed benefits, on average, for teachers or children (Fukkink & Lont, 2007; Snyder, Hemmeter, Meeker, Kinder, Pasia, & McClaughlin, 2012). But studies also report examples of proven-effective, workforce-focused PD interventions with significant positive impacts on teacher and student performance (e.g., Neuman & Cunningham, 2009; Landry, Swank, & Anthony, 2011; Pianta, Hamre, Downer, et al., 2017). This chapter addresses the gap between proven-effective PD and efforts to deliver PD that has a widespread impact on the workforce and children. Overall, PD is hampered by, among other things, varying standards across the states; less-than-effective coaches; and gaps between how implementation science says PD should work and how it is put to work in practice. When PD is intentional and integrated, it is more likely to be effective and can provide a better unified, quality experience for children across varied settings and teachers. Areas for improvement include ensuring that PD has a clear focus and targets specific outcomes; supporting the PD workforce; providing course-based PD; and using certified PD providers.

A FRAGMENTED SYSTEM, VARIED WORKFORCE, INEFFECTIVE APPROACHES

Early education and care encompasses many programs under a variety of names and auspices for children who have not yet entered kindergarten. They include state-funded pre-K, community preschools, Head Start, and family- and community-based child care. Many children are enrolled in more than one such program at any given time, and most are exposed to multiple forms of programming at different ages. The result is great variation and fragmentation for children, families, programs, and the workforce, which is reflected not only in children's exposure to multiple programs, but also in the needs of a workforce whose educational qualifications range from high school equivalents to advanced degrees. Providers often see their programs as existing in silos at the same time that their different approaches and resources constitute a whole experience for children, potentially hampering effective child development. We suspect that effective PD, implemented well across the early education system, could create more continuity and value for children, educators, and families. It may be that a more consistent, systemic focus on a few organizing principles that make for effective teaching and PD—child-centric, teacher-child interactions, intentionality, personalization, teacher-parent interaction—could make the education experience more effective across all the settings a young child may traverse.

> **Many children are enrolled in more than one such program at any given time, and most are exposed to multiple forms of programming at different ages.**

As just one example of fragmentation, consider that children can expect a stunning level of variation from year to year and setting to setting in even the most basic qualifications of the early education and care workforce. Although 95% of kindergarten teachers have a bachelor's degree, preschool teachers vary widely in their level of training. On average, they receive less training and education than do their elementary school counterparts (Early et al., 2007; Ryan & Whitebook, 2012). Even among teachers in state-funded pre-K programs, minimum requirements can range from a Child Development Associate (CDA) certificate to an associate degree to a bachelor's degree (Barnett et al., 2016). Furthermore, some states require that the two- or four-year degree be in early childhood education (ECE) or child development, whereas others do not specify a field of study. Thus, even in state-funded pre-K programs and kindergarten, which are fairly well regulated, the preparation and qualifications deemed necessary for the workforce vary substantially. Head Start has national standards for program structure, operation, and teacher credentials but does not require all teachers to have college degrees. In 2007, Head Start increased its educational standards for teachers and educational coordinators, such that a minimum of 50% of lead teachers would have at least a bachelor's degree by 2013, a goal that was attained at considerable expense in time, effort, and funds.

For children enrolled in less-regulated family- or center-based child care, exposure to credentialed or degreed staff is even lower (National Registry Alliance, 2013; Ryan & Whitebook, 2012). The National Association for Regulatory Administration's 2008 child care licensing study (NCCITA & NARA, 2010) was one of the most comprehensive examinations of the child care workforce. Data from 49 states and the District of Columbia showed that in the vast majority of states (42), child care-center directors are required to have only some occupational–vocational training, some higher education credit hours in ECE, or a CDA credential. Only one state required that directors hold a bachelor's degree. Similarly, for individuals considered as teachers in licensed child care centers, 40 states required some combination of a high-school degree and experience. Only 10 states required a vocational program, certificate, or CDA, and 13 had no requisite educational qualification for child care teachers—a pattern of low-level qualifications and compensation that remains the case today (Whitebook, Phillips, & Howes, 2014).

Clearly, states (and the field in general) have not settled on a set of minimum qualifications for adults serving as teachers of young children, whether they work in private child care, Head Start, or public pre-K. To the extent that these settings are expected to contribute to children's learning and development, then characterizing these adults as teachers and explicitly outlining qualifications and competencies aligned to that role would be a first step. Moreover, there is little agreement on the performance standards that should be applied to this role or on how to measure those standards, and the preparation and PD experiences that should align with such performance standards are woefully out of synchrony.

Unsurprisingly, given the uncertainty regarding basic qualifications, the variation in the nature and quality of training, and the low compensation for the early education and care workforce (Whitebook et al., 2014)—which

discourages higher education—it's difficult to provide effective training and PD. Given the increased costs associated with additional training and degrees, it becomes even more important to justify the costs by showing that those experiences impact students' learning and achievement. We know too little about the knowledge and competencies that representative members of the workforce display and how such knowledge and competencies map to the needs and outcomes of the children they serve, or the focus and impact of curricula or PD programs. And we have good evidence that the early education and care workforce experiences high levels of stress and workplace demands that undermine the quality of the care it provides (Whitaker, Dearth-Wesley, & Gooze, 2014). Moreover, PD and workforce training in early education and care is not often tailored to the individual professional's needs, or to curricula or programs being implemented; instead, it is fairly generic, loosely coupled to practice, and marginally effective. Overall, the early education and care workforce operates on razor-thin margins of support, whether it be in the form of compensation, regulation, or PD.

GAPS IN KNOWLEDGE, TOOLS, AND IMPLEMENTATION

The disconnect between the needs of the early childhood workforce and scaled implementation of effective PD is a tremendous impediment to improving young children's learning. This is true even when a number of early childhood workforce PD models in controlled evaluations have demonstrated benefits for teachers and for children (e.g., Bierman, Nix, Greenberg, Blair, & Domitrovich, 2008; Hamre, Pianta, Burchinal, & Downer, 2012; Raver et al., 2008). One would think that these models, once made available or disseminated, would be adopted and would yield expected benefits, at least according to the logic of research, development, and dissemination that underlies most education science (Pianta & Hofkens, 2018). Yet, even though federal and state funding has poured into initiatives emphasizing support for the teaching workforce—including for Head Start quality improvement and teacher education, for the Race to the Top-Early Learning Challenge, and for Quality Rating and Improvement Systems—few benefits have been detected for children or for teachers' skills (Pianta & Hofkens, 2018).

> **The disconnect between the needs of the early childhood workforce and scaled implementation of effective PD is a tremendous impediment to improving young children's learning.**

Recognizing the need and value for PD, policymakers have made significant investments in the workforce, which is a first step. But that investment does not focus enough on proven-effective PD models. Unfortunately, teachers rarely experience PD that reflects features of specificity and alignment to practice. In fact, a recent survey that was representative of the 1 million teachers in center-based programs for children aged 0 to 5 years indicates that the predominant form of PD is a one-hour workshop only tangentially connected to teachers' everyday practice and known to be ineffective (McCormick Center for Early Childhood Leadership, 2016; Zaslow, Tout, Halle, Whittaker, & Lavelle, 2010).

We reflect on this conundrum from the perspective of having worked for more than a decade to develop, evaluate, implement, and scale tools for assessing and improving quality in early education and care through workforce development. Collectively, our activities have included: training observers to acceptable standards of agreement; supporting large-scale implementation of classroom observations; developing and evaluating coaching, coursework, and workshop-style PD; and working with states and local systems' own initiatives that draw from an assortment of tools. This work has ranged from the early stages of research and development to implementation at scale.

In these efforts, we have witnessed stunning variation in state and local needs, workforce strengths, goals for program improvement or child learning, and the skill and knowledge profiles of educators (Barnett et al., 2015). We have also noted the manner in which this variation—at all levels and in all forms—intersects with the goals of standardization, consistency, and fidelity that are paramount in developing, evaluating, and using educational programs and tools to produce the effects for which they are designed and intended. Most of the time, the conditions that render a PD model or tool "proven effective" are misaligned with the realities of local programs and staffs, which constrains the extent to which even the best-developed and easiest-to-use tool fits local needs or goals and can be implemented locally with consistency and potency.

Implementation science can offer a framework for knitting together the potential of proven-effective training and PD with the everyday realities of classroom practice, program capacity, and surrounding systems. This is because implementation science, with its focus on identifying and engineering the conditions that influence and explain strong and weak implementation, can create the kind of systemic and aligned programs of professional training and development that foster improvements in classrooms and impacts on children.

We see tremendous potential for progress. At no other time has the field been as poised to enable sustained, positive change. Multiple stakeholders now recognize that high-impact implementation through redesigned workforce development is the key to making good on investments in access made over many decades. We understand that classroom processes are the key mechanisms through which workforce development transmits benefits to children. Effective tools (curricula, assessments, coaching models) are available. We know more now about workforce needs than we did 10 years ago. And research on the elements of effective PD provides a steady stream of largely consistent findings. Yet, although research has generated considerable new knowledge and a wide range of tools for classroom use, successful translation and use of that knowledge is spotty and weak. The essential gaps, regardless of whether we have evidence-supported tools and curricula, reside in systems for using, applying, and implementing knowledge.

A STARTING POINT: FEATURES OF PD THAT IMPROVE TEACHING AND LEARNING

Reports have clearly described the features of PD that relate to improved practice and student learning (Zaslow et al., 2010). When targeted, practice-aligned PD supports are available to teachers, student skill gains can be considerable—at times on the order of half a standard deviation and higher in some subgroups. Recent meta-analyses of PD for early childhood educators have shown positive effects at the classroom, educator, and child levels (Markussen-Brown, Juhl, Piasta, Bleses, Hojen, & Justice, 2017). For example, in the social-emotional domain, PD that focuses directly on child care providers' interactions with children leads to higher-quality classroom environments, adult-child interactions, and child behaviors (Werner, Linting, Vermeer, & Van IJzendoorn, 2016). In language and literacy, PD improved teaching and children's phonological awareness and alphabet knowledge (Markussen-Brown et al., 2017). Larger effects are typically reported more for proximal outcomes (e.g., classroom- or teacher-level) than for distal outcomes (e.g., children's learning), a finding that is common in the PD literature more broadly.

▶ Focus on teacher skills and relevant knowledge

A starting point for identifying, implementing, and eventually scaling effective PD is to consider the PD target and the system in which it will be implemented. As Burchinal (this volume) suggests, classroom observation of teacher practice is often viewed as a source of information on the focus or target of PD, as is teachers' knowledge of children's development or of a curriculum. To the extent that such practices or knowledge reflect features of quality that are linked to children's learning, there is a stronger basis for selection as a focus for PD.

Several examples demonstrate the systematic use of validated tools to observe teachers' practice as a focus for PD. For example, Hemmeter, Fox, & Snyder (2013) have used the Teaching Pyramid Observation Tool (TPOT) (Fox, Hemmeter, & Snyder, 2014) to guide their coaching work, which focuses on teachers' support for children's social and emotional skills. The TPOT measures a set of practices, identified in research on classrooms, which are known to promote positive behavior among young children. From the standpoint of linked PD, coaches who use the Practice-Based Coaching approach to intervention conduct TPOT observations to define targets for their work with teachers. Several studies have shown that linking TPOT observations to coaching on specific TPOT-identified and described behaviors leads to changes in teachers' practice (Hemmeter, Fox, & Snyder, 2013; Hemmeter, Hardy, Schnitz, Adams, & Kinder, 2015). Moreover, this approach has been shown to improve children's teacher-reported and -observed social skills, which is the model's desired outcome.

In another example of scaled-up PD linked to targeted observations, Landry, Anthony, Swank, and Monseque-Bailey (2009) built many of their effective coursework and coaching approaches explicitly from the CIRCLE TBRS (Landry, Crawford, Gunnewig, & Swank, 2002), an observational measure articulating 50 specific teaching behaviors that have been linked to children's development and learning in the social-emotional and literacy domains.

PD models designed around the Classroom Assessment Scoring System (CLASS) (Pianta, La Paro, & Hamre, 2008) include a college course and a video-based coaching model that have demonstrated positive impacts on teaching practice and, in some studies, on student outcomes (Downer et al., 2011; Pianta et al., 2017; Pianta, Mashburn, Downer, Hamre, & Justice, 2008). Hamre et al. (2012) demonstrated that the course improved the quality of teachers' interactions with children and their observation skills, an effect that remained detectable a year later (Downer et al., 2011). Experimental evaluations of MyTeachingPartner (MTP) coaching showed improvements in pre-K teachers' interactions with students, effects that doubled in high-poverty classrooms. When teachers received MTP coaching, children made greater gains in receptive vocabulary, task orientation, and prosocial assertiveness. A second evaluation of MTP, using local coaches with 450 pre-K teachers at 15 sites, showed that coaching improved nearly every CLASS dimension (and particularly instructional support), with effect sizes averaging .5 to .75 standard deviations (Downer et al., 2011), and produced overall gains in children's self-regulation skills and classroom-level language behavior (Pianta et al., 2017). In classrooms where children differed little in age, benefits were detected for children's literacy and language development skills as well (Ansari & Pianta, 2018). Notably, there was some evidence of a dose-response relation between the amount and target of MTP coaching and the level and dimension of gain in teachers' quality of interaction (Pianta et al., 2014).

In the area of teaching practices that support children's development in mathematics, Clements and colleagues (Baroody, Clements, & Sarama, 2019) have repeatedly demonstrated an impact on teachers and children from observing teachers' practice, both generally and while implementing a curriculum, and the potency of providing them with feedback, modeling, and coaching support within an integrated curricular and PD package (Clements et al., 2018). And in science education, Piasta, Logan, Pelatti, Capps, and Petrill (2015) report a similar pattern of findings linking observation with PD to drive improvements in practice.

Many PD programs with demonstrated impacts have used other methods to identify teaching practices to focus on (e.g., Piasta et al., 2012; Williford et al., 2017). As just one example, Barton, Fuller, & Schnitz (2016) developed a performance feedback model for pre-service teachers that targeted seven teacher practices for supporting children in inclusive settings. Those practices were derived from careful analysis of the empirical literature and became a focal point for feedback on candidates' emerging competencies.

It may seem obvious that PD should focus on evidence-based teaching practices, but experience and the limited available data suggest that much PD for teachers does not do so. In one review of 256 published studies of ECE PD, only 25% had explicitly focused on teaching practices (Snyder et al., 2012). And the vast majority of practice-focused PD targets more generalized teaching practices, early literacy, and/or social-emotional teaching (Schachter, 2015).

A meta-analysis of language and literacy PD packages found that including any coaching component resulted in significantly better teacher practice (d = .68 with coaching, d = .22 without coaching; Markussen-Brown et al., 2017). In another meta-analysis, Werner et al. (2016) found that programs including individualized follow-up for teachers had significantly larger effect sizes on teacher outcomes than did programs without that type of follow-up. But most early childhood teachers lack access to coaches or follow-up. Based on data from the National Survey of Early Care and Education (Tout, Halle, Datta, & Snow, 2015), only 36% of preschool teachers reported that they had received any coaching, mentoring, or consultation in the past year.

PD research has also examined teachers' knowledge of practice-relevant information. A few studies have systematically tested the effects of a specific course that aims to enhance knowledge of children's skill development, or of curriculum and practice relevant to implementation, with some promising results (Dickinson & Caswell, 2007; Howes, Galinsky, & Kontos, 1998; Kontos et al., 1996; Neuman & Cunningham, 2009). Neuman & Cunningham (2009) demonstrated that a course focused on knowledge and practices related to fostering young children's language and literacy development impacted the observed practices of child-care providers. Examining a course focused on teachers' knowledge of the dimensions of teacher-student interaction and their skills in identifying different features of interaction, Hamre et al. (2012) found positive impacts on teachers' classroom interactions that approached the effects of coaching. And Clements and colleagues (Clements et al., 2018) recently reported that exposing teachers to information on children's learning trajectories can improve practices in mathematics instruction. In sum, the evidence clearly shows that when PD provides selective and practice-relevant information, teacher and child outcomes can improve.

▶ Ensure sufficient intensity and duration

Intensity and a greater duration of PD consistently leads to improvements in teachers' practice (Garet, Porter, Desimone, Birman, & Suk Yoon, 2001; Markussen-Brown et al., 2017). Markussen-Brown and colleagues (2017) reported a wide range of intensity among the studies they included in their meta-analysis of PD, from six to 450 total hours; they found greater changes in teaching practice among PD programs with greater intensity. Unfortunately, we do not know exactly how much PD is enough, though it is likely that the answer depends greatly on the desired outcome. Smaller elements of practice can change as a result of relatively moderate-intensity PD. For example, Promoting Early Literacy in Licensed Care (PELLC) was designed to be a modest effort in terms of dosage and cost (Gerde, Duke, Moses, Spybrook, & Shedd, 2014), with a course consisting of five sessions, each lasting two hours, for a total of 10 hours of PD. Evaluation of the PELLC course found significant effects on providers' literacy knowledge and practices, but no evidence of impacts on children's literacy outcomes.

Some compelling studies have systematically varied intensity and duration in ways that provide causal evidence. Landry, Swank, Anthony, and Assel (2011) had teachers participate in nine online workshops and receive in-person mentoring twice a month across the year. Some teachers received the intervention for one year, and others for two years. The researchers found that one year of the intervention had significant effects on teachers' language and literacy instructional practices. A second year of coaching produced no additional impact on teaching practice but had larger impacts on children's learning. It takes some time for teachers to change their practice (Pianta et al., 2014), and it may be that children in teachers' classrooms during the first year of PD would not have enough exposure to the improvements in practice to show demonstrable impact. Systematically varying dosage in research studies could help refine our understanding of how much PD is needed to support specific types of practice changes, and this could be a focus for implementation research.

In sum, ample evidence from rigorous experimental studies shows that PD focused on teacher practices or relevant knowledge can improve the quality of teachers' skill and, to a lesser extent, children's learning. We have curricula, methods of practice, and tools that can predictably improve teachers' knowledge and skill, and a number of them also show evidence of further benefits for children's learning. At the same time, there is fairly broad agreement that PD for ECE teachers as typically implemented by states and school systems throughout the country is not all that effective. The opportunity to deploy PD investments for greater impact holds tremendous promise for improving the benefits of programs for children.

SYSTEMS SUPPORTING HIGH-FIDELITY IMPLEMENTATION AND SCALE-UP OF EFFECTIVE PD

To improve the quality and impact of programs at scale through workforce development, we must explicitly specify the enabling architecture—the incentives, standards, training and implementation protocols, quality control procedures, and certifications that shape the actions of various people in the system (teachers, purveyors, programs) to produce high effort and focused participation. All too often, these components of a workforce development system are misaligned with one another, with the needs of the workforce, and with the support structures needed to deliver the types of proven-effective PD described here.

Most of the time, PD requirements are established by state licensing regulations that structure educators' career development (Whitebook, Bellin, Lee, & Sakai, 2005). These regulations are typically generic—for example, the number of PD hours teachers need to complete for licensure renewal. Rarely do regulations specify the target, content, quality, or impact of PD. Most administrators lament relying on "hours accumulated" as the metric for linking PD to an incentive structure because it almost guarantees a lack of focus or alignment to teachers' skill needs or specific areas for curricular or classroom improvements. In this sense, PD is untethered from individual needs for training or local program plans. Even teachers themselves report significant failure in the PD system. When the

McCormick Center for Early Childhood Leadership (2016) surveyed over 500 teachers working across program types (75% with a BA or higher), fewer than half of respondents (43%) believed that their PD opportunities "were very helpful in strengthening their level of professional competence" (pp. 1-2). If many millions of dollars are spent on PD each year (to say nothing of the costs related to paying teachers for hours spent in PD, or the opportunity costs of attending PD that has no impact), and if PD presumably plays a critically important role in advancing the benefits of early care and education, then why are things so broken?

The primary gaps in workforce development involve mechanisms to explicitly integrate knowledge, tools, workforce needs, and incentive structures in a program improvement and workforce development system that enables rigorous and potent implementation of proven-effective approaches and systematic use of data for improvement. Without steady and close integration of two activities—mapping proven-effective PD models into a system for scaling with fidelity—most teachers will attend serial one-time workshops at considerable personal and public cost. These activities and the time teachers spend will have little to no chance of benefitting them or their students.

Let's look at one example of this interface between a PD model and a scaling system. In a recent implementation of a new QRIS, the state of Louisiana chose to use CLASS as the metric for quality, and hence the sole target for improvement through PD (enabled by incentives). Louisiana then identified a small set of PD models that, in controlled evaluations, had been shown to improve CLASS scores. The state then created systems of incentives aligned to increase teachers' and programs' selection of those models—for example, legislation linked tax credits for providers to their engagement with these effective PD models. In addition, higher education programs that prepare teachers with bachelor's degrees for the state pre-K program would soon need to align their content and assessments to the QRIS targets. Moreover, this move to scale also included procedures for ensuring reliable collection of CLASS scores, training for PD providers, and other enabling features, such as evaluation and quality control analyses. Thus, the approach was both systemic and systematic.

In this illustration, models of PD that had been proven effective in rigorous studies were integrated in a scaling system that drew on the QRIS and tax-credit system as a way to encourage and enable use at a wider scale. The Louisiana example is perhaps a template for scaling up that integrates and aligns systems of large-scale implementation with PD models that have proven potential for impact. Most notably, the Louisiana model reflects an overall strategy and explicit design for a system of inputs to teachers and the enabling infrastructure.

CONDITIONS FOR IMPLEMENTATION WITH IMPACT

We have described promising findings that suggest PD can reliably and confidently produce benefits for teachers and children, as well as the parallel challenges of promoting such proven-effective PD at scale. Next, we identify several conditions that are key to closing the gaps between PD that has been proven effective under local or controlled conditions to implementation with benefits at scale.

▶ **Use a clear and focused PD program or model**

Zaslow and colleagues (2010) have described the features of effective PD programs, which include a focus on: a) students' skill targets and developmental progressions (e.g., developmental progressions in decoding skills); b) improving teachers' skillful use of instructional and social interactions to promote student engagement and learning (e.g., feedback or conversation); and c) fostering teachers' skills and knowledge to effectively implement curricula and appropriately engage children with content (e.g., delivering an effective and engaging activity on teaching cardinality). These features all emphasize a defined and relevant set of knowledge and practices as enacted by teachers. In recent meta-analyses of PD in ECE (e.g., Markussen-Brown et al., 2017), most of the effective PD models were based on evidence linking focal practices to specific child outcomes. Some effective PD models also focus on teacher knowledge, which, if tightly linked to practice, can make positive changes to teachers' daily work in the classroom. As we note, a number of bundled curricula and PD supports have shown a proven impact on student learning; similarly, we have some examples of PD focused on general teacher practices with known relations to student outcomes. These are the starting places for decisions and investments aimed at scale.

The alignment of PD, curricula, assessment, and other enabling supports creates a sort of operating system for a program, an important factor in success. Most recently, Connors, Pacchiano, Manos, & Horsley (2018) described how the Ounce of Prevention Fund fosters leadership development among program directors. Its approach is heavily organized around performance indicators and feedback mechanisms embedded in directors' and supervisors' workflow. This is an example of integrating measurement and supports to improve identified professional competencies within systems of implementation and workflow management—an approach that is rare in educators' PD and training.

▶ **Provide necessary supports for the PD workforce**

PD's success depends in large part on the people who train and coach teachers. This means hiring, training, and supporting the PD workforce. But little research has examined these elements of program delivery, and many evidence-based PD models fail to provide much detail about them. Among evidence-based PD models that do provide such detail, this workforce typically consists of experienced ECE teachers, often with master's degrees, who have relatively extensive training and ongoing support in the particular PD model (McCollum, Hemmeter, & Hsieh,

2011; Piasta et al., 2012; Powell, Diamond, Burchinal, & Koehler, 2010). Lloyd & Modlin (2012), reporting on how they delivered three coaching models in Head Start programs, suggest that successful coaches have three major attributes: knowledge of the coaching model, general coaching and consultation skills, and knowledge of early childhood development and teaching. The Ounce of Prevention leadership initiative's job-embedded training systems, described above, constitute an example of how systems (technology, measurement, management) can also support PD providers.

In most cases, evidence-based models include fairly intensive initial training as well as weekly supervision of coaches (Isner et al., 2011). This is rarely the case in the field. For example, within the scope of Head Start's large-scale initiative on mentor-coaching, most Head Start coaches report having had some training and supervision, but very little of it was specific to coaching (Howard et al., 2013). Only 16% of the coaches described receiving any specific training related to coaching. By contrast, in the MTP evaluations, coaches participated in a weeklong training session focused on CLASS, the MTP coaching model, and use of the MTP website to support teachers; all coaches became reliable on the CLASS instrument. Coaches received ongoing help from dedicated coach-support staff, including booster training, weekly phone calls to individual coaches, and group coaching calls. Group and individual calls every two weeks give coaches a forum for sharing successes and challenges of the job.

Coaching, particularly when it follows standardized and structured models, can be highly effective for improving teachers' practices in the classroom, even in larger-scale implementations (Bierman et al., 2008; Cunningham, Zibulsky, & Callahan, 2009; Dickinson & Caswell, 2007). But coaching requires sufficient attention to supervision, adherence to standardized protocols, and use of a model that makes teachers and coaches feel effective and motivated to participate. Yet Isner et al. (2011), in their study of coaching as a part of QRIS, report that very few programs used any formal manual or set of materials to guide coaches' daily practice.

▶ **Harness higher education as a workforce development and PD delivery system that delivers results**

Despite the potential for coursework or degrees in higher education to improve teacher impacts, there is no consistently identifiable link between the two. And yet, as we describe above, there are numerous examples of courses that have led to improvements in practice. What supports are needed so that these exemplars of impact and success can be used at greater scale?

As one example, a series of follow-up investigations related to the course based on CLASS examined the supports needed to deliver the course in 15 sections, with sufficient fidelity to support impacts on teacher practice (LoCasale-Crouch et al., 2011). The list was long. Two course coordinators provided training and implementation support to 14 instructors. Course instructors were trained to achieve reliability on CLASS and on course content and implementation, to ensure consistent delivery. Before teaching each unit, instructors and course coordinators

met online to review upcoming activities, including PowerPoint slides, the instructor's manual, readings, in-class activities, homework assignments, and exams. Instructors completed a written assignment related to each unit, showing evidence that they understood and were comfortable with the material. Course coordinators held weekly individual support calls and periodic group calls with course instructors that were focused on clarifying content, implementation, and sharing successes and challenges in teaching the course. On five occasions, course instructors videotaped themselves teaching the planned lesson and received written feedback that was discussed in detail during the weekly call. As the course went on, the instructors improved and became more consistent in observed implementation.

Although the amount of support was considerable, it should also be noted that these supports were highly targeted and delivered using distal means across 15 sections at 10 different institutions. Under these conditions, 14 instructors delivered a common course with high degrees of skill, fidelity, and implementation quality, all leading to significant impact on teachers' practices in the classroom (Downer et al., 2011; Hamre et al., in press; LoCasale-Crouch et al., 2011). Embedded in a system of appropriate focus, structure, and support, course-based PD can be implemented with high fidelity at scale.

▶ Use data to target and improve PD

Although some programs collect child-outcome data and use it to support individualized approaches to instruction, fewer of them use these data at the program level to drive PD. Programs tend to lack refined indicators of teacher knowledge or competencies to use such data to tailor workforce development initiatives to individuals' profiles of knowledge and skill. Programs also often struggle to ask the right questions of their data, whether related to child outcomes or the workforce, and they often lack expertise in the technical skills required to efficiently collect, maintain, analyze, and interpret data (Crawford, Tucker, Van Horne, & Landry, 2016).

However, data can not only help to focus PD but can also track its implementation and success. Lloyd & Modlin (2012) describe a simple but effective method for supporting the coaching delivered as a part of the Head Start CARES project. They use brief online surveys, logs, and fidelity reports to help support technical assistance and management in their monitoring of coaching implementation. Similar systems are provided with the scaled-up version of MTP (Early et al., 2017). Even the simplest information, such as logs of the frequency of contacts between teachers and coaches, can be powerful ways to improve the intensity of coaching if they are used to monitor coaches' efforts and provide feedback. To the extent that PD is delivered online, the web interface and backend can provide useful data for enabling strong implementation supports for teachers, course instructors, and coaches (LoCasale et al., 2016). As states build systems of PD support online and link them to various forms of credentialing (including micro-credentialing), the result can be more fully integrated alignment of teachers' PD needs and goals, PD inputs to teachers, supports for effective delivery (by coaches, instructors, or web systems), and structures that codify and encourage teachers' participation and progress.

▶ Link workforce development systems and incentive structures

Most states, school districts, and Head Start programs require only that teachers complete a certain number of clock hours of PD each year, ranging from over 100 to 15 or fewer (Barnett et al., 2016). All states give programs flexibility in how these hours are allocated, reducing the likelihood that those hours (or any effective PD approach) will drive program improvements. One way states have tried to tighten the link between PD hours and impact is to require teachers, directors, and/or coaches to articulate clear PD plans and then evaluate those plans (Rous, Grove, Cox, Townley, & Crumpton, 2008). State workforce registry systems are typically limited to tracking members of the ECE workforce (often volunteer participants), their credentials, and the PD they have attended (Ryan & Whitebook, 2012). However, registry systems are being developed that codify individual teachers' records of acquired PD (National Registry Alliance, 2013a) and perhaps even the competencies they attain, which will mean greater capability to identify and encourage effective PD as well to tie those experiences to accrued competence and certifications.

▶ Certify PD providers

The skills and impact of those who provide PD support to teachers and programs vary widely (Soliday-Hong, Walters, & Mintz, 2011), and there are very few systems for documenting their expertise and effectiveness. Although almost half of the states have developed tracking systems for PD providers (Institute of Medicine and National Research Council, 2015), none have effectiveness metrics or standard certifications and training. Some have moved beyond tracking to comprehensive training and certification requirements for providers. For example, anyone who receives funding from the state of Pennsylvania to offer training has to participate in the Pennsylvania Quality Assurance System, which includes online coursework and a review of professional development activities (Hong et al.).

In some states, PD providers must register and complete training (National Registry Alliance, 2013b), but these systems are typically voluntary and their requirements are not particularly stringent. Clearly, PD providers and coaches need more intensive training and certification programs. Examples on which to build include the University of Colorado Early Childhood Coaching Certificate program, a three-course series that focuses on developing specific coaching and organizational change skills. Yet, despite some promising developments, such programs are the exception; PD staff hired by preschool programs rarely have robust and ongoing training.

CONCLUSION

> **If we wish to narrow intransigent gaps in children's experiences and outcomes, research points to a clear need for systems of program design, implementation, and improvement that span the period from birth through preschool and up to third grade.**

We cannot improve quality and impact in the U.S. early education and care sector simply through renewed appreciation for workforce development. Rather, if we wish to narrow intransigent gaps in children's experiences and outcomes, research points to a clear need for systems of program design, implementation, and improvement that span the period from birth through preschool and up to third grade. These systems must not only select and disseminate proven-effective models of professional development, they also must meet the conditions, such as incentives, data, and certification regimes, that allow PD models to be scaled with fidelity. With increased use of technology to deliver PD online as well as continuing refinement of PD models to deliver relevant knowledge and training of practice-focused skills, a future of individualized PD pathways, stackable credentials, state registries, and even increased compensation may not be far off.

References

Ansari, A., & Pianta, R. (2018). Classroom age composition and the early learning of preschoolers. *Journal of Educational Research, 112*(2), 234-242. doi: 10.1080/00220671.2018. 1514356

Barnett, W. S., Friedman-Krauss, A. H., Gomez, R. E., Horowitz, M., Weisenfeld, G. G., Clarke Brown, K., & Squires, J. H. (2016). *The State of Preschool 2015: State Preschool Yearbook.* New Brunswick, NJ: National Institute for Early Education Research.

Baroody, A. J., Clements, D. H., & Sarama, J. (2019). Teaching and learning mathematics in early childhood programs. In C. Brown, M. B. McMullen, & N. File (Eds.), *Handbook of Early Childhood Care and Education* (1st ed., pp. 329-353). Hoboken, NJ: Wiley Blackwell Publishing.

Barton, E. E., Fuller, E. A., & Schnitz, A. (2016). The use of email to coach preservice early childhood teachers. *Topics in Early Childhood Special Education, 36*(2), 78-90. doi: 10.1177/0271121415612728

Berkel, C., Mauricio, A., Schoenfelder, E., & Sandler, I.N. (2011). Putting the pieces together: An integrated model of program implementation. *Prevention Science, 12*(1), 23 – 33. doi: 10.1007/s11121-010-0186-1

Bierman, K.L., Nix, R.L., Greenberg, M.T., Blair, C., & Domitrovich, C. (2008). Executive functions and school readiness intervention: Impact, moderation, and mediation in Head Start REDI program. *Development and Psychopathology, 20*, 821-843. doi: 10.1017/S0954579408000394

Birman, B.F., Desimone, L., Porter, A.C., & Garet, M.S. (2000). Designing professional development that works. *Educational Leadership, 57*(8), 28-33.

Borko, H. (2004). Professional development and teacher learning: Mapping the terrain. *Educational Researcher, 33*(8), 3-15. doi: 10.3102/0013189X033008003

Chen, J.Q., & McCray, J. (2012). The what, how, and why of effective teacher professional development in early mathematics education. *NHSA Dialog, 15*(1), 113-121.

Cochran-Smith, M., & Zeichner, K.M. (2005). *Studying teacher education: The report of the AERA panel on research and teacher education.* Washington, DC: AERA.

Connors, M.C., Pacchiano, D.M., Manos, E., & Horsley, H.L. (2018, March). *Building the infrastructure: Leveraging research partnerships to improve and scale an instructional leadership professional development program.* Paper presented at Society for Research on Educational Effectiveness Spring 2018 Conference, Washington, DC.

Crawford, A., Zucker, T., Van Horne, B., & Landry, S. (2016). Integrating professional development content and formative assessment with the coaching process: The Texas School Ready model. *Theory into Practice, 56*(1), 55-65.

Cunningham, A.E., Zibulsky, J., & Callahan, M. (2009). Starting small: Building preschool teacher knowledge that supports early literacy development. *Reading and Writing, 22*(4), 487-510. doi: 10.1007/s11145-009-9164-z

Dane, A.V., & Schneider, B.H. (1998). Program integrity in primary and early secondary prevention: Are implementation effects out of control? *Clinical Psychology Review, 18*(1), 23-45. doi: 10.1016/S0272-7358(97)00043-3

Desimone, L. M., & Garet, M. S. (2015). Best practices in teachers' professional development in the United States. *Psychology, Society and Education, 7*(3), 252-263.

Dickinson, D., & Caswell, L. (2007). Building support for language and early literacy in preschool classrooms through in-service professional development: Effects of the Literacy Environment Enrichment Program (LEEP). *Early Childhood Research Quarterly, 22*, 243-260. doi: 10.1016/j.ecresq.2007.03.001

Domitrovich, C.E., Gest, S.D., Gill, S., Bierman, K.L., Welsh, J.A., & Jones, D. (2009). Fostering high quality teaching with an enriched curriculum and professional development support: The Head Start REDI program. *American Educational Research Journal, 46*(2), 567-597. doi: 10.3102/0002831208328089

Donohue, C., Fox, S., & Torrence, D. (2007). Early childhood educators as eLearners: Engaging approaches to teaching and learning online. *Young Children*, 34-40.

Downer, J.T., Pianta, R.C., Fan, X., Hamre, B.K., Mashburn, A., & Justice, L. (2011). Effects of web-mediated teacher professional development on the language and literacy skills of children enrolled in prekindergarten programs. *NHSA Dialog: Research-to-Practice Journal for the Early Childhood Field, 14*(4), 189-212.

Downer, J.T., Pianta, R.C., Burchinal, M., Field, S., Hamre, B.K., LoCasale-Crouch, J., … Scott-Little, C. (2011). *Coaching and coursework focused on teacher-child interactions during language/literacy instruction: Effects on teacher beliefs, knowledge, skills, and practice.* Manuscript in preparation.

Early, D.M., Maxwell, K.L., Ponder, B.D., & Pan, Y. (2017). Improving teacher-child interactions: A randomized control trial of Making the Most of Classroom Interactions and My Teaching Partner professional development models. *Early Childhood Research Quarterly, 38*, 57-70. doi: 10.1016/j.ecresq.2016.08.005

Early, D.M., Maxwell, K.L., Burchinal, M., Alva, S., Bender, R.H., Bryant, D., … Zill, N. (2007). Teachers' education, classroom quality, and young children's academic skills: Results from seven studies of preschool programs. *Child Development, 78*(2), 558-580. doi: 10.1111/j.1467-8624.2007.01014.x

Fox, L., Hemmeter, M.L., & Snyder, P.S. (2014). *Teaching Pyramid Observation Tool for Preschool Classrooms (TPOT), Research Edition*. Baltimore, MD: Paul H. Brookes.

Fukkink, R.G., & Lont, A. (2007). Does training matter? A meta-analysis and review of caregiver training studies. *Early Childhood Research Quarterly, 22*, 294-311. doi: 10.1016/j.ecresq.2007.04.005

Garet, M.S., Porter, A.C., Desimone, L., Birman, B.F., & Suk Yoon, K. (2001). What makes professional development effective? Results from a national sample of teachers. *American Educational Research Journal, 38*(4), 915-945.

Gerde, H.K., Duke, N.K., Moses, A.M., Spybrook, J., & Shedd, M.K. (2014). How much for whom? Lessons from an efficacy study of modest professional development for child care providers. *Early Education and Development, 25*, 421-441. doi: 10.1080/10409289.2013.788424

Hamre, B.K., Pianta, R.C., Burchinal, M., Field, S., LoCasale-Crouch, J., Downer, J.T., … & Scott-Little, C. (2012). A course on effective teacher-child interactions: Effects on teacher beliefs, knowledge, and observed practice. *American Educational Research Journal, 49*(1), 88-123. doi: 10.3102/0002831211434596

Hamre, B. K., Pianta, R. C., Mashburn, A. J., & Downer, J. T. (2012). Promoting young children's social competence through the preschool PATHS curriculum and MyTeachingPartner professional development resources. *Early Education and Development, 23*(6), 809-832.

Hamre, B.K., Downer, J.T., Jamil, F.M., & Pianta, R. (2012). Enhancing teachers' intentional use of effective interactions with children: Designing and testing professional development interventions. In R. Pianta (Ed.), *Handbook of early childhood education* (507-532). New York, NY: Guilford Press.

Hamre, B.K., Pianta, R. C., Burchinal, M., DeCoster, J., & Downer, J. (2015, March). *Variation in impacts of MyTeachingPartner coaching model on preschool children's development.* Paper presented at the Biennial Meeting of the Society for Research in Child Development, Philadelphia, PA.

Hamre, B.K., Pianta, R.C., Burchinal, M., & Downer, J.T. (in press). A course on supporting early language and literacy development through effective teacher-child interactions: Effects on teacher beliefs, knowledge and practice. *American Educational Research Journal.*

Hemmeter, M.L., Fox, L., & Snyder, P. (2013). A tiered model for promoting social-emotional competence and addressing challenging behavior. In V. Buysse & E. Peisner-Feinberg (Eds.), *Handbook of response to intervention in early childhood* (85-101). Baltimore, MD: Paul H. Brookes.

Hemmeter, M.L., Hardy, J.K., Schnitz, A.G., Adams, J.M., & Kinder, K.A. (2015). Effects of training and coaching with performance feedback on teachers' use of pyramid model practices. *Topics in Early Childhood Special Education, 35*(3), 144-156. doi: 10.1177/0271121415594924

Howard, E.C., Rankin, V.E., Fishman, M., Hawkinson, L.E., McGroder, S.M., Helsel, F.K., et al. (2013). *The Descriptive Study of the Head Start Early Learning Mentor Coach Initiative.* OPRE Report #2014-5a; Washington, DC: U.S. Department of Health and Human Services, Administration for Children and Families, Office of Planning, Research and Evaluation.

Howes, C., Galinsky, E., & Kontos, S. (1998). Child care caregiver sensitivity and attachment. *Social Development, 7*(1), 25-36. doi: 10.1111/1467-9507.00048

Institute of Medicine (IOM) and National Research Council (NRC). 2015. *Transforming the workforce for children birth through age 8: A unifying foundation.* Washington, DC: National Academies Press.

Isner, T., Tout, K., Zaslow, M., Soli, M., Quinn, K., Rothenberg, L., & Burkhauser, M. (2011). *Coaching in early care and education programs and Quality Rating and Improvement Systems (QRIS): Identifying promising features.* Report produced for the Children's Services Council of Palm Beach County. Washington, DC: Child Trends.

Kontos, S., Howes, C., & Galinsky, E. (1996). Does training make a difference to quality in family child care? *Early Childhood Research Quarterly, 11*(4), 427-445. doi: 10.1016/S0885-2006(96)90016-2

Kraft, M.A., Blazar, D., & Hogan, D. (2016). The effect of teaching coaching on instruction and achievement: A meta-analysis of the causal evidence. Working paper, Brown University, Providence, RI.

Landry, S.H., Anthony, J.L., Swank, P.R., & Monseque-Bailey, P. (2009). Effectiveness of comprehensive professional development for teachers of at-risk preschoolers. *Journal of Educational Psychology, 101*(2), 448–465. doi 10.1037/a0016746

Landry, S.H., Crawford, A., Gunnewig, S., & Swank, P.R. (2002). *Teacher Behavior Rating Scale.* Unpublished research instrument, University of Texas Health Science Center at Houston, Center for Improving the Readiness of Children for Learning and Education.

Landry, S.H., Swank, P.R., Anthony, J.L., & Assel, M.A. (2011). An experimental study evaluating professional develop activities within a state funded pre-kindergarten program. *Reading and Writing, 24*(8), 971-1010. doi: 10.1007/s11145-010-9243-1

Lloyd, C.M., & Modlin, E.L. (2012). *Coaching as a Key Component in Teachers' Professional Development: Improving Classroom Practices in Head Start Settings.* OPRE Report 2012-4, Washington, DC: Office of Planning, Research and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services.

LoCasale-Crouch, J., Hamre, B., Roberts, A., & Neesen, K. (2016). If You Build It, Will They Come? Predictors of Teachers' Participation in and Satisfaction with the Effective Classroom Interactions Online Courses. *The International Review of Research in Open and Distributed Learning, 17*(1).

LoCasale-Crouch, J., Kraft-Sayre, M., Pianta, R., Hamre, B., Downer, J., Leach, A., ... Scott-Little, C. (2011). Implementing an early childhood professional development course across 10 sites and 15 sections: Lessons learned. *NHSA Dialog, 14*(4), 275-292.

Markussen-Brown, J., Juhl, C.B., Piasta, S.B., Bleses, D., Hojen, A., & Justice, L.M. (2017). The effects of language- and literacy-focused professional development on early educators and children: A best-evidence meta-analysis. *Early Childhood Research Quarterly, 38*, 97-115. doi: 10.1016/j.ecresq.2016.07.002

Mashburn, A. J., Pianta, R. C., Hamre, B. K., Downer, J. T., Barbarin, O., Bryant, D., ... & Howes, C. (2008). Measures of classroom quality in pre-kindergarten and children's development of academic, language and social skills. *Child Development, 79*(3), 732-749. doi 10.1111/j.1467-8624.2008.01154.x

Mashburn, A.J., Downer, J.T., Hamre, B.K., Justice, L.M., & Pianta, R.C. (2010). Consultation for teachers and children's language and literacy development during pre-kindergarten. *Applied Developmental Science, 14*, 179–196. doi: 10.1080/10888691.2010.516187

McCollum, J.A., Hemmeter, M.L., & Hsieh, W-Y. (2011). Coaching teachers for emergent literacy instruction using performance-based feedback. *Topics in Early Childhood Special Education, 33*(1), 28-37. doi: 10.1177/0271121411431003

McCormick Center for Early Childhood Leadership. (2016). *Quality standards drive professional development opportunities.* Wheeling, IL: National-Louis University, McCormick Center for Early Childhood Leadership. Retrieved from http://mccormickcenter.nl.edu/wp-content/uploads/2016/11/RN-Fall-2016-final.pdf

Mendive, S., Weiland, C., Yoshikawa, H., & Snow, C. (2016). Opening the black box: Intervention fidelity in a randomized trial of a preschool teacher professional development program. *Journal of Educational Psychology, 108*(1), 130-145. doi: 10.1037/edu0000047

National Child Care Information and Technical Assistance Center (NCCITA) and the National Association for Regulatory Administration (NARA). (2010). *The 2008 child care licensing study.* Lexington, KY: National Association for Regulatory Administration.

National Registry Alliance. (2013a). State of registries survey 2012: A survey of the nation's early childhood and school-age registries. Washington, DC: National Registry Alliance.

National Registry Alliance. (2013b). 2012 state of the nation's training and trainer registries and approval systems. Washington, DC: National Registry Alliance.

Neuman, S.B., & Cunningham, L. (2009). The impact of professional development and coaching on early language and literacy instructional practices. *American Educational Research Journal, 46*(2), 532-566. doi: 10.3102/0002831208328088

Pianta, R. C., DeCoster, J., Cabell, S.Q., Burchinal, M., Hamre, B.K., Downer, J.T., & Howes, C. (2014). Dose-response relations between preschool teachers' exposure to components of professional development and increases in quality of their interactions with children. *Early Childhood Research Quarterly, 29*(4), 499-508. doi: 10.1016/j.ecresq.2014.06.001

Pianta, R.C., Hamre, B.K., Downer, J.T., Burchinal, M., Williford, A., LoCasale-Crouch, J., ... & Scott-Little, C. (2017). Early childhood professional development: Coaching and coursework effects on indicators of children's school readiness. *Early Education and Development, 28*(8). doi: 10.1080/10409289.2017.1319783

Pianta, R.C., Hamre, B.K., & Hadden, S. (2012) Scaling-up effective professional development. In C. Howes, B. Hamre & R. Pianta (Eds.), *Effective early childhood professional development: Improving teacher practice and child outcomes.* Baltimore, MD: Paul H. Brookes.

Pianta, R. C., & Hofkens, T. (2018). The Bush-Obama agenda for education research and innovation: Major investment, mixed returns. In F. M. Hess, & M. Q. McShane (Eds.), *Bush-Obama school reform* (87-106). Cambridge, MA: Harvard Education Press.

Pianta, R.C., La Paro, K.M., & Hamre, B. (2008). *The classroom assessment scoring system, Pre-K version.* Baltimore, MD: Paul H. Brookes.

Piasta, S.B., Justice, L.M., Cabell, S.Q., Wiggins, A.K., Turnbull, K.P., & Curenton, S.M. (2012). Impact of professional development on preschool teachers' conversational responsivity and children's linguistic productivity and complexity. *Early Childhood Research Quarterly, 27*, 387-400. doi: 10.1016/j.ecresq.2012.01.001

Piasta, S.B., Logan, J.A., Pelatti, C.Y., Capps, J.L., & Petrill, S.A. (2015). Professional development for early childhood educators: Efforts to improve math and science learning opportunities in early childhood classrooms. *Journal of educational psychology, 107*(2), 407-422.

Powell, D. R., Diamond, K. E., Burchinal, M. R., & Koehler, M. J. (2010). Effects of an early literacy professional development intervention on head start teachers and children. *Journal of Educational Psychology, 102*(2), 299-312. doi: 10.1037/a0017763

Raver, C.C., Jones, A.S., Li-Grining, C.P., Metzger, M., Smallwood, K., & Sardin, L. (2008). Improving preschool classroom processes: Preliminary findings from a randomized trial implemented in head start settings. *Early Childhood Research Quarterly, 23*(1), 10-26. doi: 10.1016/j.ecresq.2007.09.001

Resnicow, K., Davis, M., Smith, M., Lazarus-Yaroch, A., Baranowski, T., Baranowski, J., ... Wang, T. (1998). How best to measure implementation of school health curricula: A comparison of three measures. *Health Education Research, 13*(2), 239-250. doi: 10.1093/her/13.2.239

Rous, B., Grove, J., Cox, M., Townley, K., & Crumpton, G. (2008). *The impact of the Kentucky professional development framework on child care, head start and public preschool classroom quality and child outcomes.* Lexington, KY: University of Kentucky, Human Development Institute.

Ryan, S., & Whitebook, M. (2012). More than teachers: The early care and education workforce. In R.C. Pianta (Ed.), *Handbook of early childhood education* (92-110). New York, NY: Guilford Press.

Schachter, R.E. (2015). An analytic study of the professional development research in early childhood education. *Early Education and Development, 26*(8), 1057-1085.

Scott-Little, C., La Paro, K. M., Thomason, A. C., Pianta, R. C., Hamre, B., Downer, J., . . . Howes, C. (2011). Implementation of a course focused on language and literacy within teacher–child interactions: Instructor and student perspectives across three institutions of higher education. *Journal of Early Childhood Teacher Education, 32*(3), 200-224.

Snyder, P., Hemmeter, M.L., Artman Meeker, K., Kinder, K., Pasia, C., & McLaughlin, T. (2012). Characterizing key features of the early childhood professional development literature. *Infants and Young Children, 25*(3), 188-212. doi: 10.1097/IYC.0b013e31825a1ebf

Soliday-Hong, S. L., Walters, T., & Mintz, T. (2011). Professional development systems for early childhood educators within a state and federal policy context. In C. Howes, & R. C. Pianta (Eds.), *Foundations for teaching excellence: Connecting early childhood quality rating, professional development, and competency systems in states* (117-132). Baltimore, MD: Paul H. Brookes.

Taggart, V.S., Bush, P.J., Zuckerman, A.E., & Theiss, P.K. (1990). A process evaluation of the District of Columbia "Know Your Body" project. *Journal of School Health, 60*(2), 60-66. doi: 10.1111/j.1746-1561.1990.tb05907.x

Tout, K., Halle, T.G., Datta, A.R., & Snow, K. (2015, June). *A National Portrait of Quality in Centers: Recent Findings from the National Survey of Early Care and Education.* NAEYC Professional Development Institute, New Orleans, LA.

U.S. Department of Education and U.S. Department of Health and Human Services. (2014). *The Race to the Top – Early Learning Challenge Year Two Progress Report.* Washington, DC.

Werner, C.D., Linting, M., Vermeer, H. J., & Van IJzendoorn, M.H. (2016). Do intervention programs in child care promote the quality of caregiver-child Interactions? A meta-analysis of randomized controlled trials. *Prevention Science, 17*(2), 259-273.

Whalen, S., Horsley, H., Parkinson, K., & Pacchiano, D. (2016). A development evaluation study of a professional development initiative to strengthen organizational conditions in early education settings. *Journal of Applied Research on Children: Informing Policy for Children at Risk, 7*(2), Article 9.

Whitebook, M., Bellm, D., Lee, Y., & Sakai, L. (2005). *Time to revamp and expand: Early childhood teacher preparation programs in California's institutions of higher education.* Berkeley, CA: Center for the Study of Child Care Employment.

Whitebook, M., Phillips, D., & Howes, C. (2014). *Worthy work, STILL unlivable wages: The early childhood workforce 25 years after the National Child Care Staffing Study.* Berkeley, CA: Center for the Study of Child Care Employment, University of California, Berkeley.

Williford, A.P., Carter, L.M., Maier, M.F., Hamre, B.K., Cash, A., Pianta, R.C., & Downer, J.T. (2017). Teacher engagement in core components of an effective, early childhood professional development course: Links to changes in teacher-child interactions. *Journal of Early Childhood Teacher Education, 38*(1), 102-118. doi: 10.1080/10901027.2016.1269028
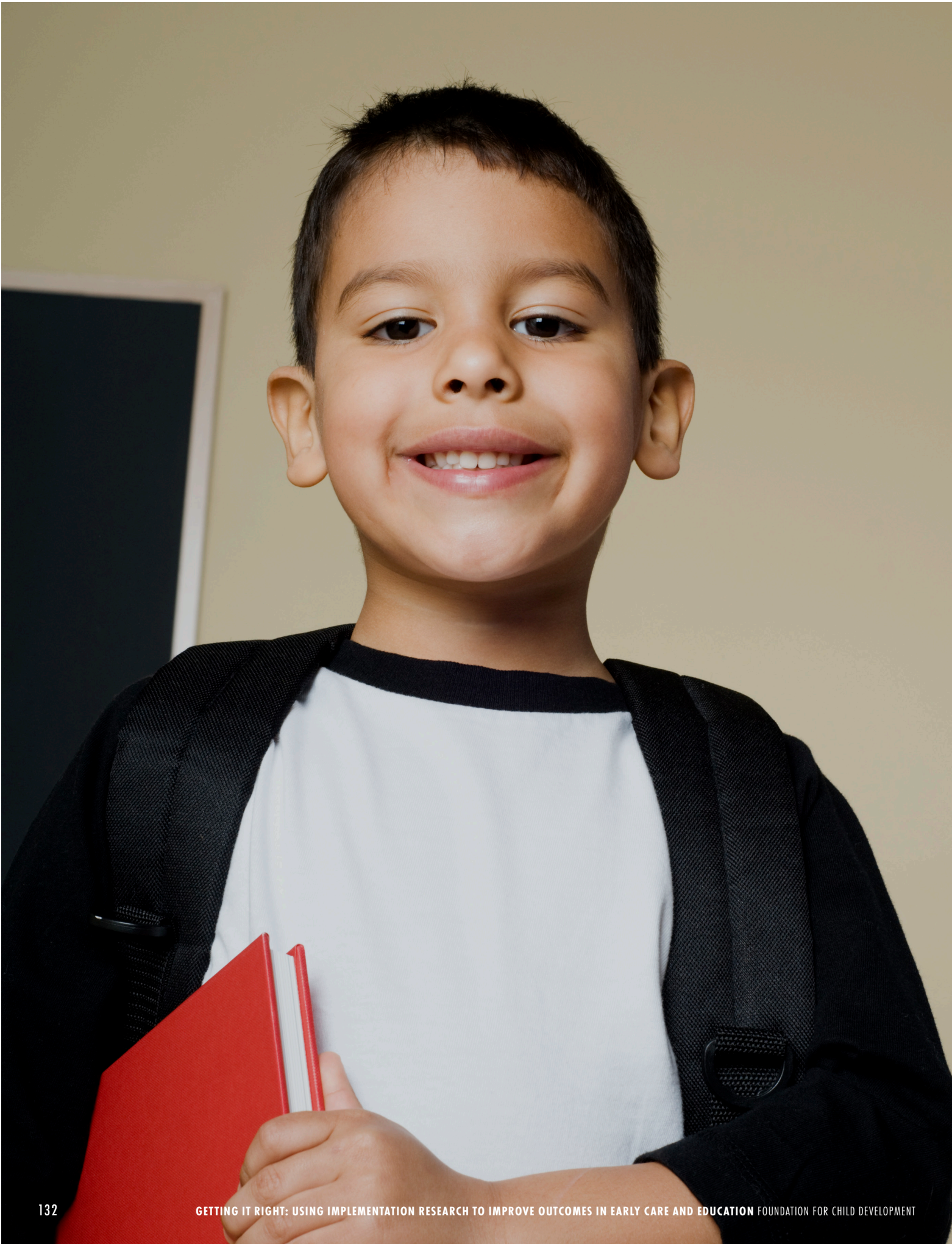
Yoshikawa, H., Weiland, C., Brooks-Gunn, J., Burchinal, M., Espinosa, L., Gormley, W., ... & Zaslow, M. (2013). *Investing in our future: The evidence base on preschool education.* Washington, DC: Society for Research in Child Development and the Foundation for Child Development.

Zaslow, M., Tout, K., Halle, T., Whittaker, J. V., & Lavelle, B. (2010). *Toward the identification of features of effective professional development for early childhood educators: Literature review.* Washington, DC: U.S. Department of Education, Office of Planning, Evaluation, and Social Development.

SECTION 2, CHAPTER 6

ADDRESSING EQUITY IN THE ECE CLASSROOM: EQUAL ACCESS AND HIGH QUALITY FOR DUAL LANGUAGE LEARNERS

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The early childhood education (ECE) profession has a long-standing commitment to the principle of equity and to antidiscriminatory practices, as the recent position statement from the National Association for the Education of Young Children (2019) makes clear. This position statement, combined with supporting curriculum and assessment materials, promotes equal access to high-quality early education and affirms the value of all children and families for their unique talents and cultural and linguistic strengths. One particular group of diverse children, dual language learners (DLLs)—meaning children who are aged 0-5 and speak a language other than English in the home—face a number of challenges that contribute to decreased educational attainment and have implications for ECE educational equity (Castro, Espinosa, & Páez, 2011).

Research shows that all young children can learn more than one language during the ECE years and that doing so carries significant linguistic, academic, social, and cognitive advantages (NASEM, 2017). Yet many dual language learners evidence achievement gaps in comparison to native English speakers (EOs), suggesting that ECE educators need to adopt new strategies for actualizing the academic and intellectual potential of DLLs. To design effective educational approaches for DLLs, we must first understand what typical development and school readiness looks like for these children, what factors contribute to their growth and learning, and what teaching practices and classroom conditions best support their achievement. In this chapter, I propose that we shift the conceptual frame for understanding and improving instructional practices for DLLs by essentially broadening critical pedagogical knowledge and how to apply it.

To provide equitable early education to linguistically diverse children, ECE teachers must consistently implement a set of instructional adaptations across multiple settings. One core necessity here is to recognize that these children are learning content or conceptual knowledge at the same time that they are also learning the language in which that content or concept is expressed. Thus instructional approaches that focus on monolingual English speakers need to be adapted and enhanced (Castro, Espinosa, & Páez, 2011; NASEM, 2017) to build on what children already know in their first language while they are also adding English. This chapter outlines the research on the benefits of early bilingualism and presents specific strategies that all ECE teachers can implement that will support DLLs' acquisition of English while also maintaining their home language. I first summarize the research on early bilingualism and then outline instructional adaptations based on current scientific evidence on how to support improved outcomes for DLLs.

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Why do we need high-quality ECE for DLLs? One of the driving forces behind publicly funded ECE programs, such as Head Start and state prekindergarten programs, has been compensatory education. These programs have been largely designed to provide early learning experiences that promote "school readiness" for children from low-income homes, many of whom are minorities and do not speak English in the home. In fact, Head Start's stated mission is to promote "the school readiness of young children from low-income families by enhancing their cognitive, social, and emotional development" (Office of Head Start, 2015). Almost 30% of U.S. 4-year olds are served by state prekindergarten programs (Barnett, Carolan, Squires, Clarke Brown, & Horowitz, 2015), most of which have income eligibility requirements and are focused on increasing vulnerable preschoolers' access to high-quality ECE. Based on both historical and current empirical research that has demonstrated that children who attend a year or two of high-quality ECE have better oral language, literacy, and mathematics scores at kindergarten entry than their peers who do not have such experiences (Yoshikawa et al., 2015), government at all levels has been seeking to expand access to and improve the quality of early education (National Institute for Early Education Research, 2017). These efforts have primarily targeted children from low-income families, with the ultimate goal of reducing the achievement gap at kindergarten entry and improving long-term school success.

Researchers have stressed that high quality is important to achieve improved academic skills that are both discernable at the end of prekindergarten and sustained into the elementary school years. As Dale Farran notes in this volume, a central element of high-quality education during the early years is frequent, warm, responsive, engaging interactions between adults and children that include multiple turn-taking. Ensuring these kinds of interactions for children who are not native English speakers and whose English language skills are not well developed is difficult in ECE settings. Researchers and practitioners are asking a range of questions to address these challenges. What language should be used during these individual and group interactions? At what age should young children be exposed to a second language? How much of each language should be used throughout the preschool day? What qualifications should ECE staff have to best meet the needs of children who understand very little English? What strategies can monolingual English-speaking teachers use when working with children who do not speak or understand English? Do state and local learning standards apply equitably to all language speakers? What are reasonable expectations for language growth? And, finally, how can ECE staff assess progress when children have limited English skills?

The growth of DLLs in the child population has meant that many ECE settings, such as Head Start and state prekindergarten programs, now serve large numbers of families and children who primarily speak languages other than English. Demographics demonstrate the increasing linguistic diversity of our children and families. Although many states do not collect data on their preschool DLLs (National Institute for Early Education Research, 2018), the U.S. Census Bureau estimates that nearly one-third of all children ages birth to 8 are growing up with exposure to more than one language in the home (Park, Zong, & Batalova, 2018). The Office of Head Start (2017) reports that more than 30% of preschool children in their programs are considered DLLs, and in the state of California, 60% of

children ages 0 to 5 are so identified (First Five California, 2017). More than 130 different languages have been identified in the Head Start child population; more than 80% of all Head Start classrooms serve DLLs, who in many cases speak multiple languages. Unfortunately, ECE teachers who speak more than one language remain in short supply, making up only about 15% of the workforce (Park, McHugh, Zong, & Batalova, 2015).

The substantial and persistent achievement gap between DLLs and native English speakers is of concern to researchers, educators, and policymakers across the U.S. In many studies, DLLs show language gaps during infancy, although language is almost always assessed only in English in these studies and DLLs have had fewer opportunities to learn English (Fuller, Bein, Kim, & Rabe-Hesketh, 2015). They perform significantly below their English-only peers at kindergarten entry and have much lower reading and math scores at third grade. Many are classified as long-term English learners (ELs) during upper grades and have little access to the general curriculum and a higher probability of dropping out of school (NASEM, 2017; Olsen, 2010).

To effectively provide educational equity and high-quality ECE for DLLs, we must define and put into practice effective program language models, specific instructional practices that scaffold language interactions for DLLs, instruments and methods for ongoing assessment, and ECE teacher qualifications. Fortunately, scientific knowledge about how a young child learns a second language and what constitutes best practice in ECE for DLLs has expanded greatly during the past decade (NASEM, 2017). Yet many questions about specific approaches and instructional practices remain.

REJECTING THE DEFICIT APPROACH TO DUAL LANGUAGE LEARNING

Historically, most research examining the growth, progress, and achievement of DLLs has focused on differences between DLLs and non-DLLs, judging DLLs' performance using norms designed for English-only populations without considerations for the unique linguistic and developmental trajectories of children whose first language is not English (Center for Early Care and Education Research—Dual Language Learners, 2011). This approach has often led to a "deficit perspective" that views DLLs as having less potential and fewer academic abilities than their monolingual English peers because of their lack of English proficiency. In fact, policymakers have sometimes referred to "the extra burden" of having to learn two languages during the early years. The deficit perspective, however, often negatively affects teachers' views of DLLs' potential, and it is, moreover, contradicted by current research.

The scientific consensus is that children who become fully proficient in both their home language and English are likely to reap benefits in cognitive, social, academic, and professional outcomes and to be protected from brain decline at older ages (NASEM, 2017). This suggests we should view the development of DLLs through the powerful advantages of having more than one language. The assets associated with bilingualism and biliteracy have been well documented and should be recognized and supported.

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All who work with children who speak a language other than English in the home must recognize that DLLs' development differs in significant ways from that of their native English-speaking peers due to the unique context and societal circumstances of their upbringing. For example, although more than 90% of DLLs are born in the United States (NASEM, 2017), often one or both of their parents were born elsewhere. Many of these families have recently immigrated to the United States and may be unfamiliar with social and cultural norms or school expectations. Some of them have experienced trauma associated with migrating to the United States, which can have negative cognitive and social consequences for child development (Yoshikawa, 2011). And by definition, the families of DLLs speak a language other than English in the home, a characteristic that can lead to social isolation and, in some cases, can create mixed feelings or even a sense of shame for the children (Halgunseth, Jia, & Barbarin, 2013). Culture-specific parenting goals, values, and practices that vary across ethnic groups can contribute to inaccurate perceptions of DLLs' early social, language, and literacy potential. For instance, among Latino families, culturally specific parenting concepts such as *familismo* (family), *respeto* (respect), and being *bien educado* (well educated) (Halgunseth et al., 2013) emphasize the importance of harmonious relationships with others, respect for adult authority, prioritizing the needs of the family, and conducting oneself in a manner that does not bring shame on the family or community. Other values that children are exposed to early in life may include a focus on group or collective well-being rather than individualism, individualism being an attribute stressing independence and self-reliance that is commonly emphasized in American schools (Small, 2002). These contrasting early socialization practices can lead to patterns of behavior that are inconsistent with ECE program goals, such as being reluctant to stand out as the only child who knows the answer, and they can give teachers' a misleading impression of DLLs knowledge level.

Family members' beliefs about exposure to English and continued use of the home language also affect their children's language learning and academic success (Billings, 2009). Some may view the home language as critical for maintaining ties to the family's cultural heritage and connections with family members in their countries of origin. Conversely, newly arrived immigrant families may prize the rapid acquisition of English over maintenance of their heritage language and encourage their children to speak only English. Thus, beliefs and goals about cultural and language maintenance can play a key role in how much exposure and opportunity children have to use their two languages.

The family contexts and early learning environments of DLLs vary widely, and thus they should not be considered a homogeneous group or only in comparison to their English-only peers. Sociocultural and demographic variables such as language spoken in the home, age at first exposure to English, family socioeconomic status, and country of origin can all influence children's proficiency and early literacy skills in both the home language and English

(NASEM, 2017). To understand each DLL's language status and educational needs, ECE teachers need in-depth knowledge of their family circumstances, values, and culture. Specifically, ECE personnel must expand their thinking beyond simple comparisons between DLLs and English-only children and not use norms or learning trajectories based on English-only learners. All ECE program leaders need to design tools and methods to collect important information about DLLs' background (e.g., the age of acquisition of each language, the extent and nature of exposure to each language, and key family characteristics) as well as family histories that go beyond the typical home language survey.

Finally, the amount and quality of DLLs' exposure to and usage of their two languages are also important features of early development that impact later school success. Multiple studies have shown that preschoolers' and school-age children's exposure to the home language supports their development of that language (Hammer et al., 2012). Use of the child's first language in the home or in school does not appear to affect the rate or level of English acquisition. However, emphasizing English in the ECE setting does appear to undermine DLLs' continued development of the home language. This is likely due to the higher value given to English proficiency at school and in the broader social context. Given research findings about the impact of exposure to their two languages at home and in school, we should devote attention to the amount and quality of exposure DLLs experience in each language.

What follows is a discussion of some recent findings and conclusions about dual language development during the early years and specific classroom practices that have empirical evidence of efficacy for linguistically diverse children. Hopefully, if we clearly and explicitly communicate how young children acquire and benefit from exposure to more than one language and describe in detail which practices have shown pedological promise, we can produce more equitable and higher-quality ECE for DLLs.

CURRENT RESEARCH ON EARLY BILINGUAL DEVELOPMENT

As knowledge concerning DLLs' language development has grown, it has increasingly been used as a foundation to support and guide ECE practice. Several strands of research from multiple disciplines have illuminated the process of early bilingualism. First, research on early brain development has shown that infants can learn two languages simultaneously and that the early years are the optimal time to become bilingual (Ramirez & Kuhl, 2017). Evidence from cognitive neuroscience shows that the bilingual brain is more active neurologically than the monolingual brain due to the need to process two languages (Bialystok, 2017). This increased early processing demand is associated with greater control of focused attention and self-regulatory behavior (Conboy, 2013), skills that are associated with enhanced executive function in DLLs. Second, research from psycholinguistics has shown that although DLLs follow a general language trajectory similar to that of monolingual children, their development will demonstrate unique characteristics as a function of learning two languages. These characteristics include language mixing, smaller vocabularies in each language (Bedore, Peña, García, & Cortez, 2005), and differences in the emergence of certain linguistic benchmarks (NASEM, 2017).

A 2017 report by the National Academy of Sciences, Engineering, and Medicine (NASEM), *Fostering the Educational Success of Children and Youth Learning English*, offers a research synthesis on the development and achievement of DLLs from birth to age 21. This consensus study has yielded a comprehensive view on language development, school practices, and educational policies that impact DLLs' growth and school success. It reports four major interrelated conclusions that are central to improving the educational outcomes for DLLs. First, all children are capable of learning more than one language from the earliest months of life and benefit from early exposure to multiple languages. Second, high levels of proficiency in both the home language and English are linked to the best academic and social outcomes. Third, the earlier a child is exposed to a second language, the greater their chances for full bilingualism.

Summary of Findings of NASEM (2017) Report for DLLs 0-5.

The major findings about DLLs ages birth to five from the NASEM (2017) report include the following:

- *All young children, if given adequate exposure to two languages, can acquire full competence in both languages;*

- *Early bilingualism confers benefits such as improved academic outcomes in school as well as enhancement of certain cognitive skills such as executive functioning;*

- *Early exposure to a second language—before three years of age—is related to better language skills in second language, English;*

- *The language development of DLLs often differs from that of monolingual children: they may take longer to learn some aspects of language that differ between the two languages and their level of proficiency reflects variations of amount and quality of language input;*

- *The cognitive, cultural, and economic benefits of bilingualism are tied to high levels of competence including listening, speaking, reading, and writing in both languages, e.g., balanced bilingualism at kindergarten entry predicts best long-term outcomes;*

- *DLLs should be supported in maintaining their home language in preschool and early school years while they are learning English in order to achieve full proficiency in both languages;*

- *DLLs language development is enhanced when adults provide frequent, responsive, varied language interactions that include a rich array of diverse words and sentence types. For most DLL families this means they should continue to use their home language in everyday interactions, storytelling, songs, and book readings;*

- *There is wide variation in the language competency among DLLs that is due to multiple social and cultural factors such as parents' immigration status and number of years in U.S., family Socio-Economic Status (SES), status of home language in the community, resources and amount of support and for both languages.*

Source: NASEM (2017). *Promoting the Educational Success of Children and Youth Learning English: Promising Futures*. Washington, DC: The National Academies Press.

Fourth, home language loss is currently the norm for DLLs, particularly once they enter English-speaking ECE settings, which undermine the possibility of full bilingualism and may place the child at risk for unhealthy family relations, including estrangement from their cultural heritage. (See text box for a summary of the NASEM findings for DLLs.)

The NASEM report findings are contributing to an emerging consensus on the elements of effective practices for DLLs. An underlying principle for the effective education of DLLs is early and systematic exposure to English as well as intentional support for home language maintenance and development. Early balanced and intentional exposure to both languages supports early bilingualism, which is important for kindergarten entry and later academic success. Research has identified certain home environment and ECE program features and instructional practices that promote school readiness and help reduce the achievement gap between DLLs and their English-only peers at kindergarten entry.

> **ECE teachers must adopt strategies that recognize, value, and integrate the use of DLLs' home languages into classroom practices.**

Home language preservation should be considered a priority for all ECE programs. When very young DLL children are exposed to English, they often start to show a preference for speaking English and a reluctance to continue speaking their home language (Wong-Filmore, 2001; Oller & Eilers, 2002). ECE professionals and program administrators should know that there are developmental risks associated with the loss of a child's first language. As English constitutes the primary language that DLLs hear outside the home, and it is often the preferred language in community contexts, it is very easy for DLLs to lose their desire and ability to understand and speak their home language, especially once they are exposed to English in an ECE setting that uses English as the language of instruction. Therefore, ECE teachers must adopt strategies that recognize, value, and integrate the use of DLLs' home languages into classroom practices.

Ensuring exposure to English during the preschool years is also key. Although some preschool DLLs may be fluent in both languages, others will be proficient in the home language but know very little English, have some English conversational language abilities but few academic language skills, or have minimal proficiency in both languages (Páez & Rinaldi, 2006; Place & Hoff, 2011). Recently, several studies have shown that lower levels of English proficiency at kindergarten entry are related to later school difficulties, specifically in English reading (Galindo, 2010; Halle, Hair, Wandner, McNamara, & Chien, 2012). These studies underscore that systematic exposure to English during the preschool years is also important to DLLs' future school performance. Recent research on the amount of time it takes DLLs to become reclassified as fully proficient in English has also found that early proficiency in both the home language and English at kindergarten entry is critical to the process of becoming academically proficient in a second language and may reduce the amount of time it takes to become reclassified (Thompson, 2015; Ansari & Winsler, 2016). Further, Barbara Conboy's (2013) and others' research has led to a consensus that earlier exposure to two or more languages with frequent enriched language interactions leads to the cognitive advantages associated with bilingualism, as the specific languages a child is learning as well as the amount of experience with each language influences how the brain processes each language.

These bilingual benefits have been found across cultural and socioeconomic groups as well as across different language combinations. However, these cognitive advantages depend on the extent to which the child is bilingual (Gordon, 2016). Children who are more balanced in their bilingualism show larger advantages than children who are more dominant in one language. The fact that preschool DLLs enter programs with some proficiency in their home language and are at an ideal age to learn and benefit from learning a second language, that is, English, provides a compelling rationale for designing programs that support both languages.

To summarize, scientific findings confirm that preschoolers have the capacity and, indeed, are neurologically prepared to learn more than one language—and they gain cognitively from managing the linguistic processing required to become bilingual. However, learning a second language should not come at the expense of continued home language development. The research highlights the importance of sufficient exposure to both languages to reap the benefits of bilingualism.

It is important for educators to recognize that there are differences between DLLs and monolinguals. Preschool DLLs seem to show a different pattern of strengths and needs than monolinguals. They are at risk for low levels of oral language development if they don't receive frequent high-quality enriched language learning opportunities in both languages. Their basic mathematical understandings may differ from those of English speakers if their first language uses different language constructs for expressing math concepts such as counting, plurals, grouping, and so forth. They may also excel in certain executive function skills such as cognitive control, and they often demonstrate social-emotional strengths (NASEM, 2017).

In some areas of development, preschool bilinguals show either no differences or slight developmental gaps when compared to monolingual children. For instance, Sandhofer and Uchikoshi (2013) point out that studies have consistently found that bilingual children take longer to recall words from memory. They have slower word retrieval times in picture naming tasks and lower scores on verbal fluency tasks. These findings underscore the need for teachers to understand the challenges a young DLL experiences when processing language, particularly the nondominant language, and the need to allow sufficient time for the child to come up with a response. It is important to give all children sufficient time to respond, but it is critical for young DLLs who are processing language requests in two languages.

In addition, many studies have found that bilingual preschoolers tend to have smaller vocabularies in each language when compared to English-speaking and Spanish-speaking monolinguals. However, a DLL's vocabulary is distributed across two languages; when both languages are considered, their vocabulary size is often comparable to that of monolinguals. As Conboy (2013) has pointed out, "Bilingual lexical learning leads to initially smaller vocabularies in *each separate language* than for monolingual learners of those same languages, but that *total vocabulary sizes* (the sum of what children know in both their languages) in bilingual toddlers are similar to those of monolingual toddlers" (p. 25).

Because vocabulary size is a key goal in preschool and very important to future reading comprehension, this variation in dual language learning is critical for preschool teachers to understand. The difference in DLLs' vocabulary development most often does not indicate language delays or possible learning problems but is a typical feature of early bilingualism. If a preschool child does not know the English word for book, the child may nonetheless understand the concept of a book but know it by a different word such as *libro*.

To sum up, multiple factors are known to affect DLLs' vocabulary growth including similarities between the two languages being learned, the language of schooling, age of acquisition of each language, the child's family socioeconomic status, and the quality and quantity of their exposure to each language. Further, DLLs typically develop vocabulary knowledge in different contexts such as home or school for each of their languages, and the rate of vocabulary development may not be the same for each language (NASEM, 2017; Espinosa, 2015).

Oral language skills, including vocabulary skills, listening comprehension, grammatical knowledge, and expressive vocabulary, have been found to be especially important for DLLs' future reading abilities. Recent research with young Spanish-speaking children from low socioeconomic backgrounds has found that these young DLLs might be at risk for delays in their early literacy development due to their weaker oral language abilities (Espinosa & Zepeda, 2016; Mancilla-Martinez & Lesaux, 2011). This research with dual language learners demonstrates the need to promote oral language development by providing rich and engaging language environments in both languages while at the same time focusing on building early literacy skills. In light of this research, it is essential for preschool programs to recognize the critical importance of oral language and vocabulary development for young DLLs.

Knowledge of linguistically appropriate assessment practices for DLLs is particularly crucial. Valid and comprehensive assessment of young DLLs' development and achievement is essential yet often challenging for ECE professionals (Espinosa & García 2012). Individualized instruction enhances young children's learning opportunities and promotes the important developmental and achievement outcomes necessary for school success. Individualized instruction, however, requires comprehensive, ongoing assessments that are fair, valid, and linguistically, culturally, and developmentally appropriate. Such assessments show educators what DLLs already know and what needs to be taught.

For DLLs, the language in which an assessment is given will determine how well they score as well as the educational services they receive. Because DLLs acquire their knowledge of the world around them through two languages, their language skills will be distributed across both. Therefore, to get an accurate picture of DLLs' language abilities requires assessment in each of their languages. A DLL child may know some words and concepts in one language and others in the second language. Depending on children's experiences and learning opportunities, they most likely will not perform as well as monolingual speakers of either language. This pattern is a typical and usually temporary phase of emergent bilingualism (Paradis, Genesee, & Crago 2011).

DLLs who are assessed only in the weaker language, such as English—as is often the case with early language and kindergarten readiness assessments—will often score significantly lower in language, literacy, math, and basic concepts tasks than their English-only peers (Espinosa & García, 2012). However, their scores may be typical for children who are in the early stages of second language acquisition and may not represent any language delays or be a cause for concern. Therefore, conclusions about DLL children's developmental progress or need for special services must be based on knowledge about their abilities in both languages as well as on what should be expected of preschool DLLs and how they differ from monolinguals.

Both formal and informal methods are required to ensure appropriate assessments of DLLs (Espinosa, 2015). Initial assessment should include a formal family interview or questionnaire about what languages spoken in the home and by which family members. Other formal child assessments such as the preLAS (Duncan & De Avila, 1985)—a measure of language proficiency—can be administered to individual children to give ECE personnel more specific information about a child's receptive and expressive language abilities. In addition to formal assessment, ECE teachers can use ongoing informal observational assessment—both structured and unstructured—to monitor a child's progress and plan appropriate learning activities.

IMPLICATIONS OF RESEARCH FOR INSTRUCTIONAL PRACTICES FOR DLLS

> *Unless you believe "in your bones" that having a second language in addition to English is a gift, and not a disadvantage, and diversity is a resource, not a problem to be solved, you are likely to respond to DLL children in ways that discourage the continued use of the home language, especially if you are not fluent in the child's home language.*
>
> —Espinosa & Magruder, 2015, p.80

The following instructional strategies and recommendations referenced in the NASEM report (2017) are backed by empirical evidence that shows they promote important academic outcomes for DLLs. It should be noted that particular educational approaches will differ based on a program's language model and its goals and objectives for first and second language development—that is, full dual language models versus primarily English language development with support for home language maintenance.

▶ **Getting to know the children you are teaching**

Before teachers can specifically address instructional goals and strategies for DLLs, they must first get to know the children. They need to gather formal and informal information on their students' backgrounds and their early language learning experiences as well as abilities, including how much exposure they have to both the home

language and English and how much they use each. During face-to-face interviews with parents, teachers can learn about family values, language preferences, cultural traditions, and the ability to partner actively with teachers in the classroom.

▶ Instructional supports

Although common features of high-quality early education described throughout this volume are beneficial for all children, DLLs require additional instructional support. The NASEM report (2017) outlines a number of instructional strategies and enhancements that have been linked to improved achievement for DLLs in early education settings. Because use of the home language while a child acquires English is associated with higher rates of English proficiency (Méndez, Crais, Castro, & Kainz, 2015), ECE staff who use the home language across content areas will help DLLs develop their conceptual knowledge and promote continued development of the home language while they are acquiring English. In addition, if DLLs receive opportunities to develop listening, speaking, writing, and reading skills in both their languages, over time they will demonstrate higher levels of academic achievement in elementary school (Valentino & Reardon, 2015). An ECE program can adopt any of several language models, ranging from full two-way immersion programs to primarily English-language instruction with systematic support for the home language. It is beyond the scope of this chapter to discuss in detail all of the language models possible in ECE settings, but the underlying principle is that DLLs need systematic, intentional exposure to English while also having opportunities to see, hear, speak, and write in their first or home language. If no staff members speak a child's home language, family members or other fluent speakers of the child's language can be recruited to volunteer in the classroom to tell stories, help create print and labeling that can be posted throughout the classroom, identify culturally relevant materials, and possibly even teach all the children a few words of the family's language. Much research has documented the power of honoring and valuing children's home languages in the classroom (NASEM, 2017). DLLs also need instructional adaptations that explicitly bridge what they already know in their home language and what they need to learn in English such as cognate charts, language labeling, and explicit comparisons between the two languages.

One feature of high-quality classrooms that serve DLLs, whether dual language classrooms or primarily English with support for home language, is the monitoring of the amount of time in each language. Supporting DLLs' overall language development requires sufficient time and frequent language interactions in both languages, but ECE teachers often adopt an informal approach that unintentionally results in the dominance of one language over the other. Therefore, continuous monitoring of when, how much, and by whom each language is used is vitally important.

Giving DLLs the definitions of specific vocabulary words in both their home language and English and exposing them to print in a variety of contexts (e.g., storybook reading, daily schedules, and labels on objects) will also assist their

comprehension and oral language skills. Repetition of vocabulary through multiple readings of familiar storybooks and across different activities will help expand their understanding of word meaning. ECE teachers can also help children comprehend and retain new academic vocabulary by targeting three to four words per day, using pictures and visual cues that convey meaning, embedding targeted academic vocabulary in familiar chants and songs, and using physical gestures linked to particular words. These approaches are good practice for all young children, but they are especially helpful for children who do not understand English and cannot be expected to rely solely on oral language input.

Oral language development, which includes a focus on phonological awareness, vocabulary development, listening comprehension, speaking, and narrative skills, is another tool that helps DLLs. Because strong oral language skills are associated with future literacy skills such as narrative production and reading comprehension, young children need ample opportunities in listening and speaking. We now know that most young DLLs learn the code-related skills important to early literacy, such as letter sounds and knowledge of the alphabet, but have a much harder time developing oral language abilities, like extended English vocabulary and grammatical knowledge, that they need to understand complex text (NASEM, 2017). Therefore, daily instruction must provide targeted and responsive opportunities for young DLLs to listen to, comprehend, and review the vocabulary and to practice the skills integral to oral language development.

Language development should not be isolated and restricted to a topic or time of the day but rather embedded in daily interactions and activities. Contingent, responsive interactions that contain increasing levels of grammatical and word complexity with speakers proficient in the second language and adults who help expand a child's language skills during verbal interactions will support English language development. For example, if a child gives a one-word response in the home language to a question posed in English, the teacher should give the child sufficient time to complete the thought in either language, acknowledge the response positively, and provide a response in English that matches the child's level of comprehension. Most experts in early bilingualism recommend that although teachers should stay in one language during a given activity with preschool DLLs rather than switching between languages, they should also ensure that there are enough activities in each language to promote the program's language goals.

Small group activities are also valuable. Like all young children, DLLs need individual attention. However, because DLLs are learning a new language and must process language inputs through two linguistic systems, they benefit from additional time to practice and build both comprehension and production of language. More time spent in small group activities like dialogic reading or vocabulary instruction will allow teachers to individualize interactions with DLLs, informally assess their level of understanding, and probe their language needs. DLLs are often reluctant to participate actively in large group activities, particularly when their English language skills are not well developed. Recent research also demonstrates that DLLs' peers play an important role in their language development (Sawyer et

al., 2018). Most DLLs are highly motivated and eager to interact socially with peers, which gives them opportunities to practice their emerging language skills without adult pressure. Teachers should structure ECE environments and daily schedules with time for both informal (e.g., dramatic play) and formal (e.g., structured partner learning activities) peer interactions throughout the day.

Last, ECE classrooms should reflect the children and families enrolled. Evidence suggests that creating a supportive environment that reflects DLL children's language and culture will help them feel accepted and welcome, thus promoting positive learning. Displaying pictures and artifacts that represent each family, their home culture, and their family history provides a welcoming and familiar atmosphere. Culturally responsive classrooms have teachers who acknowledge the presence of culturally and linguistically diverse students and create environments in which DLLs feel comfortable, accepted, safe, and intellectually engaged. In such programs, teachers recognize the strengths and needs of their students, convey positive attitudes toward bilingualism, and implement instructional strategies such as those described here that promote early bilingualism and academic achievement. In these ways, teachers create a climate that recognizes the unique characteristics of each child while also setting challenging but achievable goals.

QUALIFICATIONS OF ECE PROFESSIONALS WHO WORK WITH DLLS

If DLLs are to have equitable educational opportunities, an essential element is the qualifications and competencies of the ECE professionals that provide the services. The Institute of Medicine and the National Research Council's report *Transforming the Workforce for Children Birth Through Age 8: A Unifying Foundation* (Institute of Medicine & National Research Council, 2015) identifies "professionals with regular (daily or near-daily), direct responsibilities for the care and education of young children" as *educators* (p. 27). The quality of these educators has a direct and significant impact on DLLs' overall development, including their language proficiencies (NASEM, 2017). This section briefly summarizes the recommendations for ECE educators who work with young DLLs.

Currently few states require ECE teachers who work with young DLLs to have specialized training or coursework focused on meeting the needs of such children and their families (Espinosa & Calderon, 2015). The NASEM (2017) report concludes, "The educator workforce, including early care and education providers, educational administrators, and teachers, is inadequately prepared during preservice training to promote desired educational outcomes for dual language learners" (p. 462). For educators working with DLLs, the report recommends a common course of core content that includes the following elements (NASEM, 2017):

- an understanding of language development and the relationship between first and second language development;
- an understanding of the influences of sociocultural factors on language learning;

- knowledge of and ability to implement effective practices for promoting the successful education of DLLs/English learners, including early intervention strategies for DLLs/English learners with disabilities;

- an understanding of assessment instruments and procedures and of how to interpret and apply assessment results for DLLs/English learners;

- development of skills for establishing respectful partnerships with families of DLLs/English learners; and,

- development of skills to advocate on behalf of DLLs/English learners.

In addition, Zepeda (2015), in a paper commissioned for the NASEM report, reviews the research and identifies the following important competencies for people who work with infant, toddler, and preschool DLLs:

- understanding the relationship between early brain development and language development;

- recognizing that switching between languages is a normal part of early bilingualism and not a sign of confusion;

- understanding how to support oral language development in the first and second language;

- recognizing that children's first language is the medium through which they learn about the values and beliefs of their culture.

> **To provide equitable educational services to DLLs, we need an expanded perspective that recognizes their strengths and potential for cognitive, linguistic, and social advantages, not one that views DLLs' development as "deficient" because of their limited English skills or one that is based on expectations for monolingual English-only children.**

Though there is widespread agreement among bilingual scholars that it takes specialized knowledge and competencies to work effectively with DLLs, very few states address this issue in their ECE teacher preparation programs. Moreover, ECE professional development efforts often fall short, and licensing or credentialing programs rarely include much content focused on second language learning (Espinosa & Zepeda, in press). Generally, at every level of ECE professional preparation and training, expertise on effective pedagogy for DLLs is limited. To provide equitable educational services to DLLs, we need an expanded perspective that recognizes their strengths and potential for cognitive, linguistic, and social advantages, not one that views DLLs' development as "deficient" because of their limited English skills or one that is based on expectations for monolingual English-only children. The challenges to including this expanded perspective and DLL-specific knowledge into the complex system of ECE preservice and professional development, although significant, must be addressed through diversification of higher education faculty and ECE workforce development.

DIRECTIONS FOR FUTURE RESEARCH

Substantial research has been done on the capacity of all children to successfully become bilingual, the factors that influence early bilingualism, and the attendant cognitive, linguistic, and social advantages, and there is also an emerging scholarship on effective practices for DLLs. Yet there are still many gaps in our knowledge. The following research topics are derived from the preceding literature review and discussion:

Instruction

- Which instructional strategies are most effective with different populations of DLLs from a range of linguistic backgrounds, that is, when the languages represented are highly diverse and dissimilar to English, when the proportion of DLLs ranges from few to mostly DLLs, and when DLLs run the gamut with respect to prior English exposure and proficiency?

- How do different language models—e.g., 90-10, 80-10, or 50-50—impact the acquisition of English during the ECE years?

- At what age should young DLLs attending ECE programs be exposed to English, and what is the ideal amount of early exposure?

- What characteristics of teacher-child interactions support improved school readiness?

- How do differential language proficiencies at school entry affect the learning trajectories of DLLs over the course of K-12 education?

- What are the most effective accommodations for early balanced bilingualism and academic success and what and educational enhancements promote it?

Assessment

- What are the best assessment tools and procedures to accurately capture the strengths and needs of children who speak more than one language? What combination of formal and informal assessments is needed for developmental screening, measuring progress, and accountability?

- How can we develop a profile of normative development for DLLs from a wide range of linguistic and sociocultural backgrounds that guides educational decisions such as whether a child has a developmental disability, is ready for school, or is making sufficient progress?

Implementation Research

- What are the most effective ECE teacher preparation and professional development models for teachers serving DLLs?

- What are the core elements and necessary supports for effective implementation of dual language program models, for example, 50-50, 90-10, and 80-20?

- What are the necessary conditions in communities, programs, staff, and schools for successful implementation of a preschool bilingual program?

- What are the barriers to implementing a preschool bilingual language model?

References

Ansari, A., & Winsler, A. (2016). Kindergarten readiness for low-income and ethnically diverse children attending publicly funded preschool programs in Miami. *Early Childhood Research Quarterly, 37*, 69-80.

Barnett, W. S., Carolan, M. E., Squires, J. H., Clarke Brown, K., & Horowitz, M. (2015). *The state of preschool 2014: State preschool yearbook*. New Brunswick, NJ: National Institute for Early Education Research.

Bedore L., Peña, E., García, M., & Cortez, C. (2005). Conceptual versus monolingual scoring: When does it make a difference? *Language, Speech, and Hearing Services in Schools, 36*(3), 188-200.

Bialystok, E. (2017). The bilingual adaptation: How minds accommodate experience. *Psychological Bulletin, 143*(3), 233-262.

Billings, E. S. (2009). El alfabetismo y las familias latinas: A critical perspective on the literacy values and practices of Latino families with young children. *Journal of Latinos and Education, 8*(4), 252-269.

Castro, D.C., Espinosa, L. M., and Páez, M. (2011). Defining and measuring quality early childhood practices that promote dual language learners' development and learning. In M. Zaslow, I. Martinez-Beck, K. Tout, & T. Halle (Eds.), *Quality measurement in early childhood settings* (pp. 257-280). Baltimore, MD: Brookes Publishing.

Center for Early Care and Education Research—Dual Language Learners. (2011). *Early care and education quality measures: A critical review of the research related to dual language learners* (Research Brief 5). Chapel Hill: University of North Carolina, Frank Porter Graham Child Development Institute, Center for Early Care and Education Research—Dual Language Learners.

Conboy, B. (2013). Neuroscience research: How experience with one or multiple languages affects the developing brain. In L. M. Espinosa (Ed.), *California's best practices for young dual language learners* (pp. 1-50). Sacramento: California Department of Education.

Duncan, S. E., & De Avila, E. A. (1985). *Pre-Language Assessment Scales*. Monterey, CA: CTB/McGraw-Hill.

Espinosa, L. M. (2015). *Getting it right for young children from diverse backgrounds: Applying research to improve practice with a focus on dual language learners* (2nd ed.). Upper Saddle River, NJ: Prentice Hall.

Espinosa, L. M., & Calderon, M. (2015). *State early learning and development standards, policies and related practices: How responsive are they to the needs of young dual language learners?* (BUILD Initiative report). http://www.buildinitiative.org/Portals/0/Uploads/Documents/State%20Early%20Learning%20and%20Development%20Standards,%20Policies%20and%20Related%20Practices%20pdf.

Espinosa, L. M., & García, E. E. (2012). *Developmental assessment of young dual language learners with a focus on kindergarten entry assessments: Implications for state policies* (Working paper 1). Chapel Hill: University of North Carolina, Frank Porter Graham Child Development Institute.

Espinosa, L. M., & Magruder, E. S. (2015). Practical and proven strategies for teaching young dual language learners." In Espinosa, L. M. (Ed.), *Getting it right for young children from diverse backgrounds: Applying research to improve practice with a focus on dual language learners*, 2nd edition (pp. 76-113). Upper Saddle River, NJ: Pearson.

Espinosa, L. M., & Zepeda, M. (2019). Linguistic and cultural diversity: Knowledge utilization in ECE. In B. Wasik & S. Odom (Eds.), *Celebrating 50 years of child development research: Past, present and future perspectives* (pp.75-92). Baltimore, MD: Paul H. Brookes.

First Five California (August, 2017). *What constitutes high quality early learning experiences for California's young dual language Learners* (Unpublished working paper).

Fuller, B., Bein, E., Kim, Y., & Rabe-Hesketh, S. (2015). Differing cognitive trajectories of Mexican American toddlers: The role of class, nativity, and maternal practices. *Hispanic Journal of Behavioral Sciences, 37*(2), 139-169.

Galindo, C. (2010). English language learners' math and reading achievement trajectories in the elementary grades. In E. E. García & E. C. Frede (Eds.), *Young English language learners: Current research and emerging directions for practice and policy* (pp. 42-58). New York: Teachers College Press.

Gordon, K. R. (2016). High proficiency across two languages is related to better mental state reasoning for bilingual children. *Journal of Child Language, 43*(2), 407-424.

Halgunseth, L., Jia, G., & Barbarin, O. (2013). Family engagement in early childhood programs: Serving families of young dual language learners. In L. M. Espinosa (Ed.), *California's best practices for young dual language learners* (pp.119-171). Sacramento: California Department of Education.

Halle, T., Hair, E., Wandner, L., McNamara, M. & Chien, N. (2012). Predictors and outcomes of early versus later English language proficiency among English language learners. *Early Childhood Research Quarterly, 27*(1), 1-20.

Hammer, C.S., Komaroff, E., Rodriguez, B., Lopez, L., Scarpino, S., & Goldstein, B. (2012). Predicting Spanish-English bilingual children's language abilities. *Journal of Speech-Language-Hearing Research, 55*(5), 1251-1264.

Institute of Medicine & National Research Council. (2015). *Transforming the workforce for children birth through age 8: A unifying foundation.* Washington, DC: The National Academies Press.

Mancilla-Martinez, J., & Lesaux, N. (2011). The gap between Spanish-Speakers' word reading and word knowledge: A longitudinal study. *Child Development, 82*(5), 1544–60.

Méndez L. I., Crais E., Castro D., & Kainz K. A. (2015). Culturally and linguistically responsive vocabulary approach for young Latino dual language learners. *Journal of Speech, Language, and Hearing Research, 58*(1), 93-106.

National Academies of Sciences, Engineering, and Medicine (NASEM). 2017. *Promoting the educational success of children and youth learning English: Promising futures.* Washington, DC: The National Academies Press.

National Association for the Education of Young Children. (2019). *Advancing equity in early childhood education: A position statement.* Washington, DC: NAEYC.

National Institute for Early Education Research. (2017). *The state of preschool 2016: State preschool yearbook.* New Brunswick, NJ: NIEER.

National Institute for Early Education Research. (2018). *The state of preschool 2017: State preschool yearbook.* New Brunswick, NJ: NIEER.

Office of Head Start. (2015). *Head Start early learning outcomes framework: Birth to five.* Washington, DC: U.S. Department of Health and Human Services, Administration for Children and Families.

Office of Head Start. (2017). *Home Language Support.* https://eclkc.ohs.acf.hhs.gov/culture-language/article/home-language-support.

Oller, D. K, & Eilers, R. E. (2002). *Language and literacy in bilingual children.* Clevedon, UK: Multilingual Matters.

Olsen, L. (2010). *Reparable harm: Fulfilling the unkept promise of educational opportunity for California's long-term English learners.* Long Beach, CA: Californians Together.

Páez, M., & Rinaldi, C. (2006). Predicting English word reading skills for Spanish speaking students in first grade. *Topics in Language Disorders, 26*(4), 338-350.

Paradis, J., Genesee, F., & Crago, M. (2011). *Dual language development and disorders: A handbook on bilingualism and second language learning.* Baltimore, MD: Brookes Publishing.

Park, M., McHugh, M., Zong, J., & Batalova, J. (2015). *Immigrant and refugee workers in the early childhood field: Taking a closer look.* Washington, DC: Migration Policy Institute.

Park, M., Zong, J. & Batalova, J. (2018). *Growing superdiversity among young U.S. dual language learners and its implications.* Washington DC: Migration Policy Institute.

Place, S., & Hoff, E. (2011). Properties of dual language exposure that influence 2-year-olds' bilingual proficiency. *Child Development, 82*(6), 1834-1849.

Ramirez, N. F., & Kuhl, P. (2017). The brain science of bilingualism. *Young Children, 72*(2), 38-44.

Sandhofer, C., & Uchikoshi, Y. (2013). Cognitive consequences of dual language learning: Cognitive function, language and literacy, science and mathematics and socioemotional development. In L. M. Espinosa (Ed.), *California's best practices for young dual language learners* (pp. 51-89). Sacramento: California Department of Education.

Sawyer, B., Atkins-Burnett, S., Sandilos, L., Hammer, C. S., Lopez, L., & Blair, C. (2018).Variations in classroom environments of preschool children who are low income and linguistically diverse. *Early Education and Development, 29*(3), 398-416.

Small, M. F. (2002). *Kids: How biology and culture shape the way we raise young children.* New York, NY: Anchor Books

Thompson, K. D. (2015). English learners' time to reclassification: An analysis. *Educational Policy, 31*(3), 1-34.

Valentino, R. A., & Reardon, S. F. (2015). Effectiveness of four instructional programs designed to service English learners: Variation by ethnicity and initial English proficiency. *Educational Evaluation and Policy Analysis, 37*(4), 612-637.

Wong-Filmore, L. (2001). When learning a second language means losing the first. *Early Childhood Research Quarterly, 6*(3), 323-346.

Zepeda, M. (2015). *The early childhood workforce for dual language learners: What do we know and where do we need to go?* Unpublished manuscript, California State University, Los Angeles, Department of Child and Family Studies.

VIGNETTE: BUILDING A HIGH-QUALITY PROGRAM— THE BOSTON PUBLIC SCHOOLS EXPERIENCE

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> *I usually start my presentations with an image of a carousel with one horse taking off to acknowledge that our work is heavily situated within our own contexts, stakeholders, and resources. My story starts in a public school district, but I suspect that readers will come from many places—for example, state education departments, city governments, local agencies, and school districts. The Boston Public Schools' early childhood education program, which I lead, often spans multiple domains—academic, operational, budgetary, prekindergarten and kindergarten, early elementary, and the like. I hope that readers will become like the horse breaking free—taking what is useful for their own contexts—and that this article will help your work as you set out to build or improve your own preschool systems and partner with your own public schools.*
>
> —Jason Sachs

The story of the early childhood initiatives undertaken by Boston Public Schools (BPS) starts long before I arrived. Boston was home to the first public school in America and also the first kindergarten. By the time I joined BPS over a decade ago, six early education centers were running full-day programs for prekindergarten up to first grade and were headed by principals who were outspoken leaders in early childhood education in both the district and in the city. The district had run half-day programs for 4-year-olds in the 1990s, but it cut that program to create resources for full-day kindergarten for all 5-year-olds. In 2005, Mayor Thomas Menino and Superintendent Thomas Payzant, both veterans in their jobs, decided it was time to serve 4-year-olds again, and almost overnight they created a universal prekindergarten program. The program was to be delivered in schools in the BPS system; it would be free for all, and teachers would be paid on the same scale and receive the same benefits as K-12 teachers and be subject to the same educational and certification requirements (e.g., they would need to earn a master's degree within 5 years). After this momentous decision, I was hired to lead the newly created Department of Early Childhood. The mayor and the superintendent at the time had each been in his position for almost a decade and had provided steady leadership and support, which turned out to be very important to the success of the program.

Before I took the job with the BPS, I worked for the Massachusetts Department of Education's Early Learning Services, which oversaw the distribution of $128 million in funds for programs from birth (family support and home visiting) through kindergarten. The work I did at the state level influenced how I saw policy tools such as accreditation from the National Association for the Education of Young Children (NAEYC), quality enhancements, professional development (PD), home visiting, evaluation, budgeting, and collaboration. It also influenced my views on management. For example, I believe that strong leaders act as facilitators, pose problems, listen, and usually speak last. I also learned how to navigate in a large bureaucracy where leaders, politics, and priorities are constantly changing. A statewide view showed me that the leadership of public schools, Head Start, and community-based programs varies from community to community, as does the quality of the services these programs offer.

Other lessons center around the importance of local collaboration, accountability, relevant real-time data, the nature of funding mechanisms (grants versus child subsidies), and capacity building. I also learned that things can be both created and dismantled very quickly, so it is important to build systems and structures that can withstand changing priorities.

Taking what I learned from the state and before, I spent 5 years working in Boston for a large child-care agency run by Douglas Baird, an outspoken leader for early education reform. Working in and for a community-based organization gave me the opportunity to see the fiscal challenges created by low state reimbursement rates for low-income child-care subsidies funded by the state and federal governments, a subject that had been an interest of mine since my PhD days. My dissertation focused on the consequences low-quality early education programming on students' outcomes. Once I knew the harm that seemingly well-intentioned policies were causing, my life's trajectory was set.

BUILDING SYSTEMS: THE WORK OF THE BPS DEPARTMENT OF EARLY CHILDHOOD

To build systems, you have to think in terms of a 3- to 5-year arc, knowing that you are going to have to make tactical shifts along the way. The choices you make should be strategic: the goal should be services that are both needed and possible to secure. It took us 6 years, for example, to implement a kindergarten curriculum across the district and almost 9 years to meaningfully link our curriculum to families. It was only in our 12th year that we were able to introduce a formative assessment system based on observation and documentation. In this chapter, I share with you the larger projects we did along the way, many of which persist to this day in modified

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forms. For example, we decided to use a centralized pre-K curriculum but have since rewritten it, and we have also developed a kindergarten to second-grade curriculum that draws on some of the same instructional practices that we use in the pre-K program.

BASIC FACTS ABOUT THE BPS EARLY CHILDHOOD PROGRAM

Under the program developed by the mayor and superintendent in 2005, K1 (our pre-K program for 4-year-olds) is the same as any other grade in the district. The only difference is that there is a full-time paraprofessional in every classroom. Our staff to student ratio is 1:11. The program operates on a normal BPS school-day and school-year schedule, and enrollment is based on a lottery system. We currently serve roughly 55% of all 4-year-olds in the city and have a waitlist of well over 1,000. The BPS pays for the services out of its own budget. The per-pupil cost is about the same as for kindergarten or fifth-grade students. Though the cost of the program to the district is reported to be around $10,000 per pupil per year, the true cost is more like $17,000 per pupil per year, owing to building maintenance and salaries for principals and support teams.

CREATING A DEPARTMENT OF EARLY CHILDHOOD

You can't really go anywhere with a group of people if you don't know where you are going and cannot convince the people with you that they want to go as well. That's why we developed a mission statement for the BPS Department of Early Childhood in 2006. The department aims "to ensure that principals, teachers, paraprofessionals and school support staff have the knowledge, skills and resources they need to provide a high-quality early education experience for all students," and its "expectation is that all children will become internally driven and self-motivated learners and will be able to read, write and communicate effectively by third grade."[1] Lately, I have been thinking that we should change "communicate effectively by third grade" to "communicate effectively and with passion by third grade." We are also contemplating adding "and compute" after "communicate" to acknowledge the importance of math skills.

As a team, we have grown from two to 24 people, and we now oversee the citywide universal pre-K program and have curriculum oversight for preschool through second grade. Eighty percent of the staff are program developers, that is, coaches, and they are a large part of our success. They are the main body of our staff and spend at least 50% of their work time in classrooms. Coaches are in a different union from the BPS teachers, so they can also provide evaluation assistance to principals. However, because the relationship between a teacher and his or her coach is nonevaluative, we use a different coach to evaluate the teacher. Coaches in general have master's degrees and are paid as much as BPS teachers or more. We have four managers—one for NAEYC accreditation, one for the universal pre-K program, one for budgets and work plans, and one for research and grant writing. Having the majority of our staff in classrooms makes us aware of the real impact of our work. Schools and classrooms are dynamic places, and we have to compete with other school and district priorities, so having coaches lead most of our work shows us what is both needed and realistic.

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[1] 1 https://www.bostonpublicschools.org/earlychildhood

We have a blended funding model that secures us resources from state, federal, and private entities. Forty percent of our staff are paid with outside grants, and the district covers the rest. Having outside funding sources is helpful for two reasons: it allows us to innovate and be flexible (city/state funds usually have to be used in specific ways), and it also holds us accountable to our private funding sources, which often require evaluation data. I have the unique opportunity to combine BPS general funds with private funding dollars. While the resources have priorities and associated accountability, there is enough tolerance in the funding that I am allowed to start new projects and also shift resources when needed. For example, both times we launched a curriculum pilot, more schools applied then we anticipated; rather than limit them, we were able to accommodate them. This decision, though it drained more resources, allowed us to serve more students in real time than if I had been constrained by the original design of the funding partner.

We are a productive group. We like to complete tasks and move on to the next large project, because many other areas—special education, learning assessments, dual language considerations, toxic family stress—need our attention. We use work plans and the evaluation system to help us focus on our priorities. We usually spend the end of May through July celebrating, analyzing our challenges, and then planning and prioritizing our work for the next school year. From August to October, we create and enact implementation plans, and from November through April we focus our efforts on schools and have monthly staff meetings that alternate between PD and coaching calibration. Grade and project teams meet weekly. This process allows us time both to reflect by providing natural break points during which to assess our progress and to productively struggle in the field where day-to-day progress seems slower.

Staff are also allowed to spend up to 20% of their time on a goal that they feel will effect change, for example, linking curriculum to families, incorporating "beautiful stuff" into the curriculum, or connecting with outside partnerships. Many of the innovations—and, subsequently, strategies—of the department come from staff members embracing their passions in this way.

COACHING AND PROFESSIONAL DEVELOPMENT

We have tried a variety of coaching models, with ratios as low as one coach to eight teachers and as high as one coach per 20 (more of a grade-level team focus). What we have learned is that coaching is most effective when the teacher wants to change and that the strategies we use need to be differentiated based on a teacher's knowledge level and how committed the school or program is to change. Loosely, teachers fall into three categories: those who need to be evaluated out; those who can grow with coaching through biweekly visits; and those who do not need much coaching or who attend seminars with peers. We have also had to work carefully on what kinds of coaching goals we pursue, focusing, for example, on curriculum knowledge transference rather than good early childhood practice because the former is much clearer and easier to coach and measure through fidelity scores.

Our PD model is relatively standardized and linked to coaching. That is, for the most part, if you attend the PD you get coaching, as the two are linked in scope and sequence. In the summer we take 3 to 5 days to introduce our curriculum to new teachers, and then we have monthly seminars—run like graduate school classes with smaller cohorts—to support their curriculum instruction. Videotaping, teacher documentation of student work, and webinars are becoming more common in our practice, and we have much more room to grow in these areas.

The lion's share of our PD focuses on first setting the table—getting teachers to understand their curriculum and the "whys" underneath it, and then getting them to reflect about who they are teaching and how differentiate their instruction. Though we focus on curriculum fidelity, we view it as "a tool, not a rule." We know that strong teachers will need to make adjustments along the way to meet the diverse needs of their classrooms. The rub is getting them to make choices based on what facilitates learning versus what is easier to manage.

WHO AND HOW WE HIRE

At BPS we work hard to hire coaches who represent the early childhood field. Hence we hire teachers from community-based programs, district literacy coaches, directors of education programs, and principals. Below are sample questions we use for hiring staff. These questions address the depth of knowledge our coaches need and underscore our commitment to the population we are serving and the importance of early literacy.

- What is your approach to collaboration? What do you expect of others? What do you do when your perspective differs from the perspectives of others?

- Please describe any experience you have working with low income, culturally diverse children and families. Include your experience working with children whose first language is not English or children with special needs. What do you draw from these experiences that would help you as a program developer or coach?

- What does developmentally appropriate practice mean to you? Why is it important and how do you incorporate this pedagogy into your practice?

- Talk about your experience teaching early literacy. What approaches have you followed and what resources have you relied on? What do you believe are the critical components to building and supporting strong early readers and writers?

- What is your approach to integrating content areas? For example, how do you see connections between literacy and science or math and social studies?

- Describe your experience with coaching or mentoring teachers (for example, observing, planning, modeling, and debriefing lessons). What is your approach to moving a teacher's practice?

- How do you advise a teacher who recognizes the interest of an individual child or group of children that strays from the path of the established curriculum? How might you respond to this tension?

- How would you develop a relationship with the principal/administrative staff to facilitate your success as a program developer? Please give examples of specific things you would do.

- Please talk about your experience and comfort in providing PD for teachers and administrators. What ideas do you have about the most effective ways to pass on professional knowledge?

SELECTION CRITERIA FOR SELECTING CLASSROOMS IN BPS

We had to establish some basic selection criteria based on supply and demand, quality of facilities, and school capacity to determine where to place classrooms:

- We did not want to create a single early childhood strand, as teachers work better in pairs.
- We had to place as many pre-K classrooms in schools as there were kindergarten classrooms.
- We had to place classrooms on first or second floors with bathrooms within 40 feet of them to meet NAEYC standards criteria.
- We had to put classrooms in schools where there was demand.
- We had to look at the choice of where to put classrooms through an equity lens of who would get access.
- The school needed to have stable leadership in place to take on more students.

In the early days, we grew from serving roughly 400 students in 30 mixed inclusion classrooms in 2005 to serving over 2,500 4-year-olds in over 150 classrooms in more than 70 elementary schools by 2010.

RESEARCH AND EVALUATION: THE ROLE OF DATA IN THE PROCESS OF CHANGE

In this section, I offer a brief history of the Department of Early Childhood's use of data and evaluations to guide program and practice. The use of research and data to drive change by the department got off to what many would consider an inauspicious start.[2] After just 2 years of operation, it hired an outside research firm to measure the quality of its classrooms. The findings were displayed prominently on the first page of the *Boston Globe*: "Boston Preschools Falling Far Short of Goals," the headline read, with the story noting that "the city's public preschool and

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[2] This section was written in collaboration with Christina Weiland, and parts of it appear in a book by Betty Bardige, Megina Baker, and Ben Mardell (2018) about the Boston Public Schools and its early childhood efforts. Chris has collaborated with our department on almost all data and evaluation work. She started out as an intern and is now an assistant professor at the University of Michigan. Having a researcher along every step of the way has strengthened the program immeasurably (pun intended).

kindergarten programs are hobbled by mediocre instruction" (Jan, 2007). The findings could have jeopardized the whole endeavor of public preschool in Boston, by creating both a "see, we told the BPS they couldn't do this" mindset and mistrust among teachers. On both counts, we survived. We did so thanks to strong leadership from the mayor and superintendent and by communicating directly with teachers and listening to the "why" behind the findings. For example, teachers said that they did not have strong curriculums, that their principals did not let them teach in developmentally appropriate ways, and that they spent too much time assessing students. The 2006 findings, however, played a large role in shaping our strategic plan and taught us that the BPS, the school committee, and the city council can tolerate negative findings, which allowed us to continue to evaluate and revise our work going forward.

RESEARCH AND EVALUATION IN THE DEPARTMENT OF EARLY CHILDHOOD, 2006–2017

Over the course of the department's history, we have collected and used data in a variety of ways. Table 1 illustrates the data types we use, how frequently these data are collected, their purpose, and how we use them to drive change. The table is purposely broad so as to give a gestalt understanding and not overwhelm the reader with information pertaining to every data type and every wave of data collection.

The outside team produces a report with central findings and also a dataset for the district's use. We use their findings to help the department make programmatic and district policy decisions and also to perform our own analyses, often linking their dataset to other sources of data available internally, such as administrative data on program demographics. Partnerships with outside researchers bring an additional perspective on what the results mean and provide more objectivity. Importantly, we are careful in our contracts with outside firms to retain full access to the identified data so that we are not limited in the kinds of internal research that are subsequently possible.

▶ **Multipurpose data use**

As Table 1 illustrates, the Department of Early Childhood uses data for a variety of purposes, such as identifying systematic weaknesses across classrooms and targeting PD accordingly. For example, classroom quality data collected in 2010 in prekindergarten and kindergarten revealed that although the program had the highest instructional quality of any large-scale prekindergarten to date (Weiland, Ulvestad, Sachs, & Yoshikawa, 2013), teachers were not doing enough to support children's conceptual development. Professional development was then modified to target best practices in this area. We also created a teacher-friendly template that displayed each teacher's results compared to district averages and areas for growth. Coaches worked with teachers to help them understand the implications of their scores for their practices.

Table 1. Summary of types of data collected, frequency of collection, and use

Data source	When collected	Purpose	Use
Classroom quality and curriculum fidelity observational scores	About every 2 years	Changes as program evolves; in 2012, for example, data collection focused on K-2 due to concerns about quality of education after prekindergarten	To determine program gaps, needs, and strengths; to guide professional development (PD) and programmatic decisions
Administrative data	Ongoing	To track important programmatic data like child attendance, enrollment, demographics as well as teacher education, certification, and experience	To answer questions about programmatic use and take-up; to describe the BPS population and how it changes over time. These data also are used as control variables in analyses, reducing participant burden
Teacher surveys	About every 2 years	To gather richer data on teacher background, experience of PD, and opinions/desires related to current offerings	To understand teacher population in more depth; to guide PD and programmatic decisions
P-2 child early reading skills and prekindergarten vocabulary	3 times per year (assessed by teachers)	To monitor children's early literacy and language skill development and to identify supports as needed	To describe the BPS population; to draw on as outcomes in evaluation studies
Broader set of child outcomes	When external funding is available or when a research study under way requires them	To examine children's levels and growth on a broad set of important outcomes (math, executive function, socioemotional skills)	To describe the BPS population; to draw on as outcomes in evaluation studies

Data are used to link children's learning to their program experiences. For example, BPS elementary schools vary in how mixed they are in their income demographics. At some schools, nearly all children come from low-income households, while others have approximately equal representation of students from higher- and lower-income backgrounds. Our department was interested in what effect this demographic variation would have on the pre-K program. We believed that because of the way preschool classrooms are structured, children spend a lot of time interacting with each other, and therefore that children learn a lot from each other; we also believed that higher-income children, on average, come to school with stronger language skills and more world knowledge than their lower-income peers. At the time, Harvard Graduate School of Education researchers Christina Weiland and Hirokazu Yoshikawa took up this question and examined whether the proportion of low-income peers was related to children's gains in their prekindergarten year. They found that having more mixed-income peers (versus only low-income peers) did predict gains in children's vocabulary skills during prekindergarten (Weiland & Yoshikawa, 2014). These results did not drive a policy change; BPS children are assigned to schools via a centralized choice system. But it did enhance the department's understanding of what drives children's gains in early childhood classrooms, and it contributed to conversations in the design of Boston's mixed-delivery universal pre-K system.

The mixed-income peers study was published in a peer-reviewed academic journal; feedback from peer reviewers helps us make our work more rigorous and more credible. However, more often than not, the work we have done with data sources in Table 1 has not been usable for studies in peer-reviewed journals. The available data are not always complete enough or able to capture the story fully enough to meet these journals' high standards.

However, the department has been able to make good use of its date internally. For example, in 2010, the district faced a decision regarding whether to continue to offer a summer reading program to kindergarten and first-grade students and whether to extend the program to incoming prekindergarten students. The district was well aware of research showing that low-income children commonly experience summer learning loss (Entwisle & Alexander, 1992) and that high-quality summer enrichment programs are effective in combating this problem (Borman & Dowling, 2006; Jacob & Lefgren, 2004). In late fall 2010, within the structure of our research partnership, we identified key data from the summer 2009 district summer program that could guide the decision (which children chose to attend the program, attendance data, and student outcome data) and the key research questions.
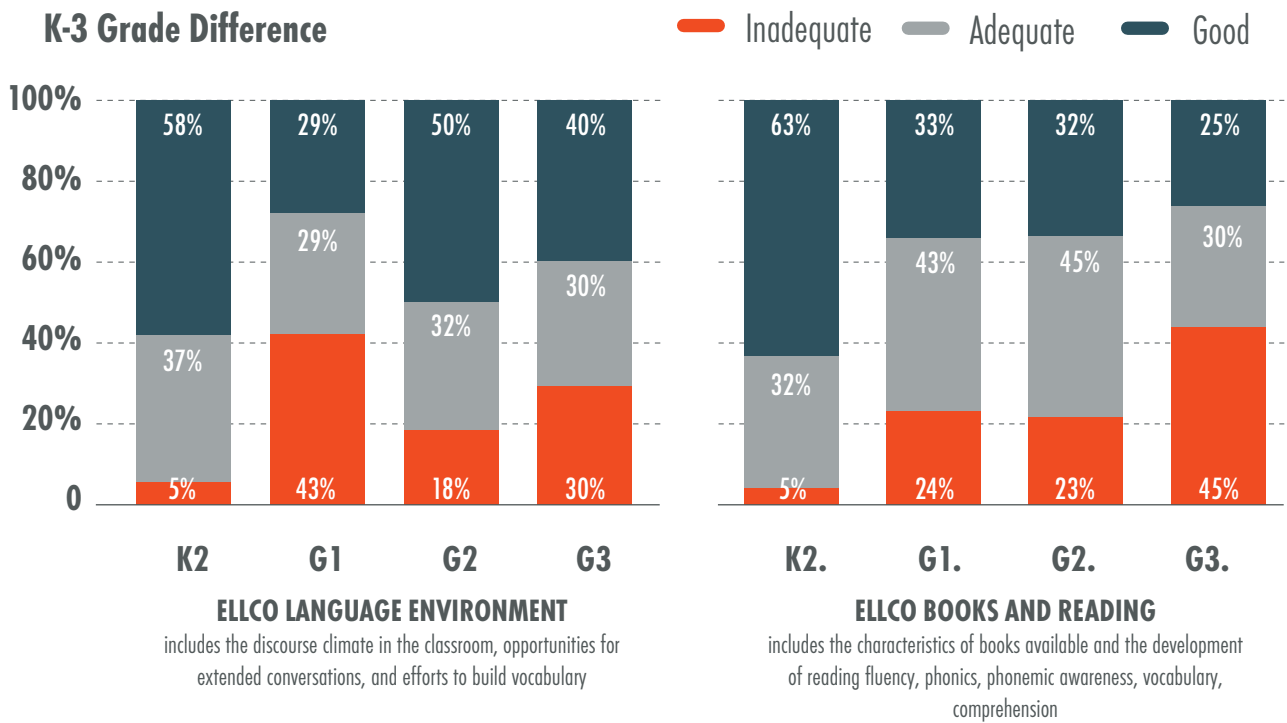
The challenge in answering the research questions rigorously was that students had selected into the program, and so any results, positive or negative, could have had to do with the students themselves and not the program. The research team decided to create two quasi-experimental control groups to increase study rigor: one group was made up of students who applied to the program but did not attend and the other was made up of students attending the same schools as summer-program attenders. Analyses showed that program attendance was strong—80% of students had attendance rates of 73% or higher. The program also reached children more in need of help than their peers; participants had lower literacy skills than their peers prior to the program and were

significantly more likely to have previously repeated a grade. Students who attended the program had stronger post-program literacy skills scores than did children in either of the two control groups. On the basis of this evidence, along with feedback from teachers involved in the program, the district decided not only to continue to offer the program but to offer it to incoming prekindergarten students as well. The program has evolved over time but continues to be offered to young Boston students each summer.

▶ **Data on fadeout**

"Fadeout" is a hot topic for the field and merits some discussion. Our data are mixed. We definitely see a decline in student gains from pre-K to third grade, but the impact of the BPS's pre-K program is still significant and substantial. In addition, we still see a gap between black and white students. Our reading fluency (as measured by the DIBELS) data also demonstrate that children who attend K1 score better than students in other pre-K settings and that fewer of them slip into the at-risk category between kindergarten and second grade, so K1 attendance definitely provides some insulating. That said, our data on instructional quality reveal that first through third grade instruction needs improvement, much like preschool and kindergarten did in 2006 (see Figure 1), and hence we have shifted our focus there.

Figure 1. Differences in quality of literacy instruction K-3 (2012).

Source: Department of Early Childhood, Boston Public Schools.

KEY LESSONS

From over a decade of work connecting research to practice, we have drawn a set of key lessons that may be of use to other programs.

First, there are natural tensions in a research-practice partnership. Rigor and timeliness often conflict; careful studies can take years, while policy and practice decisions are often made in a matter of weeks or months. As one example, around 2010, a critical decision the district faced was whether to pursue NAEYC accreditation for all district elementary schools. This accreditation process is intended to improve program quality by ensuring that participating early childhood programs meet a set of 10 program standards focused on four main domains: children, teachers and staff, management and administration, and family and community relations. Though NAEYC accreditation is widely considered a marker of quality by the early childhood field, studies have produced limited empirical evidence that it has positive effects on classroom quality and child outcomes (Minnesota Department of Human Services, 2005; Whitebook, Sakai, & Howes, 1997). Accordingly, in 2008, using available district data, we examined whether undertaking accreditation was associated with higher classroom quality in the group of early adopters of the approach in the district. Importantly, schools had selected into accreditation, and the level of rigor we would have preferred was not possible in time to contribute to the district's decision-making process, but we found that NAEYC accreditation was associated with meaningful improvements in classroom quality (Sachs & Weiland, 2010). The district subsequently used the results of this analysis as one piece of evidence in making its decision to expand NAEYC accreditation to more district schools. Analyses in 2010 and 2015 also examined the role of NAEYC accreditation in the district; the 2015 results led to a shift in NAEYC work that emphasized cognitively demanding tasks for students.

Some questions are too academic in the department's view; that is, they might benefit the field but not the department. It turns down ideas from Weiland and others that fall into this category if they represent a burden without benefit for the district. Conversely, sometimes the department has had a question or a "need to know" that is either not of interest to academics or not publishable. Weiland and her team have generally taken these on just the same; their view is that to be good citizens and partners and to learn as much about the district as possible, it is important to address them. Finally, a common issue in our work has been that available funders are willing to heavily fund either the research or the program but not both. Research-practice partnership usually requires both, and managing this issue has meant cobbling together sources of support as best we can.

Second, planning matters. In September 2007, after 3 months of working with the department, Weiland prepared a memo that included a list of all data collected by the district relevant to the department, study designs that could be appropriate for answering the department's questions, and an overview of what external funding would be required to collect other types of data. This early exercise—shared and discussed with the department and the BPS director of

research—helped create a strategic plan for the kinds of questions our research partnership would address and when. A key question, for example, was whether the program was ready for an impact study and what funding would be available to carry it out. In accordance with the literature, we jointly determined that 2 years after the implementation of the district's curricula and biweekly coaching was a good time to determine whether the new model was working. The subsequent study—funded by the Institute of Education Sciences—showed that the model had the largest impacts of any large-scale prekindergarten program to date. These impacts were apparent in both outcomes directly targeted by the program—language, literacy, math, and socioemotional skills—and in a domain that was not directly targeted (executive function) but that is developmentally linked to growth in other domains (Weiland & Yoshikawa, 2013). It was critical that this evaluation was conducted when the program was ready and not before the new changes had had time to take root. A research strategic plan also helped us to be clear about which data would be used for continuous quality improvement and how, as well as how the research and data fit together.

Third, what you don't do is as important as what you do. Importantly, we collect less data than many programs do, particularly teacher-collected data. The department's philosophy is that teachers should focus on teaching, and it has pushed back against state requirements for teachers to collect data via the formative assessment systems used in most pre-K programs nationally. Weiland reviewed the literature on these systems for the department, and she concluded that there is very little rigorous evidence they provide reliable, valid data or that they change teachers' practice. Such systems require teachers to collect lengthy data on every child in their classrooms, several times a year, and they generally require paying an administrative per child fee to the licensing company. Instead, we have relied on a sampling approach and limited teacher-collected data as well as short direct assessments of child language and literacy that use well-validated, reliable measures.

Fourth, data helps you work smarter. I opened this section by recounting the inauspicious beginning of data use in the Department of Early Childhood that the scary headline on the front page of the *Boston Globe* broadcast to the community. Those very public results caused the department to slow down the pace of its expansion and invest in quality. The next time that it attempted something so ambitious as launching a preschool program, it had learned to build in data and careful piloting from the beginning. Specifically, in 2012, the department was asked to expand its model to community-based preschools in Boston. Accordingly, it carefully built in a pilot of its model in this new context and also conducted a pilot study that included observational quality measures, surveys, and interviews of key stakeholders. After 2.5 years, the results were disappointing. While quality initially increased after coaching and curricula were implemented in the first 1.5 years, these gains were not sustained, and the quality of the community-based organizations remained lower than that of BPS classrooms (Yudron, Weiland, & Sachs, 2016). The pilot study identified six barriers that contributed to implementation failure, including lack of common planning time, teachers' retention of old curricula, teacher attrition from community-based organizations, too many 3-year-olds in a program targeted to 4-year-olds, and no start time for instruction.

These barriers are being addressed—that is to say, data are helping us get smarter. The department capped the number of 3-year-olds allowed in each classroom to approximately five out of 20 students, standardized the pay increases across community-based organizations so that participating lead teachers in them receive salaries equivalent to those of BPS prekindergarten teachers, and required common planning time. The department also modified the PD it offers to community-based organizations to better incorporate their teachers into district training. Another research team (Abt Associates) is evaluating this new model and expansion effort and sharing data with the department. Findings from the first year of implementation were encouraging, and research continues (Checkoway, Goodson, Grindal, & Hofer, 2017). The pilot project and its associated research components have operated as intended in this respect—that is, as part of a continuous quality improvement system—despite somewhat disappointing overall quality changes in the organizations in the pilot project. In our view, improving preschool nationally requires more such careful program piloting and research to pinpoint specific, practical barriers to program quality improvement.

Fifth, it is important to create strategic plans, and to stick with them. Strategic plans are very effective, as they let people know what you are trying to do and how they can help. I have had many, many bosses and partners come and go in 12 years. Having a clear strategic plan with a roadmap and deliverables of what you have done and what you want to do is critical. As part of this process, you should collect data and make adjustments along the way. The data will challenge you, but the data will also provide opportunity. As part of our approach of using data to inform the program, we have created two strategic plans; the first lasted 10 years, and the second is set for 5 years. For us, creating a strategic plan with an embedded holistic theory of change is critical. Prioritizing how we should spend our time and identifying what we think are the effective strategies both help to build consensus and to provide direction for the staff. They also help to orient new staff, leadership, funders, and other stakeholders and allow them to get to know what we are doing.

I spend much of my time setting up structures and finding resources to get the work done. On my end, I usually set up a new project—such as Boston K1DS (which was subsequently supported by a federal preschool expansion grant and is now a city-funded universal pre-K program), a first- and second-grade curriculum, an Institute of Education Sciences longitudinal study, or, most recently, a childhood observational assessment—and then once it's up and running I will move on to the next. Our most recent theory of change is that all children will become internally driven learners, able to read, write, reason, solve problems, and communicate effectively by third grade, and that the BPS will close the achievement gap if we can:

- align our work with the BPS vision, implementation plan, and instructional vision;

- expand the early childhood vision to early elementary grades (first to third);

- use data to consistently improve our curriculum, PD, coaching, and assessments;

- target PD and coaching as a way to make specific changes in instructional practice;

- collaborate with teachers, instructional leaders and other departments;

- build capacity for high-quality pre-K in community-based organizations;

- expand out-of-school time programming to support working families; and

- leverage partnerships to sustain our capacity and share our findings.

Our first strategic plan focused on establishing early childhood systems in the BPS, while the second one is focused on a system to support greater expansion into community-based programs for preschool and for altering the first- and second-grade curriculum. Since our current administration is more aligned with approaches centered on coherence building and instruction and collaboration, we are spending more of our time thinking about how to capitalize on departmental interdependence so that we aren't doing the work all on our own.

Sixth, the curriculum needs to keep pace with the students. One of my big takeaways from this job is that even if you run a high-quality pre-K program with strong results, you will lose momentum in student gains if it doesn't keep up. Our curriculum history is robust:

- In 2006, we selected Open the World of Learning (OWL) and Building Blocks.

- In 2010, we wrote the Focus on K2 curriculum.

- In 2012, we re-wrote the Focus on K1 curriculum.

- In 2014, we worked with Nonie Lesaux and the Harvard team and to write Focus on First Grade.

- In 2018, we completed our rewrites of Focus on First and Second Grade.

The math curriculum continues to use Building Blocks, and TERC[3] Investigations and is taught discretely.

Our curricula have several core instructional practices that are threaded across the grades. They all have daily expectations and follow a scope and sequence. Common P-2 instructional practices include:

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[3] Formerly known as Technical Education Research Centers

- facilitating discourse and feedback[4]

- experiential learning across disciplines[5]

- consideration of variance in development, processes, and perspectives[6]

- promotion of active agency and autonomy[7]

- documentation of teaching and learning

We purposely aligned this work with the district's essential practices to allow administrators to see the connections between early childhood practices and district initiatives. In addition, we have aligned the practices with the Classroom Observation Tool (CLASS) and with district's teacher evaluation system. The curricular components we use to facilitate these instructional practices include:

- centers (called "studios" in later grades)

- thinking and feedback, a protocol for sharing work in centers

- theme (4 to 6 units per grade)

- interdisciplinary topics in science and social studies that are literacy focused

- core read-alouds that are read multiple times

- vocabulary development

- culminating projects

- phonics programs (kindergarten to second grade)

- storytelling and story acting

- literacy centers that are dedicated to small group literacy work

- discrete math time using Building Blocks and TERC Investigations

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[4] https://depts.washington.edu/cqel/PDFs/DickinsonTeacherChildConvers.pdf, http://www.wbur.org/commonhealth/2018/02/14/mit-brain-study.

[5] http://www.ascd.org/publications/books/61189156/chapters/The-Growing-Need-for-Interdisciplinary-Curriculum-Content.aspx.

[6] http://www.pz.harvard.edu/projects/multiple-intelligences.

[7] http://www.earlychildhoodnews.com/earlychildhood/article_view.aspx?ArticleID=607.

Underlying the design of the curriculum are principles of backward design and those of the Universal Design for Learning framework, as well as paying particular attention to culturally sustaining practices. We are working on:

- writing
- programs that link school to home
- observational assessment
- dual language platforms
- overall coherence for pre-K to second grade, with a particular focus on English Language Arts standards

You can explore any of our curricular and other materials on our early childhood website: (https://sites.google.com/bostonpublicschools.org/earlychildhood.)

Seventh, use NAEYC accreditation as a driver to set quality at the school level. When I was at the Department of Education administering preschool grants, NAEYC accreditation was a requirement for programs to receive a grant. The notion was that a nationally recognized outside organization had a better chance of validating quality than the local community or the state government (e.g., via QRIS). When I accepted the job at the BPS, one of the first thresholds of quality I mentioned to the mayor and superintendent was accreditation; it helped that accreditation was supposedly a requirement to receive a $2 million grant that added funds for a part-time paraprofessional in kindergarten classrooms. Although the requirement was not truly mandated, I used it as tool to underscore the importance of quality at the district level. This is a good example of how state policies can align to help improve programs.

In 2007 we started our accreditation work in earnest in 15 schools. We intentionally selected schools that ranged in size, that posed different challenges to procuring accreditation, and that had different levels of motivation with respect to earning accreditation. Initially we hired outside "mentors" who had worked with community-based programs, but we quickly learned that this was not our best strategy. We found that some of the mentors would do all of the work for the schools, not allowing them to swim on their own. We also found that too many of the mentors were treating the accreditation criteria as a checklist and not as reflective practice necessary to sustain change We decided to change our partnership with outside mentors structurally in two ways: we partnered them with a BPS coach, and we held monthly meetings with the BPS coaches and mentors to calibrate the work. We also developed an NAEYC methodology that moved the work to a deeper and more reflective space than the checklist approach. It is important to keep in mind here that while piloting work in a district is a luxury that allows you to learn with schools, there can be drawbacks, as there is urgency to the work and the possibility of a change in course direction in leadership or funders.

The costs of NAEYC supports in Boston are not trivial. We spend around $6,000 per classroom each year, and it usually takes 3 years to achieve accreditation. We now have over 40 accredited schools. To fund this work, we have used a combination of district and private money.

We are now at a crossroads with the NAEYC. Our early childhood programs go up to second grade, but the NAEYC is primarily focused on pre-K and kindergarten. As a department that is now responsible for 15,000 students, 70% of whom are on free and reduced lunch plans, we need a validation system to support all of our early childhood students. We are currently thinking through our options: maintain (but perhaps expand) the NAEYC system, adopt another K-12 accreditation system, or develop our own.

Eighth, whether degrees are critical for education workers is a fraught issue. A large number of early education workers lack bachelor's degrees, and less than a sliver have master's degrees. The work of educating and cultivating young learners is complex. Every day we ask teachers to emotionally support children, facilitate their conceptual knowledge, and crack the complex codes of reading, writing, and math. This work requires creativity, flexibility, observation, reflection, classroom management, planning, content knowledge, and an ability to respect and understand a variety of cultures that influence behavior and learning styles. Teaching is hard, and currently the data indicate that for pre-K to third grade we are not doing it well. National studies that have been conducted using the Classroom Assessment Scoring System place teachers somewhere in the 3s (on a scale of 1-7) on instructional supports, conceptual development, and language modeling.

Perhaps 20 years from now we will wonder how this work was ever done by anyone with less than a master's degree and a 2- to 4-year residency, but in today's reality the field is reluctant to require degrees and has no preservice placement requirement. The reluctance comes from the paucity of evidence around degrees, fear of losing diversity, and difficulty in finding qualified staff who are willing to work long hours for little pay. Also, people know intuitively that a degree does not make a teacher. Rather, it is in part a matter of personality traits, though it takes much more than personality; it also requires, for example, reflection, planning, and persistence.

That many early education teachers do not have degrees is also in my view connected to the fact that early education and care are often born from programs that are designed to help parents work and that are supported either through subsidies or by parent fees. Both sources of funding limit the ability to pay teachers and both pit access against quality. To be sure, the growth of the universal preschool movement is changing that, but progress is slow. To mitigate this problem, I believe preschool and its related educational requirements/certifications and compensation need to be included under the auspices of public education. This does not necessarily mean that preschool has to be delivered by the public schools: programs in New Jersey, Tulsa, New York City, and Boston offer some examples of successful mixed-delivery programs. Formally linking public schools and early education programs

> **Formally linking public schools and early education programs will not only improve compensation, PD, and supports but will also provide many more opportunities to create meaningful linkages with birth to third grade programs and to transform public education from kindergarten to third grade.**

will not only improve compensation, PD, and supports but will also provide many more opportunities to create meaningful linkages with birth to third grade programs and to transform public education from kindergarten to third grade.

Last, creating a pre-K model for community-based programs is crucial. When the BPS opened up free preschool to 4-year-olds in the city it created an economic challenge to community-based preschool programs. (Preschool is the most economically sustainable due to large ratios). The BPS quickly became a large part of the market, moving from serving around 10% of 4-year-olds to serving 55%. Teachers with BA degrees often applied for BPS jobs over community-based program jobs. Compounding the problem was that families who wanted a more "desirable" school had to apply to preschool (K1) in that system, as it increased their chance of getting their child enrolled in this school later on. This dramatic change was a disruptive influence and created tension between community-based organizations and the BPS. It also put families in the challenging position of having to choose between access, quality, and their child's K-12 experience.

The new mayor is moving in the direction of expanding preschool programs in both the public schools and in community-based programs. To assure families of equity in quality, the mayor has designated a task force to oversee the design of a mixed-delivery system. We are excited about creating a "connective" system between community-based organizations and the BPS, as it would help programs develop meaningful pathways for students that would allow information to go from teacher to teacher and directors to principals, thereby improving overall communication to families. The opportunity for schools and community-based organizations to become more interdependent on one another is also exciting; for example, if a program is funded then families in community-based organizations would come off of the BPS waitlist. Finally, this might allow us to help support 0-3 programming, which is largely structurally ignored by the public school system.

I am often asked about the cost of public schools versus cost of community-based programs, as policymakers want to weigh cost and benefit and/or how much "quality" costs. The challenge of answering these questions is that the costs to the BPS and each city and town are relative to their context. The work in community-based programs, with coaching, BA-comparable salaries, and 12 months a year for 8 hours a day, costs the same per child as that in the BPS system, if not more. In any event, the current state and federal reimbursement rate is around 60% of that cost, so much more work will have to be done to combine (or braid) funds to cover the real price of investing in early childhood education. Our current universal pre-K budget is around $11,000 per child for community-based organizations, with an additional $7,000 coming from state subsidies to cover wraparound services and nonschool days. The universal pre-K program pays teachers BPS starting salaries and provides access to comprehensive services.

CONCLUSION

My motivation for writing this chapter is to help other programs think through the steps necessary for change, which include being systematic, collecting data, staying on task, and giving staff room to grow and solve problems. That said, our team will change course and revise our strategies, methods, and partners as needed. But we do so within a framework we created for ourselves that is centered on curriculum, professional development, coaching, and partnerships.

Finally, I would like to thank the leadership of the BPS for their support of the work. I would also like to give a large thank you to the staff of the Department of Early Childhood; we have a small, determined group of people, and the focus and passion they give to their jobs and ultimately to students is tremendous. They have an incredible wealth of knowledge and expertise, and day in and day out they show themselves to be stubborn, humble, and true leaders in the field.

References

Bardige, B., Baker, M., Mardell, B. (2018). *Children at the center: Transforming early childhood education in the Boston Public Schools*. Cambridge, MA: Harvard Education Press.

Borman, G. D., & Dowling, N. M. (2006). Longitudinal achievement effects of multiyear summer school: Evidence from the Teach Baltimore randomized field trial. *Educational Evaluation and Policy Analysis, 28*(1), 25-48.

Checkoway, A., Goodson, B., Grindal, T., & Hofer, K. (2016). *Year 1 Massachusetts Preschool Expansion Grant (PEG): Evaluation Report.* Cambridge, MA: Abt Associates.

Entwisle, D. R., & Alexander, K. L. (1992). Summer setback: Race, poverty, school composition, and mathematics achievement in the first two years of school. *American Sociological Review, 57*(1), 72-84.

Jacob, B. A., & Lefgren, L. (2004). Remedial education and student achievement: A regression-discontinuity analysis. *Review of Economics and Statistics, 86*(1), 226-244.

Jan, T. (April 7, 2007). Boston preschools falling far short of goals, study says. *Boston Globe.*

Minnesota Department of Human Services (2005). *School readiness in child care settings: A developmental assessment of children in 22 accredited child care settings*. St. Paul, MN: Minnesota Department of Human Services, Children and Family Services.

Sachs, J., & Weiland, C. (2010, September). Boston's rapid expansion of public school-based preschool: Promoting quality, lessons learned. *Young Children, 74-77.*

Weiland, C., Ulvestad, K., Sachs, J. & Yoshikawa, H. (2013). Associations between classroom quality and children's vocabulary and executive function skills in an urban public prekindergarten program. *Early Childhood Research Quarterly, 28*(2), 199-209.

Weiland, C., & Yoshikawa, H. (2013). The impacts of an urban public prekindergarten program on children's mathematics, language, literacy, executive function, and emotional skills. *Child Development, 84*(6), 2112-2130.

Weiland, C., & Yoshikawa, H. (2014). Does peer socio-economic status predict children's gains in receptive vocabulary and executive function in prekindergarten? *Journal of Applied Developmental Psychology, 35*(5), 422-432.

Whitebook, M., Sakai, L., Howes, C. (1997). *NAEYC accreditation as a strategy for improving child care quality: An assessment by the National Center for the Early Childhood Work Force*. Washington, DC: National Center for the Early Childhood Workforce.

Yudron, M., Weiland, C., & Sachs, J. (2016). BPS K1DS: *Piloting the Boston Public Schools' prekindergarten model in community-based organizations*. Boston: Boston Public Schools. http://bpsearlychildhood.weebly.com/uploads/1/0/1/3/10131776/bpsk1ds_final_report_feb2016_11.pdf.