CENTER for URBAN EDUCATION LEADERSHIP

The Ounce PDI Study

Development Evaluation of a Job-Embedded Professional Development Initiative for Early Childhood Professionals

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Executive Summary

The Ounce of Prevention Fund (the Ounce) is among the premier organizations in the United States committed to the expansion and improvement of educational services for children and their families in the early childhood years. A central commitment of the Ounce is to explore and codify models of job-embedded professional development (PD) that can be implemented in community-based early childhood education (ECE) settings, and by extension, help improve the life chances of children living in high-needs communities across the United States (Yazejian, Bryant & Kennel; 2013; Educare Learning Network, 2014). In fall 2011 the Ounce was awarded a 3-year "i3" (or, Investing in Innovation) development grant from the US Department of Education to accelerate the design of an embedded PD framework for community-based urban ECE centers. Implementation of the Ounce Professional Development Initiative (PDI) occurred from January 2012 to November 2014, targeting four representative community-based ECE centers in the City of Chicago.

The Ounce designated the Center for Urban Education Leadership (CUEL) at the University of Illinois at Chicago (UIC) as its external evaluation partner (required by the i3 program). CUEL focuses primarily on policy and program design research in the area of K-12 principal preparation and leadership development. The Ounce and the CUEL share a common understanding that decisive and sustainable improvements in instructional capacity involve the development not simply of individual teacher practices, but also the capacities to support teacher development at all levels of the school as an organization. In addition, the two organizations are committed to enhancing the power of job-embedded PD through the application of design and development research methodologies. Both the Ounce and CUEL share a stake in learning how to build information systems around improvement efforts in ways that enable timely adjustments to PD design elements. For the CUEL evaluation team, this has meant striking a productive balance between the roles of independent summative evaluator and collaborative formative evaluator providing data that informs the design development process.

This report summarizes the evaluation findings from the implementation and impact study of the i3 PDI development project. We begin by introducing the context for the PDI and the logic model guiding the development strategy. Next, we provide the study questions and an overview of the design as well as the participant sample. We then summarize the findings from the fidelity of implementation and impact studies. Lastly, we offer conclusions and recommendations for future research.

Early Childhood Education at a Crossroads: The Context for the PDI

For advocates and educators who have championed the importance of early childhood education in recent years, it is no exaggeration to claim that the current decade is at once the best and the worst of times. On the one hand, a wealth of well-validated data has been assembled to effectively argue both for the impact of high quality ECE on children's lives and for the return on investment of ECE in both economic and social terms. These concerted arguments to invest significantly in ECE have in turn garnered unprecedented levels of funding to develop effective systems of monitoring instructional quality and expand PD opportunities for early childhood professionals (Yoshikawa et al., 2013). But while resources and public will for improvement have expanded, ECE as a sector continues to face formidable obstacles to the sustained "uptake" of PD and organizational capacity initiatives. Education levels among early childhood educators are the lowest across all sectors of American schooling, and are mirrored in the lowest compensation rates and highest poverty levels among the country's teachers. High levels of

teacher turnover, burnout, depression, and attrition are endemic to community-based ECE centers, and most pronounced in centers located in under-served and minority communities. While Head Start and allied state and local funding regimes have undeniably established professional supports and quality standards, they also present center leaders with a bewildering array of regulatory requirements and institutional affiliations, leading rather inevitably to professional cultures of compliance and risk-aversion. For center leaders and supervisors, managing regulatory and quality assessment regimes can become a full-time pre-occupation, leaving little time for attention to instructional quality and engagement with families (Goffin & Washington, 2007; Rohaceket al., 2012). Taken together, these constraints on local capacity pose a serious challenge to efforts to transform early childhood centers into self-sustaining professional learning organizations.

As a seasoned policy advocate and research organization, the Ounce of Prevention is well acquainted with both the ubiquity and severity of constraints on instructional improvement within the early childhood sector. As such, understandings of the dynamics of improvement sought through research on collaborative continuous quality improvement efforts informed the logic guiding the PDI model. In particular, the PDI model is grounded in over two decades of evidence from K-12 programs that indicate schools can organize themselves to improve the quality of instruction at scale—even schools engaged with the challenges faced by low-income families in underserved communities (Bryk et al., 2010). A common denominator in such schools is the exercise of leadership to create conditions and systems for teachers to build craft and knowledge together, on the school site, based upon consistently applied protocols and norms for PD (Elmore, 2004; Leithwood et al., 2011). These and related lines of research form a foundation for the ambitious design for center-wide organizational development advanced in the PDI.

PDI Logic Model

The PDI aims to build ECE leaders' systemic support of birth-to-five teachers' capacity to design and deliver standards-aligned, data driven instruction, toward the long-term goal of closing the achievement gap for high-needs students in Chicago. Through four core job-embedded PD strategies or "contexts for learning" (i.e., Learning Labs, Lesson Planning Meetings, Coaching Cycles, and Reflective Practice Groups (RPGs)), the PDI supports ECE leaders' ability to provide organizational systems and cultures to enhance teachers' instructional excellence. In particular, the PDI scaffolds the ECE leaders' capacity to support ECE teachers transition to a teaching approach that: (a) aligns their curriculum, instruction and assessment practices to the IELS' and core curriculum and development goals for infants, toddlers, and preschoolers; and (b) employs routines of collaboration and protocol informed inquiry cycles within teaching teams in an effort to encourage reflection intended to improve decision-making so that they provide high-needs children with evidence-based interactions that are socially supportive, organized, and instructionally challenging.

To this end, the PDI also develops the knowledge, skills, and capacity of PDI Coaches, who are charged with rigorously implementing the PDI, making model-informed decisions when contemplating adaptations in the course of PD delivery, and working with the project team and evaluators to inform ongoing development of the PD design and implementation. By aligning the professional learning cycles of these four key stakeholders –center leaders, direct supervisors, teachers, and coaches – early learning settings are poised to realize significantly improved standards-aligned instruction in the classroom, leading to better results for young high-needs children over time.

Evaluation Goals

The purpose of the 3-year evaluation study was to assess the effectiveness of the Ounce PDI in advancing the knowledge, skills, and dispositions of community-based early childhood leaders and teachers in relation to creating the conditions for superior developmental outcomes and kindergarten readiness for low-income, under-served students served by these community-based centers. Therefore, the evaluation pursued three broad goals: First, we intended to monitor and summarize patterns of implementation over the full span of the PDI in order to assess fidelity and feasibility of implementation. Second, we aimed to assess impacts of implementation on the professional learning of teachers, leaders, and coaches, and more distally, upon the growth and development of children in all intervention centers. Third, drawing on Improvement Sciences methodology, we planned to strike a productive balance between the roles of independent external summative evaluator and collaborative formative evaluator providing rich and timely data and feedback to the design development process.

Guiding Research Questions

1. Overall, was the PDI activity implemented with fidelity as the designers intended? Was the PDI activity engaged and received by the participants as intended? How feasible is the implementation of the Ounce PDI in diverse community-based provider settings and contexts?
2. Was the information processed and understood (i.e. learned) by leaders and teachers as a result of their participation in the PDI?
3. Does the PDI produce a significant increase after two years of implementation in the social-emotional development, language and communication development, and cognitive development of students in the classrooms of PDI-involved teachers compared to outcomes of students in comparison teachers' classrooms?

Research Design

We employed a mixed methods approach to the design of our study. For the implementation study we measured fidelity for six key components of the PDI model. For the impact study, a quasi-experimental design was used to test impacts for both students and classroom teachers for the intervention and comparison conditions.

Implementation Study Sample

Participants for this study included 15 predominantly female community based early childhood leaders of color (i.e. center owners, directors, and direct supervisors) who supported 60 predominantly female Black and Latino teachers in four community based early childhood centers serving approximately 600 low-income families and children of color in the City of Chicago. Centers were selected by the Ounce through an application process that required center leaders to demonstrate the interest of leaders and teachers in undertaking a demanding JEPD process. Analyses indicated that the four centers selected for the study were demographically representative of Head Start centers located in high needs communities in Chicago.

Impact Study Sample

Several criteria were initially applied to select a cadre of non-PDI comparison centers for use in the classroom practice and student developmental impact analyses. First, all comparison centers had to be located within the city of Chicago. Second, comparison centers were restricted to a pool of centers receiving both Head Start and Chicago Public School funding. Third, in the case of the one not-for-profit (NFP) intervention center, matches also were required to have Early Head Start funding to assure parity in

overall budgets within the NFP comparison group. The comparison site selection process yielded a pool of 45 Chicago comparison centers including four intervention centers (or five intervention locations, as one intervention center included two distinct locations) and a pool of 40 comparison sites.

Fidelity of Implementation Findings

Overall, our evidence indicates that the key components were implemented as intended and that ECE leaders, teachers, and coaches successfully engaged with intensive, job-embedded PD, as indicated by meeting fidelity at the program level overall. Fidelity of implementation for the indicators related to coach development was consistently high and met thresholds in all years, as the eight-coach cadre consisted of highly experienced professionals who were deeply committed to program quality improvement. Variation in implementation and attendance for leaders and teachers was more evident. Several contextual factors help us understand why this variation occurred in the initial phase of implementation, which resulted in falling short of fidelity thresholds for two of the six components in Year 2. However, evidence presented in *Table 1* suggests that once these factors were addressed, fidelity to the model improved during full implementation in Year 3.

Table 1: Component Level Fidelity of Implementation Findings for Year 2 and 3

	Year 2		Year 3	
Key Component	*Component Score*	*Implemented with Fidelity**	*Component Score*	*Implemented with Fidelity**
1. Coach Community of Practice	100%	**Yes**	100%	**Yes**
2. PDI Implementation	50%	No	75%	**Yes**
3. Coach Professional Development	100%	**Yes**	100%	**Yes**
4. Teacher Professional Development	100%	**Yes**	100%	**Yes**
5. Direct Supervisor Professional Development	0%	No	100%	**Yes**
6. Center Leader Professional Development	75%	**Yes**	100%	**Yes**

* *More than 75% of centers implemented component with fidelity in order to meet overall program fidelity*

Analyses also indicated that the measures of PDI engagement for direct supervisors and center leaders received the lowest levels of fidelity and therefore no points for that indicator were awarded as seen in *Table 2* and *Table 3*. When rolled up in the total score, it was these measures that created the greatest barriers to achieving overall fidelity on that key component during Year 2 of implementation. Meeting expected levels of fidelity for Key Component 2 is challenging, in general because it requires that centers can swiftly develop systems that embed routines for collaboration into the daily operations of the center. This can raise several questions for leaders including how to coordinate meetings in relation to other required meetings and how to provide coverage for teachers so that they are able to meet together.

Table 2: Key Component 2 Indicator Construct-Level Rating in Year 2

Key Component 2 Indicator PDI Implementation:	Center 1	Center 2	Center 3	Center 4
1. For Teachers	Mid	Mid	Mid	Mid
2. For Teachers in a compressed timeframe	Mid	High	High	High
3. Of consultation contexts for direct supervisors	Low	High	High	High
4. Of consultation contexts for direct supervisors in a compressed timeframe	Low	High	High	Low
5.For direct supervisors and center leaders	High	High	High	High
6. For direct supervisors and center leaders in a compressed timeframe	High	High	High	High
7. Of consultation contexts for center leaders	High	High	High	High
8. Of consultation contexts for center leaders in a compressed timeframe	Low	High	High	High

Table 3: Key Component 5 Indicator Construct-Level Rating in Year 2

Key Component 5 Indicator Direct Supervisor:	Center 1	Center 2	Center 3	Center 4
1. Attendance to PDI contexts for learning for center leaders	Mid	Mid	Mid	Mid
2. Attendance to embedded PDI contexts for learning for teachers	Low	Low	Low	Low
3. Attendance to the consultation contexts for direct supervisors	Mid	Mid	Mid	Mid
4. Advancement of knowledge	High	High	High	High

Because the PDI logic model expects direct supervisors to be most engaged in sustaining embedded PD for teachers beyond the grant period, they were the focus of additional fidelity measures. Specifically, the PDI expected direct supervisors to attend the lesson-planning meeting for one teaching team per month and the teacher RPG every other month in order to observe the way in which the PDI coach facilitated such sessions. It is plausible that the presence of coaches in settings like lesson planning prompted a degree of role confusion for direct supervisors in relation to their supervised teachers. However, when the expectations became more clear at the beginning of Year 3, the cadre of direct supervisors increased their fidelity to the model's intended thresholds for engagement in the contexts for learning for teachers.

Leader Growth

We evaluated evidence regarding whether center directors and supervisors actually accomplished the kinds of conceptual growth intended by the PDI design for leader learning. Our analysis on balance indicated that the PDI leader learning cycles were successful in supporting the majority of center leaders to critically examine their current leadership conceptions and grapple authentically with a challenging set of new leadership principles. The PDI learning experiences appeared especially effective in broadening narrow "transactional" leadership frames to include the more inclusive and ambitious mindsets associated with a "transformational" leadership repertoire (Donaldson 2008; Leithwood et al., 2011).

Three features of the PDI design emerged as particularly catalytic for leader PD. First, there was an exceptional synergy between the curricular focus of the PDI – and especially the transaction between the Five Essentials Framework and the Classroom Assessment Scoring System (CLASS) assessment – and the two-month cycle of learning labs, on-site consultations, and reflective practice groups. Both the 5 Essential Supports and the CLASS provided leaders with the kind of "optimal" cognitive stretch that was sufficient to initiate the deconstruction of entrenched ideas and mindsets. Second, embeddedness of leader learning within the teacher learning cycles created weekly opportunities for leaders to translate new principles into keener instructional observation, stretch their comfort zones in areas like generative questioning and data dialogue, and receive regular feedback regarding their efforts from their coaches. Third, for leaders whose daily professional experience is often limited to their center buildings, the cross-site learning labs and reflective practice sessions provided a welcome venue both for collaborative learning and professional encouragement. A supportive cross-site professional learning community did cohere with time to become both a safe zone and a stretch zone, in which directors and direct supervisors could remake their practices and their leader identities.

Teacher Growth

We assessed whether the contexts for learning for teachers (i.e. Learning Labs, Lesson Planning Meetings, Coaching Cycles, and Reflective Practice Groups (RPGs)) advanced teacher knowledge, skills, and dispositions as intended by the PDI. Although variation occurred in terms of depth of advancement, the evidence suggests that the PDI did help the teachers develop a more accurate, coherent, and comprehensive pedagogical narrative. The PDI was particularly effective in strengthening the teacher's ability to be more intentional or "to act purposefully with a goal in mind and a plan for accomplishing it" (Epstein, 2007, p. 4). The PDI feature of routines for collaboration (i.e. teaching team lesson planning meetings and age-level reflective practice groups, specifically) was most essential for teacher PD.

We assessed change in teachers' classroom practice through direct observations using the age-appropriate Classroom Assessment Scoring System (CLASS) tool conducted by reliable CLASS assessors. Although qualitative evidence points to the PDI advancing the teachers' pedagogical knowledge and dispositions, a linear regression analysis employed to measure PDI's impact on PreK classroom practice found no difference between PDI centers (N=4) and comparison centers (N=12) from pre-intervention to post-intervention scores. Additionally, a repeated measure analysis of variance was employed to assess whether CLASS scores within the PDI centers improved significantly over the intervention period years 2013, 2014, and 2015 for toddler and PreK classrooms respectively. No statistically significant trends emerged, in part due to small sample sizes and low statistical power. An examination of trends in average social-emotional and organizational support domain scores did suggest an improvement trend at the infant, toddler, and PreK levels. From another angle, the percent of infant, toddler, and PreK classrooms providing mid-to-high levels of instructional practice also appeared to increase (from 0% in 2013, to 67% in 2014, and 76% in 2015). We find that further study is warranted to assess whether these trends prove significant in a larger sample of ECE classrooms.

Child Impact Results

The impact of the PDI model was assessed using students' performance measures on the GOLD Teaching Strategies measures in Social Emotional, Language, Cognitive, Literacy, and Mathematics subscales. A sub-population of children was assessed on the GOLD English Language Acquisition objectives. Children

ranged in categories of infant, toddler, and PreK age groups. Baseline measures were collected in fall 2012, quarterly progress checkpoints occurred between winter 2012 and winter 2014, and the final impact measures were collected in spring 2014. A quasi-experimental pre/post design using hierarchical linear models was applied to measure the PDI model impact effect for both one-year and two-year child cohorts (N=1,162) to determine if there was a significant difference in adjusted mean scores at the end of the intervention period accounting for the children's age-standardized baseline measures, child level characteristics, and center level characteristics. Children enrolled in intervention centers for either one or two academic years were included in the sample to assess if there was an incremental intervention effect if children were enrolled in PDI intervention centers for a longer period of time The results for the GOLD domain measures and the GOLD English Language Acquisition composite scale indicated that the PDI model did not have a significant effect on the children's learning and development. We did not detect any significant interaction effects of the PDI on post-intervention scores for children enrolled in PDI centers for two-years versus one year.

However, as seen in *Figure 8-1*, a comparative time-series analysis aimed at assessing the impact of the PDI model on children with greater exposure to the PDI yielded a statistically significant PDI effect in average growth rates in children's Social Emotional Learning and Development. Specifically, longitudinal hierarchical linear growth models were applied to determine if there was a significant difference between the rates of learning and development on the GOLD Social Emotional, Language, Cognitive, Literacy, and Mathematics learning between children in PDI centers and comparison center peers with two full years of ECE enrollment. The PDI model intervention lessened the gap in child social emotional development between the intervention and comparison center children with a medium effect size (δ = .60, p < .05). This impact does comport with the intervention's focus on improving the quality of social and emotional interactions between teachers and students as the base for realizing further student development in the cognitive and academic learning domains.

The **PDI had a positive impact** on closing the gap in **Social Emotional Learning and Development** for those children with two years of PDI exposure.

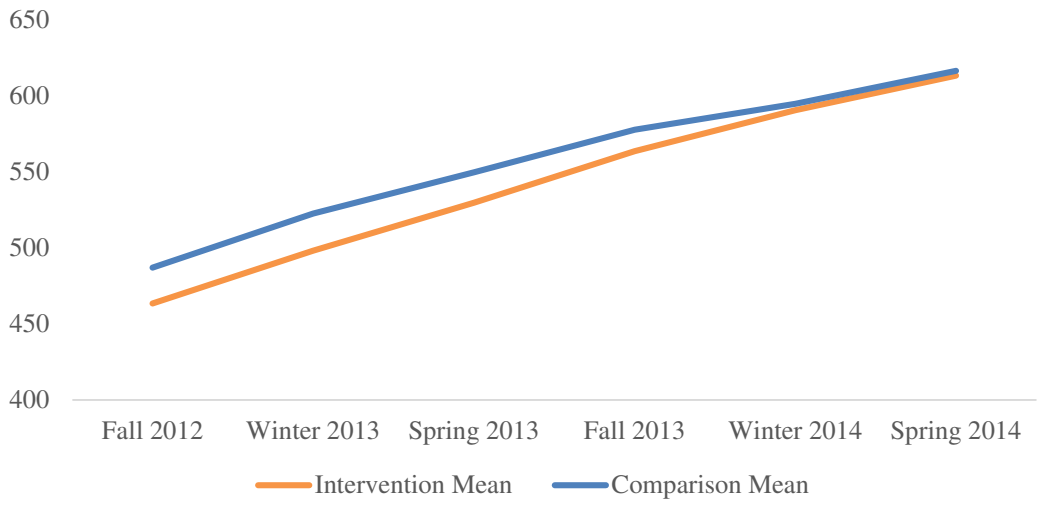

Figure 1: GOLD Social Emotional Unadjusted Mean Growth Trajectory

Additionally, the *Bracken School Readiness Assessment- Third Edition* (BSRA-3) was used to independently assess the school readiness of the children enrolled in the PDI centers in comparison to demographically-similar children in comparison centers. The BSRA-3 evaluates a child's understanding of 85 important foundational academic concepts children need to know in order to be prepared for early formal education. A quasi-experimental pre/post design using hierarchical linear models was applied to measure the PDI model impact effect for both one-year and two-year student cohorts (N=58) to determine if there was a significant difference in adjusted mean scores at the end of the intervention period accounting for students' baseline measures. The results for the Bracken School Readiness Assessment indicate the PDI model did not have a significant effect on the child's readiness for school in comparison to children who were interacting with teachers who did not engage in the PDI.

Conclusions and Recommendations

The evidence warrants the conclusion that the centers were successful in implementing the PDI with fidelity. When considering all the work involved in re-organizing a center to support a concerted program of job-embedded PD, the ability to meet fidelity for the majority of the indicators is an impressive outcome of the implementation study. Meeting fidelity of implementation suggests that implementing high quality job-embedded PD is feasible in community-based early childhood centers. As such, the leaders and teachers within those centers are willing and able to overcome the many challenges that arise with intensive PD.

Although the quasi-experimental pre/post design hierarchical linear models applied to measure the PDI model impact effect for both one year and two year child cohorts did not have a significant effect on the children's development, a comparative time-series analysis for children who were exposed to the intervention for the full two year period did have a positive impact on closing the gap in the area of social emotional learning and development. Given that the PDI was designed to advance ECE teachers' pedagogical knowledge of social emotional development, these results reflect the model's effectiveness in supporting instructional practice that acknowledges that the best learning occurs within a context of supportive relationships that makes learning engaging, meaningful, and challenging (Collaborative for Academic, Social, and Emotional Learning, 2013).

Based on the body of evidence amassed over three years and our evaluation team's close acquaintance with the implementation process and the adjustments to the PDI design over time, we offer the following six recommendations for future implementations of the design.

1. ***Initiate PDI with Intensive Preparation of Center Leaders***. The PDI began with a strong commitment to the proposition that the improvement of ECE instruction is fundamentally a matter of organizational capacity, and not simply of the cumulative enhancement of individual teaching skills. This implied significant attention to the leadership capacity of centers, particularly in the domain of instructional leadership. The importance of leadership to accomplishing all elements of the PDI design became increasingly evident as the Initiative progressed. Given the considerable early adjustments in schedules, logistics, and mindsets asked of leaders by PDI, there was consensus among center directors that an intensive period of orientation and PD for centers leaders prior to engaging teacher teams would have advanced the implementation of PDI with teachers, particularly in Year 1.

2. ***Prepare and Execute the Re-development of Reflective Supervision Among Direct Supervisors Earlier in the PDI Process.*** The sustainability of the PDI job-embedded PD cycles for teachers depended on a well scaffolded "hand off" of facilitative functions from the coach to direct supervisors, with sufficient time for those supervisors to gain confidence in JEPD practices. This transition did occur at all sites in the PDI pilot project, but was delayed both by the difficulty of exposing direct supervisors consistently to key practices, and to a lack of clear guidelines for coaches around how to scaffold and pace the transition. We recommend that clearer protocols for coaches and direct supervisors be developed to support an earlier and more sure-footed transition in future implementations.

3. ***Distinguish the content and functions of learning labs and reflective practice groups (RPGs) for leaders.*** The distinct formats and functions of learning labs and RPGs for teachers were distinguished clearly from an early point in the project. In the case of leaders, however, both learning labs and RPGs remained strongly focused on transmitting vital information to leaders, often using PowerPoint presentations, combined with large and small group discussion formats. Only in the last year of the project did leaders assume a more active role in setting RPG agendas and leading discussions around evidence sources linked directly to leader practice such as video. We recommend that leader RPGs shift more quickly into more active, reflective, and leader-initiated patterns in future implementations in order to elevate the distinct and intended impacts of RPGs within the PDI design.

4. ***Don't under-estimate the challenges of equipping coaches to facilitate comprehensive JEPD***. The Ounce designers anticipated several of the transformations in behavior and mindset that the PDI would require of coaches. In response they facilitated the regular convening of coaches in professional learning formats to involve them as active collaborators in developing training content and to reflect on problems of practice in the field. Coaches generally affirmed the value of their professional learning community sessions. That said, and even with training in skill sets like Motivational Interviewing, considerable time was required to equip coaches with the lexicon and concepts of the 5 Essential Supports and (for some coaches) the CLASS. Coaches were also more accustomed to "supportive" than "challenging" modes of discourse with teachers, and were generally uncomfortable with coaching center directors. Similar to leaders, we recommend that reflective practice sessions for coaches develop clearer protocols to guide coach discussion of difficult problems of practice, making greater use of rich and direct evidence sources such as audio and video. Limited use of these resources in the PDI pilot evinced great promise for shifting coach mindsets and skill sets.

5. ***Don't under-estimate the experience of "overwhelm" in the first phase of comprehensive JEPD***. The evaluation produced encouraging findings that representative ECE teachers and leaders in Head Start settings have both the capacity and willingness to grapple with complex developmental concepts, and will translate these concepts into improved practice when scaffolded skillfully. This willingness did not prevent leaders and teachers from experiencing significant stress and fatigue early in the project as the intensity of the PDI curriculum and the frequent presence of coaches as observers became evident. While this "overwhelm" should be addressed wherever possible through design adjustments as recommended here, we believe that some level of early stress is endemic to the PDI's ambitious transformational agenda. Because the evaluation provides evidence that the phase of stress does give way to professional growth and confidence, we recommend that leaders and teachers be more effectively oriented to what to expect from the change process at the outset of this approach to JEPD.

6. ***Permit greater flexibility in the scheduling of coaching sessions to moderate the physical presence of coaches and maximize the impact of coach observations***. The evaluation documented the development of generally warm and professionally productive relationships between coaches and teachers at all four intervention centers. Teachers grew attached to their coaches in productive ways and looked forward to PD sessions. However, teachers also were critical when coaching schedules separated the days for varied functions such as lesson planning, observation sessions, and reflective feedback. Such separation created the feeling that the coaches were a ubiquitous presence, while reducing the benefits of rapid feedback to on-site observations. We therefore recommend that coaching schedules be aligned to teacher schedules in ways that link varied coaching functions as closely as possible in time both to maximize coaching benefits and reduce the stress on teachers associated with the presence of coaches.

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Glossary of Abbreviations and Acronyms

ANOVA	Analysis of Variance (Statistical Model)
BSRA	Bracken School Readiness Assessment
CLASS	Classroom Assessment Scoring System
CPP	Community Partnership Program
CPS	Chicago Public Schools
DAP	Developmentally Appropriate Practice
DFSS	Department of Family Support Services
ECE	Early Childhood Education
ECERS	Early Childhood Environmental Rating Scale
ELL	English Language Learners
ERS	Environmental Rating Scales (Includes ITERS & ECERS)
Five Essentials	Five Essential Supports
FACES	Family and Child Experiences Survey (Head Start)
FRL	Free and Reduced Lunch
FSS	Family Support Specialists
HLM	Hierarchical Linear Model
HSPS	Head Start Performance Standards
i3	Investing in Innovation Grant Program (US Dept. of Ed.)
IELS	Illinois Early Learning Standards
IEP	Individual Education Plan
IFSP	Individual Family Support Plans
IL QRS	Illinois Quality Rating System
IRB	Institutional Review Board
ITERS	Infant/Toddler Environmental Rating Scale
JEPD	Job-Embedded Professional Development
KWLH	Know-Want to know-Learned-How to learn (Assessment)
LL	Learning Lab
LLC	Leader Learning Cycles
LPM	Lesson Planning Meeting
MI	Motivational Interviewing
NAECY	National Association for Education of Young Children
NFP	Not for Profit
PD	Professional Development
PDI	Professional Development Initiative
PFA	Pre-School for All
PLC	Professional Learning Community
QED	Quasi Experimental Design
RCT	Randomized Controlled Trial
RFP	Request for Proposals
RPG	Reflective Practice Group
SOC	Stages of Change (Assessment)
SPSS	Statistical Predictive Analytic Software
TSI	Teaching Strategies Incorporated
TTM	Trans-theoretical Model
TS GOLD	Teaching Strategies GOLD (ECE child assessment system)
UIC	University of Illinois Chicago

Chapter 1 INTRODUCTION TO STUDY

The Ounce of Prevention Fund is among the premier organizations in the United States committed to the expansion and improvement of educational services for children and their families in the early childhood years. While involved in a range of program and policy initiatives, the Ounce is particularly noted for its Educare Schools which combine high quality professional development (PD) for teachers and administrators with research-based instructional practices. A central commitment of the Educare approach is to explore and codify models of job-embedded PD that can be adapted to other community-based ECE settings, and by extension, improve the life chances of children living in high-needs communities across the United States (Yazejian, Bryant & Kennel; 2013; Educare Learning Network, 2014). In October 2011 the Ounce was awarded a 3-year "I3" (or, Investing in Innovation) development grant from the US Department of Education to accelerate its adaptation of Educare PD strategies to community-based, urban early childhood education (ECE) settings. Implementation of the grant began in January 2012, targeted to four representative community-based early childhood centers in the City of Chicago, and continued through December 2014.

The Ounce designated the Center for Urban Education Leadership (CUEL) at the University of Illinois at Chicago (UIC) as its external evaluation partner (required by the USDOE i3 program). Under the leadership of Dr. Steven Tozer, CUEL has gained a national reputation for policy advocacy and program design research in the area of K12 principal preparation and leadership development. While CUEL's primary focus has been K12 principal preparation, two features of the Ounce's Professional Development Initiative (or PDI) made a research alliance with CUEL a promising venture. First, the Ounce and the CUEL share a common understanding that decisive and sustainable improvements in instructional capacity involve the development not simply of individual teacher practices, but also the capacities to support teacher development at all levels of the school as organization. These organizational supports require shifts in leader practices that range well beyond the managerial paradigms of traditional principal or center director roles (Cosner, Tozer & Smylie, 2012).

Second, the Ounce and the CUEL share a strong commitment to enhancing the power of job-embedded PD through the application of design and development research methodologies. For the CUEL this has involved learning how to design and align job-embedded coaching and academic coursework in settings such as full-time school leader internships. For the Ounce's PDI, this will involve learning how to closely articulate cycles of training, coaching, and collective reflection within sufficiently compressed time frames to consolidate improvements in classroom team practice and internalize capacity to sustain improvements over time. Both the Ounce and CUEL share a pressing stake in learning how to build information systems around improvement efforts in ways that enable timely (and when possible, rapid) adjustments to PD design elements. For the CUEL evaluation team, this has meant striking a productive balance between the roles of independent summative evaluator, on the one hand, and collaborative formative evaluator providing rich and timely data and feedback to the design development process.

In this report we summarize the primary findings of UIC's three-year implementation and impact evaluation of the Ounce's Professional Development Initiative. We begin by providing a context for the study including a brief review of key literature supporting the Ounce's general strategy for addressing the PD needs of urban community-based ECE centers.

The Context for the Ounce PDI

For advocates and educators who have championed the importance of early childhood education in recent years, it is no exaggeration to claim that the current decade is at once the best and the worst of times. A wealth of well-validated data has been assembled to effectively argue both for the impact of high quality ECE on children's lives and for the return on investment of ECE in both economic and social terms (Institute of Medicine and National Research Council, 2012; Yoshikawa & Weiland, 2013). These concerted arguments to invest significantly in ECE have, in turn, garnered surprising levels of bi-partisan political support for early childhood interventions at a time of polarized debate over most other educational initiatives. This has led to the development of systems of learning standards similar to those in K-12 to guide the improvement of ECE practice in most states. Additionally, it has buoyed a willingness among national and state legislatures to fund innovative strategies to improve instructional quality in the ECE sector, provided these efforts articulate to themes of accountability, cost-effectiveness, and long-term impact on K-12 student outcomes. As a result, significant funding is now available in many states to develop effective systems of monitoring instructional quality and expand PD opportunities for early childhood professionals (Yoshikawa et al., 2013).

While resources and public will for improvement have expanded, ECE as a sector continues to face formidable obstacles to the sustained "uptake" of PD and organizational capacity initiatives. Education levels among early childhood educators are the lowest across all sectors of American schooling, and are mirrored in the lowest compensation rates and highest poverty levels among the country's teachers. High levels of teacher turnover, burnout, depression, and attrition are endemic to community-based ECE centers, and most pronounced in centers located in under-served and minority communities (Brandon & Martinez-Beck, 2006; Bullough, Hall-Kenyon & MacKay, 2012). While Head Start and allied state and local funding regimens have undeniably established professional supports and quality standards, they also present center leaders with a bewildering array of regulatory requirements and institutional affiliations, leading rather inevitably to professional cultures of compliance and risk aversion. For center leaders and supervisors, managing regulatory and quality assessment regimens can become a full-time pre-occupation, constraining time for attention to instructional quality and engagement with families (Goffin, 2007; Gonzalez, 2014). Taken together, these constraints on local capacity pose a serious challenge to efforts to transform early childhood centers into self-sustaining professional learning organizations.

As a seasoned policy, practice, and research organization, the Ounce of Prevention Fund is well acquainted with both the ubiquity and severity of constraints on instructional improvement within the early childhood sector. But three lines of research and development in educational settings have persuaded Ounce leaders that ambitious professional and organizational development can be undertaken in community-based ECE settings. First, an emerging body of evidence drawing upon improved assessment tools (e.g. the CLASS) now supports the view that representative early childhood teachers can learn to improve their quality of practice significantly (Tout, Zaslow & Berry, 2006; Fukkink & Lont, 2007; Howes, Hamre & Pianta, 2012). These improvements, in turn, translate directly to improved learning outcomes for low-income children (Landry et al, 2009; Demitrovich, 2010; Burchinal et al., 2012). Second, over two decades of evidence from K-12 programs indicates that schools can organize themselves to improve the quality of instruction at scale, even schools engaged with the challenges faced by low-income families in underserved communities (Bryk et al, 2010; Payne, 2010). A common denominator in such schools, from coast to coast, is the exercise of leadership to create conditions and

systems for teachers to build craft and knowledge together, on the school site, based upon consistently applied protocols and norms for PD (Elmore, 2004; Leithwood et al, 2011).

Third, a clear paradigm shift has occurred in understandings of PD as a vehicle for standards-based reform (McLaughlin & Talbert, 2006; Croft et al., 2010). In contrast to traditional "one-off" modes of PD, the emerging paradigm is "...long-term, school-based, collaborative, focused on students' learning, and linked to curricula...teachers examine student work, develop performance assessments and standards-based report cards, and jointly plan, teach, and revise lessons" (Hiebert, Gallimore & Stigler, 2002, p. 3). Such "job embedded" models are demanding in that they expose gaps in knowledge and competence, challenge personal dispositions, promote the distribution of leadership opportunities, and disrupt stable organizational patterns in favor of innovation (Smylie, 2010). Available evidence suggests, however, that when leader and teacher PD strategies are integrated around shared protocols of continuous improvement, professional identity benefits and instructional improvement ensues (Heck & Hallinger, 2009; Leithwood et al., 2011).

Not all analyses of the merits of job-embedded PD approaches are equally impressive or sanguine. Even convinced advocates of investment in JEPD (Job-Embedded Professional Development) designs acknowledge that they can be time-intensive for participants, expensive in terms of assets like on-site coaching, and demanding in terms of scheduling and the coordination of elements and resources (Males et al., 2010; Croft et al., 2010; Ochshorn, 2011). Moreover, quality of implementation remains a fundamental challenge. A recent survey study commissioned by the Gates Foundation found that teachers and district administrators agreed on the broad outlines of effective PD, including that experiences be directly relevant to classroom practice, professionally respectful, interactive, and delivered by facilitators with deep content expertise. Many teachers were highly dissatisfied however with the quality of implementation, facilitation, and delivery of core formats of many embedded PD approaches such as coaching and professional learning communities (PLCs). As a result, while many teachers value opportunities to collaborate around lesson planning, peer-to-peer observation, and lesson study, they continue to associate "professional development" with externally imposed expectations of compliance (Boston Consulting Group, 2014). Their findings echo the observations of PD researcher Thomas Guskey: "Researchers have shown…that simply adding more time for job-embedded activities is insufficient. Doing ineffective things longer doesn't make them any better. Instead, we must ensure that the extended time provided for PD is structured carefully and used wisely, engaging educators in activities shown to yield improved results" (Kreider & Bouffard, 2006).

As a sector with a long legacy of investment in professional training, Early Childhood educators and researchers have engaged the national discourse on job embedded PD with an open but critical eye. On the one hand, there is near unanimous consensus that fragmented or generic PD offerings extracted from the settings in which teachers work have been especially problematic for the improvement of ECE teaching (see Bryant et al., 2009 for review). Low professional capital, high levels of teacher turnover, and severe scheduling constraints all limit the diffusion of individual learning into the professional communities of today's ECE centers, including Head Start centers (Dickenson & Caswell, 2007; Ochshorn, 2010). In response, researchers have begun to cull the corpus of ECE PD studies to identify features and formats of PD that engage teachers effectively and yield instructional improvements. Zaslow and colleagues (2012, pp xii-xiv) extensively reviewed the ECE PD to summarize several core elements

of effective ECE PD. Their list included: a) specific and articulated objectives for PD; b) explicit focus and attention given to linking the focus on early educator knowledge and practice; c) collective participation of teachers from the same classrooms or schools in PD; d) intensity and duration of PD is matched to the focal content; e) educators are prepared to conduct child assessments and interpret their results as a tool for ongoing monitoring of PD effects; f) PD is appropriate for the organizational context and aligned with standards for practice (adapted from Hamre and Hatfield, 2012, p. 217).

Several recent evaluation studies have yielded promising findings regarding the impacts of JEPD designs both on teaching quality and student outcomes. Notably, JEPD approaches have been adopted both to maximize fidelity of implementation of interventions of increased student learning as well as to deepen understanding of the theory behind these interventions for the implementing teachers. At the "fidelity" end of the spectrum, the HEAD START CARES demonstration project sought to compare three instructional interventions designed to enhance children's social-emotional development. A comprehensive embedded PD program was adopted to intensify all elements of implementation fidelity and provide a fair test of the three approaches within an RCT (randomized controlled trial) evaluation design. The study found that the "…teacher training and coaching were generally implemented as intended, supporting satisfactory implementation…of the social-emotional enhancements in Head Start classrooms, and leading to the expected influences on teachers practices…" (Morris et al., 2014, p. 2).

Other studies have tested specific embedded PD strategies against non-intervention conditions. In most cases the interventions have combined the various modes of delivering research-based information about the improvement of practice with on-site coaching and consultation with a clear instructional focus (Powell, Diamond & Burchinal, 2012). The Quince-PFI study (2009) investigated whether a specific approach to on-site consultation – Partnerships for Inclusion (PFI) - would better equip ECE teachers to employ assessment strategies and elevate instructional quality and child outcomes, both in ECE centers and home day care settings (Bryant et al., 2009). The PFI intervention was of particular interest because it combined a strong regimen of ongoing training for consultants with a flexible approach to coaching teachers that could respond flexibly to teachers' baseline capacities and organizational circumstances. As the authors noted, the PFI model built on prior research "…that suggests greater change is possible when individuals are involved in assessing their own needs, receive individualized support over an extended period of time, and have opportunities to apply new knowledge and skills in their own work setting" (2009, p. 1). The authors reported statistically significant impacts of PFI on instructional quality and student learning in both the center and home care settings, compared with demographically similar settings receiving the usual range of Head Start PD offerings. Fidelity to the intended frequency of visits to settings varied widely among consultants, although all consultants were assessed to have engaged teachers in the collaborative manner intended by the model. But an investigation of several factors pertaining both to the consultants and the target settings did not yield significant correlations to fidelity ratings.

Landry and colleagues (2009) compared the impacts on instructional quality and children's school readiness of four PD designs with a non-intervention condition. The four PD conditions all provided on-line information about language and literacy instruction but varied the dosage of two other features: direct coaching/mentoring in the classroom, and detailed feedback around the progress of students. The primary finding was that both teaching behaviors and children's language capacity showed the greatest

improvements in the condition that combined on-site mentoring, detailed data on child progress, and the on-line curriculum. Their findings also are in line with Justice and McGinty's conclusion that "…PD employed to support educators' use of specific early literacy interventions ought to emphasize issues related to intervention intensity (the 'how much') as strongly as issues related to the targets (the 'who') and techniques (the 'how') of a program" (2012, p. 90).

Similarly, the Head Start REDI (Research-based, Developmentally Informed) evaluation tested the theory that interventions to enhance children's language competencies and social-emotional skills would see greater impacts from PD attending both to curricular enrichment and higher quality pedagogy (Domitrovich et al., 2010). Teachers received an aligned mix of off-site workshops and on-site facilitation from trainers to learn the delivery of a developmentally sequenced curriculum featuring word games, interactive reading strategies, and self-regulatory and interpersonal management skills (via the Preschool PATHS curriculum). The facilitation strategies "…were designed not only to help teachers learn the mechanics of conducting the curriculum lessons in the context of Head Start, but also to help the teachers understand the theory and rationale for the enhancements" (2012, p. 71). Following a series of introductory large group workshops, REDI trainers spent roughly three to four hours per week with teacher teams observing instruction, facilitating lesson planning, and providing feedback to the teacher's implementation efforts. The articulation between workshops and coaching evolved through the year, with a mid-year workshop introducing more advanced teaching techniques, and embedded trainers using videotape, reflective discussion, and goal-setting to consolidate the progress of teachers. Use of Hierarchical Linear Models in an RCT evaluation design allowed researchers to examine independent and interaction effects on teaching quality as well as children's linguistic and social-emotional functioning. The results indicated significant improvements for instructional quality attributable to the embedded PD regimen, while the condition of embedded PD (including intensive coaching) plus the PATHS curriculum yielded the strongest linguistic and SEL gains for children (Domitrovich et al., 2009). Erikson Institute's Early Mathematics Collaborative is using a similar embedded PD strategy with an enhanced curriculum in the area of numeracy, with promising early impact results reported for teachers and students (Chen et al., 2013).

An important, emerging focus of early childhood PD involves both the importance of PD for center leaders and the role of such PD in the web of supports for teacher learning and student growth (Research Center for Leadership in Action, 2007; McCormack Center, 2012). Several factors are driving this renewed interest in and concern about leadership. First, a convincing body of evidence from the K-12 sector now links principal leadership strategies to the improvement of student learning outcomes (Bryk et al., 2010; Branch, Hanushek & Rivkin, 2013). What stands out in this literature is a challenging shift in thinking from compliance management to the facilitation of ambitious adult learning. Highly effective principals influence student achievement primarily through learning how to transform working relations among adult professionals - toward high expectations for all, distributed leadership, inquiry-based collaboration, and the development of facilitative systems (Leithwood & Riehl, 2003). Learning to re-culture schools in this way is typically an arduous process, involving considerable experience and self-examination, and benefiting considerably from professional mentorship (Davis & Darling-Hammond, 2012). This said, there is growing if tempered optimism that transformational school leadership can be taught and brought to scale in urban school systems (Pounder, 2011; Cosner, Tozer & Smylie, 2012).

Second, existing research in the ECE sector supports the positive impact of leadership investments upon both teacher efficacy and classroom practice (Muijs et al., 2004; McCormick Center for Early Childhood Leadership, 2012). Educational attainment and on-going professional training among center administrators have been linked to several metrics of program quality, including teacher retention and job satisfaction, effective use of data for program improvement, and rates of center accreditation (Bloom & Sheerer, 1992; Bullough, Hall-Kenyon & MacKay, 2012). Improved instruction and program quality, in turn, is associated with enhanced learning environments for children as well as better child outcomes (Burchinal et al., 2012; Hamre, et al., 2012). As in the K-12 context, studies tracing child outcomes back to leadership practices pose significant methodological challenges and remain a frontier of research. But the consensus is clear, at least within major policy communities such as Head Start, that investment in leadership development is essential to transitioning early childhood as a sector toward sustainable practices of evidence-driven improvement (Joseph et al., 2011).

Early evidence also suggests that differences in how leaders engage teachers have significant impact on the capacity of teachers to take up standards-based practices around instruction (Fitzgerald & Theilheimer, 2013) and social and emotional supports (Green et al, 2012). There is also evidence that community-based ECE directors are open to PD experiences, at least in settings like workshops and institutes (Bloom & Bella, 2005). However, little research has focused on the capacity of ECE leaders to engage more ambitious, multi-modal, and time-intensive models of PD in resource-stretched community based ECE centers (Dickenson & Caswell, 2007). This is a critical question for at least four reasons: first, that ECE leaders bring less formal training to challenging PD regimens than elementary or secondary principals; second, that time and resource constraints within community-based ECE centers can be severe; third, that job-embedded PD models can be expensive to mount; and fourth, that comprehensive PD efforts that lack effective leader PD are unlikely to succeed or become sustainable (McCormick Center for Early Childhood Leadership, 2012; Rohacek et al., 2012).

In many respects the Ounce's PDI represents an ambitious synthesis of the most promising features of comprehensive job-embedded PD as they have emerged in recent ECE research. PDI integrates center leaders to an exceptional degree and aligns both the content and methods of leader and teacher PD intensively over an extended period of time. And it cultivates the capacity of coaches to significantly shift the mental models of teachers and leaders in order to sustain job-embedded routines well beyond the "rooting" phase of the grant. These emphases comport with Howe and Tsao's recent observation (2012) that: "Changing practices requires changing teacher beliefs and knowledge bases as well as teacher behaviors" (2012, p. 3). In what follows we first detail the theory of action and primary design features of the PDI. We then detail our evaluation design, and describe the characteristics of the teacher and leader sample that emerged from the Ounce's center selection process. The second half of our report details findings of the implementation and impact studies, including chapters on the quality and degree of learning realized respectively by leaders, teachers, and children enrolled in the centers. We conclude with a summary of findings and brief design recommendations for future implementations of the PDI model.

Chapter 2 THE PROFESSIONAL DEVELOPMENT INITIATIVE MODEL

This chapter describes the Professional Development Initiative (PDI) model, which is comprised of intensive cycles of job-embedded professional learning for ECE leaders and teaching teams intended to build mindsets, systems, and practices for continuous quality improvement. We first describe the conceptual underpinnings of the PDI, the goals of the PDI, the process of supporting coaches to implement the model with fidelity, and how the PDI model evolved over time.

Overview of the Professional Development Initiative Model

Through three core PD strategies or "contexts for learning" (i.e., Learning Labs, Coaching, and Reflective Practice Groups (RPGs)), the PDI supports ECE leaders' ability to provide organizational systems and cultures to support early learning teachers instructional planning and implementation. To this end, the PDI also supports the PDI Coaches who are charged with rigorously implementing the model. By aligning the professional learning cycles of these four key stakeholders –center leaders, direct supervisors, teachers, and coaches – early learning settings are poised to realize significantly improved standards-aligned

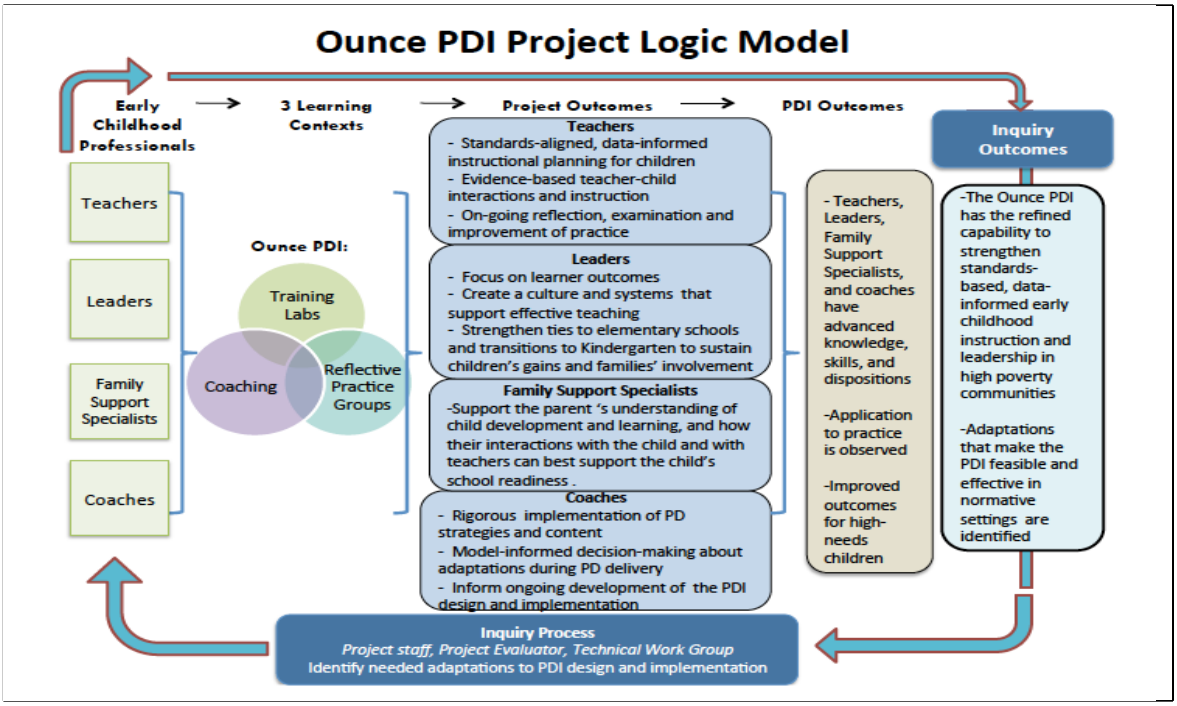


Figure 2-1 PDI Theory of Change and Logic Model

instruction in the classroom, leading to better results for young high-needs children over time. The theory of change guiding the PDI model is illustrated in *Figure 2-1*.

The PDI engages community-based ECE center leaders, teachers, and coaches in parallel learning cycles to simultaneously advance their knowledge, skills and dispositions to improve organizational systems, instructional planning and implementation, fidelity in the delivery of PD, and children's early

achievement. The PDI configures the following PD strategies –Training Labs, On-Site Coaching, and Reflective Practice Groups – to create varied learning contexts to promote different types of social interaction intended to promote adult learning. Specifically, Training Labs build knowledge and deepen understanding. Coaching systematically supports the transfer of new and nuanced knowledge into practice as abstract pedagogical discussions become more meaningful when embedded in authentic work. Reflective practice groups build professional dispositions and a culture of reflection, examination of practice and problem-solving that consolidates the learning in the proceeding training labs and coaching cycles, and helps sustain efforts at improvement over time.

While PDI configuration and content of PD for leaders and teachers varies, the general design of tightly coupled PD strategies within a compressed timeframe is similar for all participants as seen in *Figure 2-2*. The PDI learning module for leaders includes engagement in a bi-monthly 3-hour training lab comprised of leaders from different centers, 1-hour monthly on-site leadership team consultation, 1-hour monthly on-site direct supervisor consultation, and 1.5-hour bi-monthly reflective practice group comprised of leaders from different centers over a two-month period. The PDI learning module for teachers includes engagement in a two-part cycle of a bi-monthly 3-hour training lab comprised of teaching teams from the same age-group, 1-hour lesson planning meeting, 1-hour planning conversation, 1-hour observation, 1-hour reflecting conversation; all comprised at the teaching team level, and a 1.5-hour reflective practice group comprised of teaching teams from the same age-group over a four-month period. The PDI learning module for coaches includes reflective supervision and engagement in a community practice of a weekly 6-hour day comprised of a blend of training, content development, examination of formative assessment implementation data, and reflective practice over a one-month period.

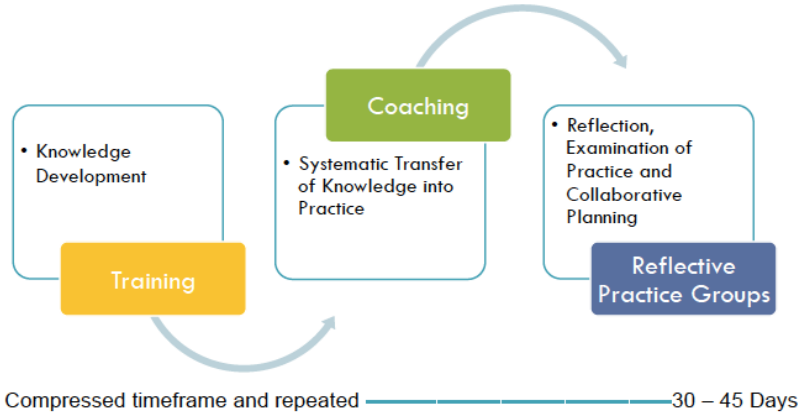


Figure 2-2 Engagement in Three Contexts for Professional Development and Learning

PDI Conceptual Framework

Studies of prekindergarten program outcomes confirm that low-income children typically enter kindergarten unprepared (Blair & Razza, 2007; Fantuzzo et al., 2007). Explanations for this underperformance have been related to multiple factors including family, community, and child risk levels; classroom structural, environmental, and interactional quality; and teacher work conditions and job satisfaction. Early childhood education accountability systems and administrators thus focus improvement efforts on these discrete variables, particularly classroom-level constructs of structural quality. Yet,

studies confirm that the quality of preschool classroom instruction in prekindergarten programs remains low, as measured by classroom quality assessments (Aikens et al., 2010; Burchinal, Vandergrift, Pianta, & Mashburn, 2010; Early et al., 2007).

As such, the PDI model emphasizes looking beyond these classroom-level elements of quality in order to strengthen both quality implementation and continuous improvement. A recognition that classroom processes do not occur in isolation from the rest of the processes of the organization greatly influenced the PDI model (Bryk, 2010). A core focus of the PDI model is the creation of organizational systems that protect time for collaboration in the school day; have explicit purposes and outcomes of collaboration; provide training in collaborative practices; and support effective and more inclusive leadership (Cibulka & Nakayama, 2000; Hord, 1997; McLaughlin & Talbert, 2001). In response to the challenging organizational conditions of community-based early childhood programs (Phillips & Bredekamp, 1998), the PDI fostered job embedded PD that promoted relational trust among staff, routine data-informed discussions and examination of practice, and collective responsibility and collaboration for practice excellence and improvement (Bouffard & Jones, 2011; Bryk, 2010). In order to support the installation, effectiveness, and sustainability of job-embedded PD, the PDI also constructed specific job aides and protocols that served as tools to support changes in organizational systems and leader and teacher practices, including (a) to provide teachers and leaders with practice frameworks that shape the coherency and comprehensiveness of complex processes (i.e., lesson planning, center-wide inclusive decision making, and collaborative data dialogues); and (b) to guide conversation and reflection in an effort to develop effective learning communities. Research on the effective use of protocols suggests that they aid in keeping practitioner talk focused on teaching and learning as well as in making effective use of meeting time (Curry, 2008; McDonald, Mohr, Dichter, & McDonald, 2013). The PDI model is based in understanding the dynamics of improvement sought through research on collaborative continuous quality improvement efforts.

Conceptually, the PDI incorporates six key frameworks that delineate evidenced-based practice goals and a final framework to motivate leaders and teachers to adopt these practices. First, the Five Essential Supports for School Improvement Framework (Bryk at al., 2010) is used to advance the leaders' understanding and application of organizational systems for continuous improvement. Second, the Ounce developed the *Inclusive-Inquiry and Decision-Making Cycle* for leaders to employ cycles of staff-inclusive and collaborative research intended to assist in problem solving. Third, the Classroom Assessment Scoring System (CLASS) framework (Pianta, La Paro, & Hamre, 2008) is used to outline evidenced-based and age-specific teacher-child interactions. Fourth, the Teaching Strategies GOLD Creative Curriculum and Assessment framework is used to help teachers advance their understanding of appropriate child development goals and application of these goals to their lesson planning and instructional practice. Fifth, the Ounce developed the *Focused Teaching Cycle* in order to encourage teachers to engage in a structured and collaborative lesson planning practice when “out of the action,” and when “in the action,” engage in structured reflection when interacting with children to increase the deliberate application of emotionally supportive, organized, instructionally meaningful practices. Lastly, coaches used Motivational Interviewing (Miller & Rollnick, 2013) micro-skills to evoke reflection on personal and organizational change processes and to galvanize leader and teacher motivation to change mindsets and practices.

PDI Goals and Content

The PDI aims to build ECE leaders' systemic support of birth-to-five teachers' capacity to design and deliver standards-aligned, data driven instruction, toward the long-term goal of closing the achievement gap for high-needs young learners in Chicago. Advancing the leader and teachers' knowledge, skills, and dispositions is vital to how the PDI intends to transform ECE centers into places of continuous learning and improvement (Appendix 2A: Ounce of Prevention Fund – Investing in Innovation Professional Development Initiative - Teacher and Leader Learning Objectives). Expectations for transformation were simultaneous and interrelated for all of the key stakeholders involved in moving from a focus on compliance and a reliance on externally driven and delivered PD to a focus on children's achievement and supporting teachers to be effective through internal job-embedded collaborative professional learning (Appendix 2B: PDI Theory of Transformation).

The PDI learning cycle for leaders intends to increase the following instructional leadership knowledge, skills, and dispositions of administrators and supervisors: a) inclusive leadership practices to strengthen relational trust and cultivate a strong professional community by including staff in collective inquiry, problem-solving, and planning for practice improvement; and b) providing a system of coherent program- and job-embedded instructional guidance and supports for teachers' continuous professional learning, practice effectiveness, and improvement. The content of the PDI modules for leaders is directly distilled from the Five Essential Supports framework (Bryk et al., 2010). By helping center leaders and direct supervisors become effective leaders strategically focused on teaching and learning, these early learning settings are poised to realize significantly improved standards-aligned instruction in the classroom, leading to better results for young high-needs children over time (Byrk et al., 2010).

As already noted in our introduction, the Ounce's PDI does not break new ground in focusing serious attention on the PD of ECE leaders. Head Start has for decades offered targeted, substantive managerial education to its affiliated agencies (Bloom & Sheerer, 1992; Bloom & Bella, 2005). And, more recently both federal and state agencies have focused more funding on building a knowledge and practice base for center directors and supervising teachers around the adoption of classroom best practices (Howes, Hamre & Pianta, 2012). What does distinguish the Ounce PDI, however, is its commitment to and grounding within a systems understanding of instructional improvement (Elmore, 2004; Bryk et al., 2010). This view asserts that educational improvement is, as Richard Elmore (2004) has put it, "a property of organizations, not of the pre-existing traits of the individuals who work in them" (p. 73). To elevate the organization's capacity to continuously improve thus requires more than the traditional tact of sending varied role players – directors, supervisors, teachers and assistants – off to separate trainings specific to their functions. It requires instead a carefully orchestrated coordination of PD experiences that helps varied role players work more effectively together within their actual contexts of practice, around shared common goals nested within a clear framework for practice excellence. This approach to PD is a culture shift for educators, including early childhood leaders, teachers, and purveyors and providers of traditional PD. It involves not just the acquisition of new knowledge and skills but also the exercise of self-discernment preceding the development of new habits of attention and action (Joyce & Showers, 2002; Howe, Hamre & Pianta, 2012). It requires a pivot from externally-driven and delivered PD for individual capacity building, to models that build administrator capacities to internally drive continuous quality implementation and improvement by strengthening job-embedded supports for teachers learning and effectiveness (Elmore, 2004; Hargreaves & Fullan, 2012).

The PDI learning cycle for teachers intends to guide them in employing an approach that: (a) aligns their curriculum, instruction, and assessment practices to the Illinois Early Learning Standards and core curriculum and development goals for infants, toddlers, and preschoolers; and (b) employs routines of collaboration that encourage reflection intended to improve decision-making related to evidence-based instructional practice. The content of the PDI for teachers is grounded in "pedagogical content knowledge" (Shulman, 1986/1987) aligned to the CLASS framework (Pianta, La Paro, & Hamre, 2008). Shulman's (1986/1987) concept of pedagogical content knowledge can be summarized as knowledge about what is taught (curricular content), who is to be taught (children), and how to teach (teaching methods) (Rojas, 2008). By focusing on pedagogical content knowledge, the PDI supports the teachers in synthesizing knowledge of content, students, and pedagogy in ways that lead to more effective planning and implementation of instructional practices (Zeynep, 2010).

Moreover, the PDI for teachers was not designed to build content-specific pedagogical practices with say, literacy or math teaching. Rather, it was designed to advance teachers' instructional practice in ways that are emotionally supportive, organized, and instructionally meaningful. Although such a focus is not new in ECE, the PDI approach of engaging community-based teachers within intensive cycles of collaborative job-embedded PD is innovative. Inspired by an understanding that teaching is complex work and that PD must align with how teachers actually learn and improve practice, the PDI understood that "…teaching occurs in particulars—particular students interacting with particular teachers over particular ideas in particular circumstances" (Ball and Cohen, 1999, p. 10) and, to be effective, teaching must be implemented with precision and personalization (Fullan, 2007). In other words, teachers most benefit from PD in which the focus is on their practice with the children in which they interact within the context in which they engage in their work on a daily basis.

Additionally, the PDI approach of initiating the learning cycle with emotionally supportive pedagogical practices is not new either. What makes a contribution to the field is how socio-emotional pedagogical knowledge informed teachers' practice development and improvement. For example, the PDI honed in on how knowledge of temperament is central to high-quality observation required of planning individualized interactions as well as formatively assessing child development over time. Simultaneously, the PDI encouraged teachers to not only consider knowledge about who is being taught (children), but also knowledge about who they are teaching with (co-teachers). Helping teachers develop emotionally supportive classroom environments for children and with co-teachers alike is likely to increase student engagement and reduce children's stressed-out, off-task behavior, thereby setting the stage for greater academic success for underserved children (McCormick, O'Connor, Cappella, & McClowry, 2015).

In addition to the routine, repeated cycles of learning for leaders and teachers, the PDI also created opportunities for them to discuss classroom assessment data collaboratively and within classroom teaching teams. Whereas the leaders met with PDI project managers to explore and deepen their understanding of the results of the Five Essential Supports Teacher Survey (adapted for ECE), teachers met with PDI project managers and their coaches to query their CLASS data. By the second implementation of the CLASS data dialogues, the coaches had supported the direct supervisors on-site in their facilitation role. Specific job aids in the form of protocols were developed to support the facilitation of learning and team-identification of practice improvement goals during these data dialogues.

The PDI learning cycle for coaches is intended to prepare them to implement the model with fidelity, to make model-informed decisions when fitting and making feasible teacher and leader participation in the PD, and to work with the project team and evaluators to inform ongoing study and development of the PD design and implementation. The PDI coaches engaged in induction training sessions that first oriented them to, and then deepened their understandings of, the PDI goals, concepts, and processes of PD. The content and methodologies of the PDI for coaches is drawn from cognitive coaching (Costa & Garmston, 2002) and is aligned to the Motivational Interviewing framework and microskills (Miller & Rollnick, 2013). By preparing coaches to both facilitate learning and simultaneously evoke motivation for change among leaders and teachers, these educators are primed to improve leadership and instructional effectiveness through reflective practice (Garmston, Linder, & Whitaker, 1993).

Coach Community of Practice –Supporting Fidelity During Implementation

As leaders and teachers benefit from communities of practice to be effective in their work (Wegner, 1998), the PDI asserts that PD Coaches will be most effective when engaged in a learning community that supports their implementation of the model with fidelity. Eight experienced coaches and their PDI managers and PDI project directors met weekly for three years to (a) develop content for the teacher learning cycles trainings; (b) deepen their understanding of the conceptual frameworks, protocols, and learning contexts used to inform the PDI; and (c) examine their coach practice through reflection of problems of their practice. Once a month the coaches would engage in reflective supervision with their age-level PDI manager. And, the coaches also met monthly with the UIC evaluators of the PDI in a research-to-practice session when they were presented with implementation data and engaged in dialogue intended to inform their practice. Cochran-Smith and Lytle's (1999) vision of such communities is apparent in the PDI in that they support coaches "as they generate local knowledge, envision and theorize their practice, and interpret and interrogate the theory and research of others" (p. 289).

Aiming for simultaneous transformations in leader and teacher knowledge, skills, and dispositions, the PDI also aimed to transform coaches' understandings of fidelity to the model. Specifically, the PDI aimed to shift the conflation of fidelity with compliance. While conceptual adherence to the methods of the model was intended, adaptations to the procedural components were also expected. It was assumed that the PDI as implemented in the beginning might be different by the end of implementation, because cycles of reflection and research were expected to inform adaptations to increase fit, feasibility, and effectiveness. While some may suggest that fidelity lacks relevancy to such formatively designed interventions (Reinking & Bradley, 2008), the PDI used concepts of fidelity to support the iterative process. Because the PDI like other improvement research is goal oriented and theoretically informed, fidelity to the conceptual underpinnings and systematic, collective cycles of iteration were upheld and bounded the formative process. Several aspects of the coach community of practice supported fidelity to both implementation and iteration.

First, the parallel process, or the "language, behaviors, attitudes exhibited in collaborative meetings and their alignment with and manifestation in classroom practices," revealed how the collaborative practices expected of coaches in their community of practice paralleled how they were expected to work with the leaders and teachers to build systems of collaboration at the site level (Kuh, 2012, p. 22). Second, the coaches co-constructed the content of the learning labs and RPGs for teachers, which was intended to increase commitment to adherence to the instructional outlines as designed. Third, an expectation for

coach reflection and documentation along with use of formative data is intended to help them examine practice and inform recommendations for improvement of the PDI. The system, structure, and methods of the coach community of practice was intended to support and advance fidelity to the model overall.

Development of the PDI

The PDI viewed iteration as an essential process to the effectiveness of the model over time. Much like teaching and learning, the PDI aimed to systematically benefit from initial implementation in ways that constructively links refinement of procedures to the development of the model during full implementation (George & Cowan, 1999). Only a handful of significant iterations were made over the course of the initiative.

First, modifications to the design were made nearly immediately in response to the sites' limited capacity to engage in the multiple hours of job-embedded PD initially. For instance, the majority of the sites decided to close for one half-day per month for PDI sessions or they aligned the PDI sessions to that of their previously scheduled in-service days. Additionally, the coaches worked with site leadership to develop a center-wide calendar to help better organize PD for their teachers, reflective supervisions, and their own participation in the PDI. These changes were intended to make the implementation of tightly coupled learning routines better fit and more feasible, thus increasing the program leaders' sustainability of these routines for collaboration.

Second, the teacher learning cycle was adapted in response to the perceived need to increase the supports for transfer to practice teachers were receiving in the originally configured learning cycle, as seen in *Figure 2-3*. This significant iteration involved, (1) adding a second coaching cycle following the reflective practice group, and (2) expanding on the "joint planning" meeting of the coaching cycle by adding a one hour lesson planning context to the teacher learning cycle. Initial implementation of the teacher learning cycle consisted of only one coaching cycle per learning cycle implemented within four to six weeks. After four months of initial implementation, the teacher learning cycle stabilized into full implementation consisting of two coaching cycles linked to a learning lab and a reflective practice group implemented within an eight-week timeframe. Adding a second coaching cycle and placing it in sequence after the RPG was expected to increase the knowledge transfer and changes in practice by providing teachers with the opportunity to use perspectives of their peers garnered from collective reflection in the RPG to test out and integrate new practices with active support through the second coaching cycle. Additionally, the facilitation of lesson planning was moved to before the first coaching cycle thereby becoming its own distinct context for learning along with the learning labs, coaching cycles, and reflective practice groups (Appendix 2C: Full Implementation of the Teacher Learning Cycle Following Initial Adaptation). Modifying the sequence of the key contexts for learning for teachers elevated the significance of lesson planning as a critical context for supporting teachers with transitioning from perfunctory lesson planning to more focused, intentional planning of standards-aligned, data-informed instruction and teacher-child interactions. Moreover, adjusting the sequence offered additional time to teachers to consolidate knowledge gained during the learning lab and try applying that knowledge out-of-the-action during lesson planning before moving into application in-the-action during the coaching cycle.

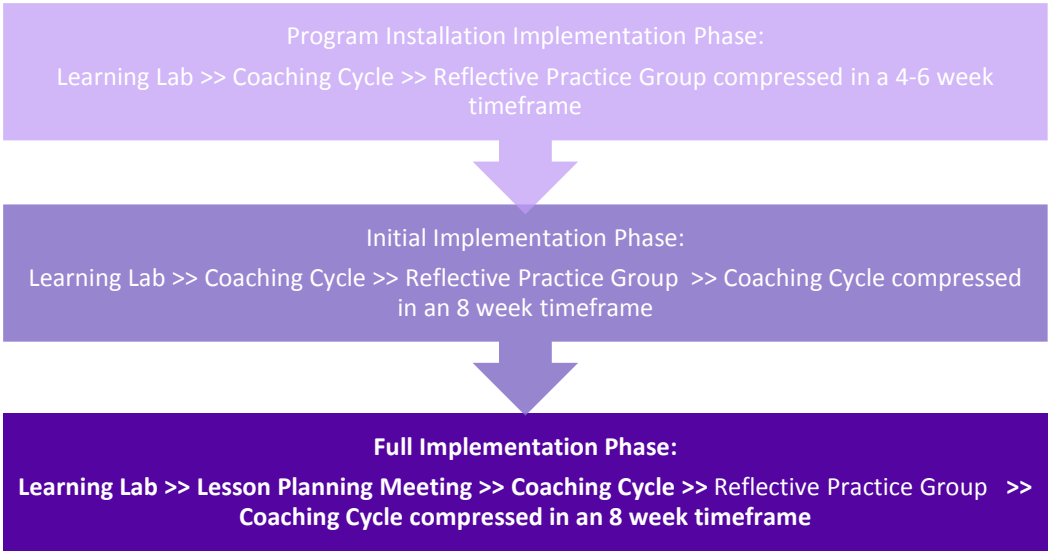


Figure 2-3 Evolution of the Teacher Learning Cycle by Implementation Phase

Third, the coach community of practice was refined in order to facilitate PDI implementation with greater alignment to its learning objectives – specified knowledge, skills, and dispositions – for leaders and teachers. For example, data reported by teachers on the coaching cycle feedback forms revealed that they were experiencing the coaching cycles as generating a more global, problem-solving process than a process that was targeting change and improvement of PDI-specific practices. In discussing this data, the model purveyors (the Ounce) identified a tension coaches were experiencing during implementation of the coaching cycles that was negatively impacting their fidelity; that is, coaches were struggling to balance being responsive and emotionally supportive of teachers with simultaneously pressing teachers to focus in on learning and practice examination for the express purpose of change and improvement that adhered to the goals of the initiative. It was hypothesized that inadequate internalization of the Motivational Interviewing framework contributed to the development of that tension for coaches. As such, the model purveyors embedded additional Motivational Interviewing training in the coach community of practice to increase their understanding of the science of behavior change. That is, humans are motivated to change their behavior when they understand why the change is important, when they have readiness about making changes, and they feel confident in themselves and confident that the change will produce a better result. Coaches better understood why the target change must be clearly and behaviorally specified, and that they were using the motivational interviewing micro-skills to support and evoke change towards that specified target. In addition to better aligning the Motivational Interviewing framework with that of the PDI goals, the model purveyors also significantly revised the coach documentation forms into a job-aide that increased coaches' fidelity and effectiveness. The revised forms structured coaches' reflection and documentation of both the teachers' learning and practice change, and how their implementation of PD, including the intensity of their focus on supporting the transfer of PDI content into practice (e.g., use of GOLD and CLASS frameworks during lesson planning). The revisions were intended to deepen the coaches' analysis of the level of thinking and conceptualization reached by the learners, what they did to facilitate such learning in each context, and how they were to improve their facilitation of learning in the next learning cycle.

Fourth, a couple of modifications were made to the leader learning cycle in order to (a) increase the coherency and comprehensiveness of their understanding of the dynamics of practice improvement per the Five Essentials supports framework, and (b) develop their specialized skills to provide teachers with coherent practice guidance and ongoing job-embedded professional learning supports. For instance, after focusing on three of the five essential supports, the purveyors' data-informed reflection revealed that the leaders were struggling to make and grow changes in their leadership practices to align with the Five Essentials. As such, opportunities to consolidate information were incorporated into the leader learning cycle. Rather than moving onto the fourth essential support, a learning lab to consolidate understanding of the first three essential supports was added. Moreover and in preparation for site-sustainability of the PDI, engagement expectations for the leaders were better specified. For example, the model purveyors specified that the sites' leaders sustain two of the PDI's contexts for teacher learning—that is, team lesson planning facilitation and reflective practice groups along with two reflective supervision and feedback routines required by the Head Start performance standards (i.e., Classroom Observation and Debriefing). In order to support leaders with developing the facilitation skills to sustain these routines, the content of the leader learning labs moved into working sessions that promoted changes to each site's infrastructure for supporting quality implementation and improvement, and developing leaders' facilitation skills necessary to sustaining the job-embedded PD routines. For example, the PDI explicitly requested that the leaders develop a plan that enables direct supervisors' to protect 25% of their time weekly and directors to protect 10% of their time weekly for instructional leadership activities. During this transition, the PDI for the direct supervisors was further modified to include additional one-on-one time with the coaches. These changes to the model were intended to improve the fit and feasibility of the PDI for sustained support at the site level well beyond the end of PDI implementation.

Fifth, two elements of the initial proposal did not materialize into full implementation. First, family support staff was initially conceptualized as a key stakeholder who would also participate in cycles of learning. Although a specialist was hired to engage family support staff in a monthly reflective practice group, the design for family support staff lacked a job-embedded component. As such, the cycle of learning for family support staff appeared to lack a link to the job-embedded conceptualization and knowledge development base of the PDI. Second, the PDI was limited in its capacity to support the sites' connection to local feeder elementary schools. On the one hand, the PDI content of the fifth Essential Support – Strong Ties and Partnerships Among Families, Schools, and the Community - encouraged leaders to develop knowledge about cultivating relationships with local schools to improve childrens' and families' transitions to kindergarten. On the other hand, the original PDI proposal intended to facilitate the development of Kindergarten Readiness Transition Folders for each child that were envisioned to provide a concrete method of strengthening these sites' connections to their local schools. To our knowledge, no significant progress specific to PDI was made on the development of these folders or on advancing specific strategies for outreach to local schools beyond strengthening those already in place at the PDI centers.

Chapter 2 Summary

The PDI model calls upon a complex web of stakeholders to transform the purpose, processes, and experience of PD in early childhood settings. The PDI model shifts from externally-driven and delivered PD focused on individual teacher capacity building, to one that develops organizational and leadership capacities with internally-supporting continuous professional learning and practice improvement (Elmore,

2004; Fullan, 2 11; Hargreaves & Fullan, 2012). Research suggests that collaborative, job-embedded PD in early childhood education improves satisfaction, increases teacher empowerment, and supports more positive classroom interactions (Fantuzzo et al., 1997). Our analysis of the design of the PDI indicates that the Ounce built deeply and extensively on the current knowledge bases on early childhood PD and k-12 school improvement processes in its proposed embedded PD design. Whether the Ounce's design proved feasible to implement and whether it achieved its intended impacts for leaders, teachers, and children was the focus of UIC's implementation and impact evaluation designs.

Chapter 3 EVALUATION DESIGN

The purpose of the 3-year evaluation study is to assess the effectiveness of the Ounce PDI in advancing the knowledge, skills, and dispositions of community-based early childhood leaders and teachers in relation to creating the conditions for superior developmental outcomes and kindergarten readiness for low-income, under-served students served by these community-based centers. Therefore, the evaluation pursued three broad goals: First, to closely monitor and summarize patterns of implementation over the full span of the PDI in order to assess fidelity and feasibility of implementation at the teacher, leader, program, and center levels, and reasons for variability of implementation across the center contexts. Second, we aim to assess the emerging impacts of implementation on the professional learning of teachers, leaders, and coaches, and more distally, upon the growth and development of children in all intervention centers. Third, drawing on Improvement Sciences methodology, we endeavored to strike a productive balance between the roles of independent external summative evaluator, on the one hand, and collaborative formative evaluator providing rich and timely data and feedback to the design development process. The i3-funded Ounce PDI development grant posed an exceptional opportunity to explore the possibilities and constraints of "fast prototyping" in an educational development project. As formative evaluators within this design process, our team: a) made selective use of practitioners, particularly coaches, in data collection roles, with thorough IRB oversight; b) led the design of "fast response" survey protocols to provide timely data to the Ounce designers regarding model adaptations; and c) forwarded recommendations to the Ounce designers around protocol design in the interest of developing consistency of measurement across time points.

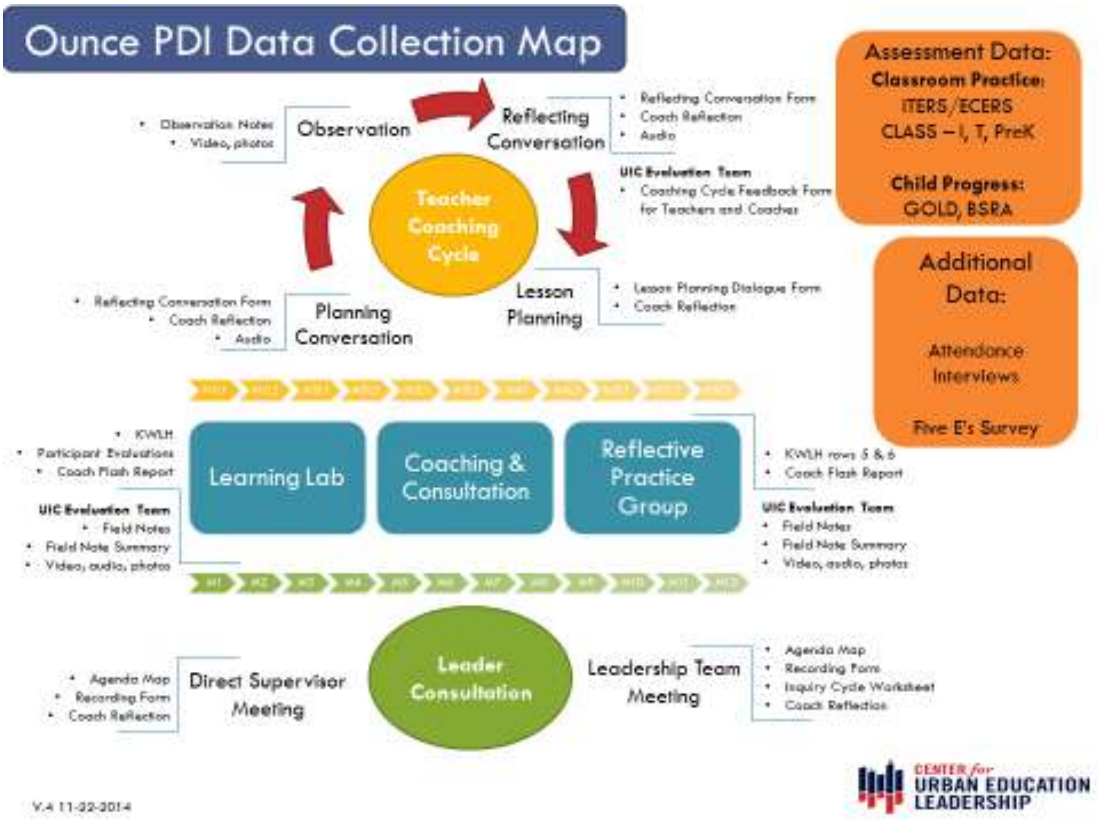
One example of our formative design role involved the adaptation of the familiar "KWLH" Assessment to address both pedagogical and evaluation needs within PDI learning contexts. Early in the project, our formative assessments consisted of several reflection questions related to the content of a leader or teacher learning module. Two problems arose: 1) the coaches largely still saw these embedded assessments as primarily products for research purposes rather than aids to improving their practice and their students' learning and 2) the structure of the reflection questions and the changing and inconsistent nature of them did not lend itself to a pseudo pre-post design that could help us better gauge learning over time. We discussed these limitations with the Ounce design team and coach cadre and proposed the use of a KWLH,[1] which is a graphical organizer designed to support the learning process as well as assess conceptual learning. The KWLH immediately addressed the need for an adaptable but stable instrument that could be used systematically to track adult learning iteratively over several PDI modules. In addition, ongoing analysis of KWLH data supported periodic conversations between our evaluators and the PDI coaches that increased coaches' understandings of their coachees as professional learners. These "data dialogues" thus became an important design feature of PDI in terms of coach PD.

Figure 3.1 provides an overview of the data collection array that the UIC evaluation built around the leader and teacher learning cycles in the first year of the project. The evaluators drew decidedly upon a mixed methods tool kit. In this section we present the core implementation and impact evaluation design

[1] The KWLH typically is structured to: a) elicit background knowledge by asking the teachers what they already **K**now; b) increase motivation by asking the teachers what they **W**ant to know; c) promote metacognition by asking the teachers to explain what they have **L**earned; d) encourage ownership of the learning process by asking the teachers to articulate **H**ow they can learn more.

features. Chapter 4 provides a detailed account of how the four ECE intervention centers were selected by the Ounce of Prevention Fund and the yield of the selection process in terms of community, center, and staff characteristics.

Figure 3-1 Overview of the UIC Evaluation's PDI Data Collection Array



Implementation Study Design

Figure 3-2 re-presents the PDI design elements covered earlier in Section 2 in a logic model to guide the evaluation study. Consistent with our account in Section 2, the Initiative aimed to build ECE leaders' systemic support of birth-to-five teachers' capacity to design and deliver standards-aligned, data-driven instruction toward the long-term goal of closing the achievement gap for high-needs students in Chicago. Through four core PD strategies or "contexts for learning" (i.e., Learning Labs, Coaching, Lesson Planning Meetings, and Reflective Practice Groups), the Ounce PDI supported ECE leaders' ability to provide organizational systems and cultures to support early learning teachers transition to a teaching approach that: (a) aligns their curriculum, instruction and assessment practices to the IELS' (Illinois Early Learning Standards) and core curriculum and development goals for infants, toddlers, and preschoolers; and (b) employs routines of collaboration and systemic focused, inquiry cycles within teaching teams in an effort to encourage reflection intended to improve decision-making so that they provide high-needs children with evidence-based interactions that are socially supportive, organized, and instructionally challenging.

To this end, the Ounce PDI also developed the knowledge, skills and capacity of PDI Coaches, who are charged with rigorously implementing the Ounce PDI approach, making model-informed decisions when contemplating adaptations in the course of PD delivery, and working with the project team and evaluators to inform ongoing development of the PD design and implementation. By aligning the professional learning cycles of these four key stakeholders –center leaders, direct supervisors, teachers, and coaches – early learning settings are poised to realize significantly improved standards-aligned instruction in the classroom, leading to better results for young high-needs children over time. A core purpose of the evaluation study was to determine to what extent these intended PD components were initiated and sustained with sufficient consistency to produce the intended impacts on adult learning and child development.

The primary focus of the implementation study was to document the fidelity of implementation of the Ounce PDI at the coach, teacher, direct supervisor, center leader, center, and PDI program levels. Four implementation research questions guided the inquiry:

1. *Overall, was the PDI activity implemented with fidelity as the designers intended?* If not, why? What challenges arise at each successive iteration of implementation of the three professional learning cycles, and how do they impact realized vs. intended levels of implementation?

2. *Was the PDI activity engaged and received by the participants as intended?* (e.g. Were they attending? Interested? Actively engaged?)

3. *Over time, are Ounce PDI functions becoming institutionalized with fidelity within the community-based ECE centers?* (For example, do the supervisors or comparable staff step into the functions formerly executed and facilitated by Ounce coaches?) Which components of the Ounce PDI must be implemented to the original model versus components that may be modified, eliminated, and/or added in order to support this transition?

4. *How feasible is the implementation of the Ounce PDI in diverse community-based provider settings and contexts?* What threshold characteristics do community-based organizations need to engage the Ounce PDI productively? What contextual issues (organizational, community) mediate successful implementation with fidelity?

Figure 3-2 Ounce PDI Evaluation Logic Model

Goal: To build birth-to-five teachers' capacity to design and deliver standards-aligned, data-driven instruction and to close developmental and learning gaps among high needs students to support their kindergarten readiness through simultaneous job-embedded PD for teachers, leaders, and their coaches.

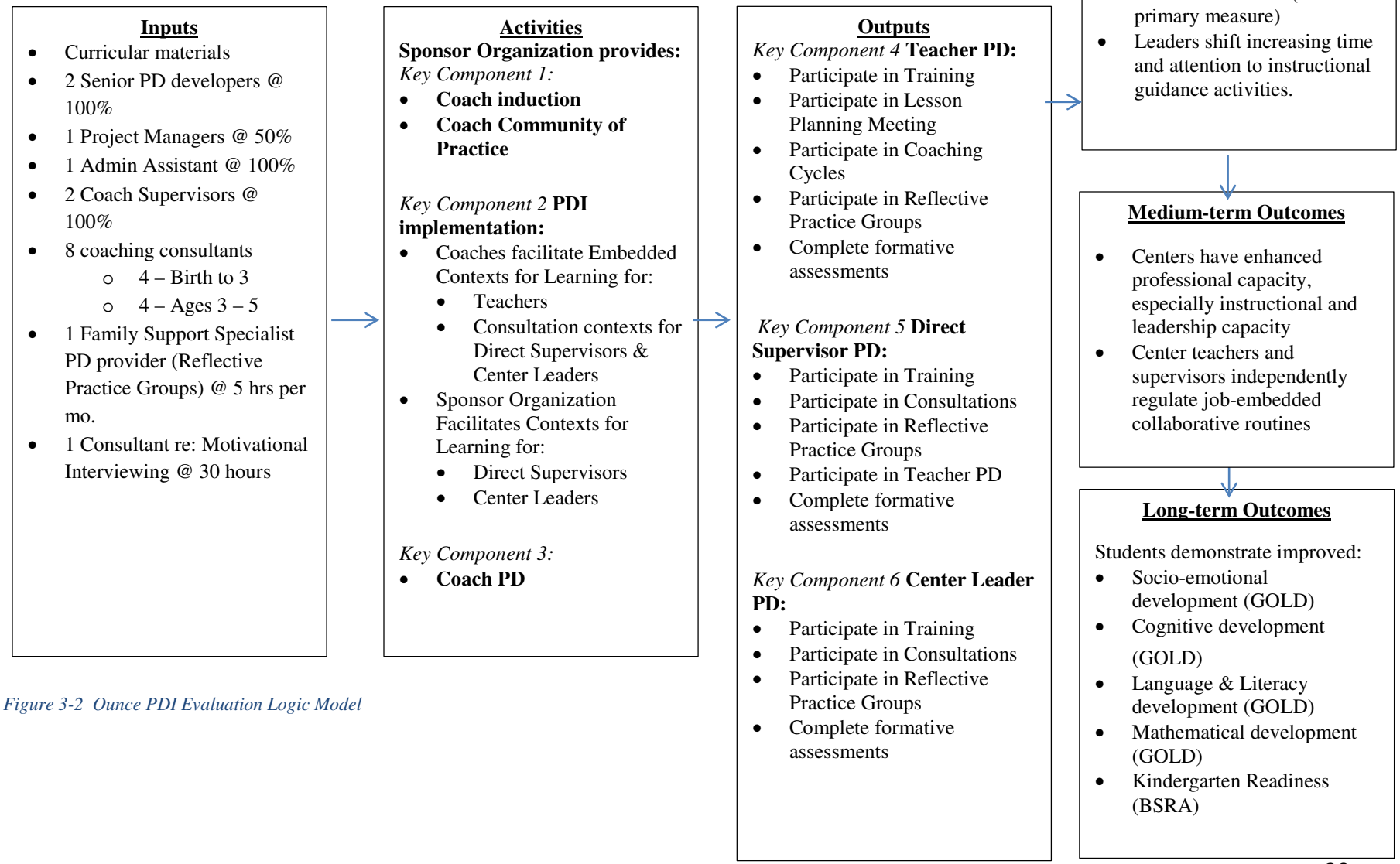


Figure 3-2 Ounce PDI Evaluation Logic Model

Conceptualizing Fidelity of Implementation

Based on the logic model (*Figure 3-1*), the evaluation identified six key components to measure for fidelity of implementation. The components (labeled in the logic model) briefly characterized include:

1. *Component 1 - Coach Induction and Community of Practice Implemented by the Sponsor Organization*. Coaches carry the primary responsibility within PDI both for rooting the embedded PD routines for leaders and teachers, and for scaffolding the transition of PD responsibilities to each center's practice leaders over time. Component 1 captures how well the Ounce team delivered the PD associated with the introductory training of the coaches for their roles in the project. Includes two sub-indicators.
2. *Component 2 - Professional Development Initiative Implementation*. The Ounce team committed to providing an ambitious schedule of PD experiences to teachers and leaders within a compressed time frame – typically, six to eight weeks, depending on the category of participants. Eight indicators focus on hours of PD delivered and percent of PD sequences delivered within the specified timeframe.
3. *Component 3 - Coach Professional Development*. Coaches continued to receive training within a general framework for building reflective practice similar to that of teachers and leaders. Two indicators focus on rates of attendance of coaches to initial induction trainings and subsequent continuing PD trainings.
4. *Component 4 - Teacher Professional Development*. Creating the conditions for teacher learning required the Ounce team to assure adequate levels of teacher attendance as well as engagement with reflective learning exercises – most notably, the KWLH reflection format. Two indicators focus on rates of attendance by teachers and levels of completion of the KWLH reflection format (described below).
5. *Component 5 - Direct Supervisor Professional Development*. Direct supervisors of age-level classroom teams were expected to take on several skill sets modeled by PDI coaches in the first half of the project. Four indicators focus on whether direct supervisors sustained high levels of attendance to leader PD sessions, completed most sections of KWLH reflection exercises, and attended the PD sessions of their assigned teachers.
6. *Component 6 - Center Leader Professional Development*. Center owners and directors are critical to establishing the necessary climate, systems, and organizational conditions for embedded PD. Three indicators focus on whether center owners and directors attended sufficient hours of PD and engaged KWLH reflection exercises thoroughly enough to shift their professional knowledge and mindsets.

Data Collection Procedures to Support Fidelity Studies

Several categories of data directly pertaining to PD delivery were collected in order to develop measures of each implementation component as well as to better understand the reasons for variability in implementation fidelity across time and contexts (*see Appendix 1A: Selected Data Collection Protocols and Instruments (Companion Volume*).

Collection of protocols and artifacts associated with PD delivery. In order to measure the indicators related to adherence to the model design, instructional outlines were collected as evidence of the agenda and content developed for the PDI context for learning. On a monthly basis from the outset of the project, the UIC evaluation team collected documents, protocols, assessments, and artifacts linked to participant attendance and successive iterations of project development, especially those artifacts implicated in the emerging/developing PD designs.

Collection of participant attendance records. UIC and Ounce staff jointly developed attendance sign-in sheets for use across the full range of PD delivery settings, particularly learning labs, on-site coaching and

lesson planning sessions, and reflective practice groups. UIC staff would collect attendance records directly in sessions they observed directly. Otherwise a secure transmission procedure was devised using the Ounce's secure website to post attendance records for timely UIC download.

Induction survey for coaches (summer 2012). The eight original PDI coaches were queried in July 2012 via online survey at the end of their pre-implementation training period. The purposes of the survey were three-fold: a) to ascertain the span and accuracy of coach understandings of core concepts related to the PDI teacher PD program; b) to gauge the subjective experience and satisfaction of coaches with the training and induction activities; c) to garner recommendations from pilot coaches to improve the induction process. Survey data were used to illuminate patterns in fidelity of coach induction.

Surveys of program quality to PD participants "post-delivery." Evaluation forms were collected from teachers and leaders at the end of their respective learning lab and reflective practice group sessions. Participants were queried regarding perceived impacts of the PD content on learning and understanding, the PD's relevance to daily practice, the quality of the PD design and delivery, and participants' overall satisfaction with the PD experience. Ratings were acquired using Likert scales varying from 3 to 5 rating points. Data were entered, aggregated, and reported for formative purposes to the Ounce team, and integrated into a data record of each PD event.

Implementation "flash reports" from PD providers/coaches "post-delivery." Over the course of the PDI, the evaluation built out a system of online and paper-based survey-based reports for coaches to reflect on the implementation of learning labs, coaching cycles, and RPGS. These surveys requested a mix of factual information about the PD setting (e.g. start and end times; completion of various sub-modules within each module or unit) along with Likert-scaled assessments of key PD impacts (e.g., the degree engagement of participants), and open-ended assessments of PD design features (e.g. components that were easier vs. harder to implement with fidelity).

"KWLH" Reflective Self-Assessments. Teachers and leaders were asked to complete a formative assessment called the KWLH, which is a graphical organizer designed to support the learning process as well as assess conceptual learning over time. Specifically, the KWLH was embedded within contexts of learning in order to:

- elicit background knowledge by asking participants what they already **K**now
- increase motivation by asking what participants **W**ant to know
- promote metacognition by asking participants to explain what they have **L**earned
- encourage ownership of the learning process by asking participants to articulate **H**ow they can learn more.

For the purpose of the implementation study, rates of KWLH completion were calculated in order to measure the advancement of participant knowledge based on the theoretical premise that completion of such formative assessment in itself leads to metacognitive development (see Key Components 4-6).

Direct observation of teacher and leader PD sessions. A sampling scheme was devised to assure coverage of a representative selection of teacher learning labs and reflective practice groups across the four centers and two primary child age levels (i.e., birth-3 and PreK practice groups). Because leader learning labs and reflective practice sessions were designed to convene leaders across all four intervention

centers, occurring on alternating months, the evaluation team documented all sessions. We also devised an observation protocol geared primarily toward gauging deviations from and adaptations of the intended PD content and evidence of teacher engagement and learning during the learning labs and RPGs. On-site coaching sessions were not directly observed to prevent any adverse impacts of the presence of evaluators on these small group learning activities.

Measuring Fidelity of Implementation

Consistent with What Works Clearinghouse and i3 grant guide lines, we measured the indicators for each of the six key components related to the implementation of PDI contexts for learning once per year for three years. Drawing on literature in the field, Head Start Performance Standards, and the Ounce's desire to hold themselves accountable to high quality implementation, we determined threshold levels of fidelity for each key component. Developing the fidelity matrix included a several month process in which we engaged in conversation with the Ounce designers to develop an authentic rating system that was sensitive enough to accurately capture variance in implementation over time. See Chapter 5 for details.

Impact Study Design

The evaluation was also tasked with assessing the degree of impact of PDI's implementation upon hypothesized outcomes at two levels: first, the quality of classroom instruction of intervention teachers, and second, the learning and development of students attending the intervention centers, including the readiness of advanced PreK students for kindergarten. Detailed descriptions of specific impact analyses are provided in Chapters 7 (classroom level impacts) and 8 (student level impacts).

Establishing a Sample of Non-PDI Comparison Centers

Several criteria were initially applied to select a cadre of non-PDI comparison centers for use in the classroom practice and student developmental outcomes QED analyses. First, all comparison centers were required to come from within the city of Chicago. Second, comparison centers were restricted to a pool of centers receiving both Head Start and Chicago Public school funding lines and in particular, the Community Partnership Program (CPP, for Infant and Toddler levels) and/or the PreSchool For All program (PFA, for Pre-School Level). Third, in the case of the one not-for-profit (NFP) intervention center, matches also were required to have Early Head Start funding to assure parity in overall budgets within the NFP comparison group. A dataset of all Chicago Head Start programs operating in spring 2012 was provided to UIC by the Chicago DFSS for the purposes of selecting the comparison sample. Application of these level-one criteria produced a pool of 45 Chicago comparison centers. In the case of the PDI center with two geographically distinct locations – Center4 – the DFSS data made clear that these locations were demographically quite distinct, and thus should be matched to distinct groups of comparison centers.

A propensity score algorithm (the SPSS Nearest Neighbors procedure) was applied to narrow the field of qualifying centers to about four comparison centers per five PDI site locations. A selection of demographic and center characteristic metrics was used in the propensity score algorithm, including: % African American students; % Hispanic students; % students with individualized education plans (IFSP or IEP); % students qualifying for Federal free/reduced subsidies. Strong to moderately close matches were identified for all five PDI locations. However, two factors subsequently forced a relaxation of the criteria for including Chicago ECE centers as comparison centers. First, while the demographics of three PDI

centers were easy to match, two others enrolled high levels of both African American and Hispanic students, and were much harder to match, necessitating the broadening of the candidate pool. Second, following the initial match process, we discovered that many optimally matched comparison centers did not possess adequate baseline and/or follow up data to be included in CLASS or GOLD analyses. We therefore expanded the pool in a second round of matching to include all Chicago area Head Start sites while prioritizing use of the maximum number of sites from the earlier propensity score round that possessed the necessary data. The center characteristics that we had hoped to use for matching were instead included in HLM models as covariates at the center level of analysis.

Appendices 3A and 3 B compare the aggregate characteristics of five matching groups with their corresponding PDI matched site, along with the characteristics of the individual matched comparison centers. Overall the tables indicate that moderately close matches were achieved for each of the five PDI locations, although variations in the closeness of fit were also evident. Matches were very close with low cross-site variation for Centers 1, 3, and 4A. These centers were quite typical of Chicago centers with high enrollments of African American (% Black) students. The demographic features of Centers 2 and 4B were much less common and matches were more variable. This was particularly the case with Center2. We conclude that the proximity of intervention and comparison centers within this pool were sufficient to permit valid baseline equivalence assessments. However, aggregate center-level characteristics also are entered into predictive analyses as co-variates to adjust for the evident variations in specific student characteristics, and in particular, levels of "Free-Reduced Lunch" (% FRL) enrollments, as well as numbers of students identified as English Language Learners (%ELL).

Impact Study of Teacher Classroom Instruction

Data pertaining to the quality of teacher instructional practices were collected annually in 2013, 2014, and 2015 for the participating classrooms in the four PDI centers. The primary measure of instructional quality was the CLASS assessment system (described below). Three distinct versions of the CLASS (Infant, Toddler, and PreK) were utilized over the three years within the PDI sample. However, non-PDI comparison data from Chicago administrative data sources were available only at the PreK level. Thus the evaluation took two approaches to testing the hypothesis that PDI would be associated with improvements in classroom instructional quality over time. In the case of infant and toddler data, the evaluation tested whether the rate of growth in instructional quality departed significantly from zero growth among the PDI centers, using a repeated measures ANOVA procedure. In the case of PreK classrooms, for which non-PDI classroom data were available, we employed a quasi-experimental "pre-post" design with comparison data matched at the center level. After establishing baseline equivalence for each CLASS measure, a regression approach was used to test the extent of difference between intervention and comparison center means with several covariates controlled two years after the baseline measure (from spring 2012 to spring 2014). We also examined PreK growth trends using all available data within the PDI sample, again using the repeated measures ANOVA procedure. Further details of statistical analyses are provided in Chapter 7.

Description of CLASS Impact Measures. According to its developers, the CLASS "…is an observation instrument developed to assess effective teacher-child interactions in infant, toddler, preschool, elementary, and secondary classrooms and settings." The CLASS is grounded in research indicating that higher quality interactions between students and teachers yield increased child development and learning

(LaParo, Hamre & Pianta, 2012). The Infant, Toddler, and PreK versions of the CLASS vary in the number of dimensions that are assessed: Infant (4); Toddler (8); PreK (10). Each dimension is included in a broader domain score that represents the average of its constituent dimension scores, on a scale of 1 through 7, as follows:

1. *Emotional Supports*: A domain score, representing the average of three or four dimension scores (see below), that gauges the capacity of classroom teacher teams to respond flexibly and sensitively to the emotional needs of children in ways that foster independence, behavioral regulation, and full participation in classroom activities (LaParo, Hamre & Pianta, 2012). For the Infant and Toddler versions, the domain score "Emotional and Behavioral Supports" is averaged from the following five dimension scores: Positive Climate, Negative Climate, Teacher Sensitivity, Regard for Child Perspectives, and Behavior Guidance. For the PreK version, the domain score "Emotional Support" is averaged from the following four dimension scores: Positive Climate, Negative Climate, Teacher Sensitivity, Regard for Child Perspectives.
2. *Classroom Organization (PreK only)*. This domain score appears only in the PreK version of the CLASS, representing the average of three dimension scores: Behavioral Management, Productivity, and Instructional Learning Formats. This domain represents the capacity of teachers to proactively organize classroom environments that help children regulate their behavior and sustain engagement in developmentally well calibrated learning experiences (Pianta, LaParo & Hamre, 2008).
3. *Facilitation of Learning (Toddler and PreK Versions)*. A domain score, representing the average of three or four dimension scores (see below), that gauges the capacity of classroom teacher teams to "advance children's thinking, reasoning, and verbal skills" through the sustained, "back and forth exchange of information" (LaParo, Hamre & Pianta, 2012). For the Toddler version, the domain score "Engaged Support for Learning" is averaged from the following three dimension scores: Facilitation of Learning and Development, Quality of Feedback, and Language Modeling. For the PreK version, the domain score "Instructional Support" is averaged from the following three dimension scores: Concept Development, Quality of Feedback, and Language Modeling.

Collecting the CLASS from PDI Intervention Centers. UIC evaluators managed the annual collection of CLASS data for the PDI centers. UIC engaged a cadre of experienced Chicago-area early childhood assessors, each of whom had completed and were current in the appropriate CLASS certification training program maintained and managed by Teachstone Training LLC. The first PDI CLASS data collections occurred in the period November 2012 through March 2013, parallel to DFSS's Head Start CLASS data collections. Due to funding constraints, we conducted CLASS observations only with intervention classrooms in the following year, fall 2013/winter 2014. DFSS conducted several CLASS assessments in these years with non-intervention classrooms in the PDI centers, and collected CLASS assessments for PDI and non-PDI comparison centers in the final year of the evaluation.

Collecting PreK CLASS records for Comparison Centers from administrative datasets. Through a data sharing agreement between the Chicago DFSS and the Ounce of Prevention Fund, the UIC evaluation was authorized to receive PreK-level CLASS records from Head Start sites during the evaluation period, including at baseline (spring 2012 or prior). The agreement allowed for the inclusion of some necessary fields of identifiable information, including teacher and classroom names and identification numbers, in order to facilitate matching of teachers and classrooms across study years. These CLASS observation records were obtained by DFSS as part of Head Start quality improvement activities using procedures

identical to those employed by UIC for intervention centers, and often by the same assessors employed by UIC. During the final year of data collection (fall 2014/winter 2015), DFSS also collected CLASS observations for the PDI intervention centers as part of an enhanced city-wide data collection in the final year of the evaluation.

Impact Study of Student Developmental Progress and Kindergarten Readiness

Consistent with the evaluation logic model, PDI intervention was expected to significantly impact the learning and development of enrolled students, along with their readiness to enter kindergarten. To test this hypothesis, the evaluation developed a quasi-experimental design (QED) comparing the progress of students enrolled for one year or two years prior to spring 2014 either in five PDI intervention sites or corresponding matched comparison centers. In addition, a more detailed growth analysis was conducted using quarterly child development data for students enrolled for two full years. Hierarchical linear modeling (HLM) with two nested levels (student and center) tested the degree of difference between students in intervention and comparison centers. Details of these analyses are provided in Chapter 8.

Measures of developmental progress. To measure developmental progress the evaluation employed the TS GOLD assessment. The Creative Curriculum GOLD assessment is the primary assessment used by the Chicago Department of Family and Support Services (DFSS) to evaluate the developmental progress of children in Early/Head Start classrooms. It is an observation-based assessment system administered by classroom teachers that gathers information on 38 developmental objectives each arrayed along continua scored on a 10-point scale ("not yet" to level 9). Five well validated developmental factors derived from these objective scores - **social-emotional, language, cognitive, literacy, and mathematics** – were the primary measures used in this study. As a sixth measure, the study employed a specific GOLD assessment of **English Language Acquisition** to capture possible differential impacts of PDI on the emerging English proficiency of students identified as "Dual Language Learners." We use GOLD data collected by children's actual ECE teachers based on this study's finding that classroom teachers provided adequate training could use the instrument reliably, and were better positioned than unfamiliar external assessors to observe their students with minimum impact on their affect or engagement with classroom materials (UNCC CEMA, 2011; Lambert 2012).

Accessing GOLD developmental metrics. GOLD is used four times annually (at spring, summer, fall and winter "checkpoints") by lead teachers in Chicago Head Start classrooms to assess child developmental progress. These data are entered into a secure online database maintained by Teaching Strategies Incorporated (TCI), the proprietary owner of the GOLD assessment system. TCI subsequently converts the data into several reporting formats that include a Raschian metric used for research purposes (Lambert 2012). Based on data sharing agreements with DFSS and CPS, UIC worked with TSI staff to acquire a comprehensive dataset of all checkpoints between spring 2012 (baseline) through fall 2014 (conclusion of PDI), for all children enrolled at any time within this time frame, for the five PDI locations and 40 matched comparison centers.

Measure of kindergarten readiness. We selected the Bracken School Readiness Assessment (BSRA, version 3) to assess the readiness of transitioning kindergartners from PDI center PreK classrooms to engage kindergarten-level work. The BSRA-3 is a well validated, direct assessment of a child's academic readiness for formal education. Trained assessors evaluate a child's understanding of 88 foundational

concepts embedded in six subtests intended to measure the following school readiness concepts: colors, letters, numbers/counting, sizes, comparisons, and shapes, requiring roughly 15 minutes to administer. Scores from six subtests are combined to create a **school readiness composite score**, which provides a standard score used to make comparisons between the performance of children in local and national contexts. This composite score was the primary measure used in the UIC kindergarten readiness study. (Bracken, 2008; Brassard & Boehm, 2007; Panter & Bracken, 2009). After a review of literature, we selected the GOLD Literacy sub-scale to stand in for BSRA at baseline (see Lambert, Kim & Burts, 2013, for thorough review).

BSRA-3 data collection. Through a cooperative arrangement with the DFSS, UIC facilitated collection of BSRA data from all PreK students transitioning to kindergarten in 15 Chicago ECE centers in May-June 2015, including the five PDI locations and 10 DFSS-affiliated Head Start locations selected from the UIC's pool of 45 demographically-matched comparison centers. The 10 BSRA comparison centers were chosen on the basis of the number of PreK students enrolled in spring 2015 who possessed GOLD Literacy sub-scale data in the evaluation's GOLD dataset. UIC arranged for a group of assessors to be trained to administer the BSRA-3 following the recommended procedures from the instrument's developers. The data collection yielded an initial pool of 150 assessed PreK students, from which 56 (28 intervention and 28 comparison) fulfilled all requirements to be included in the final QED analysis.

Further Data Supporting the Implementation and Impact Studies

Several categories of data were collected on a periodic basis (in most cases, annually) to deepen biographical and professional knowledge of the PD participants and the centers as PD contexts, to investigate how PD participants were receiving and experiencing the PDI, and to inquire whether the intended professional learning was emerging (*see Appendix 1A: Selected Data Collection Protocols and Instruments (Companion Volume*)).

"Stages of Change" Questionnaire. The Stages of Change Survey (Version 2.0) is a normed research instrument that assesses the readiness of early childhood educators to consider, explore and undertake steps to improve the quality of their classroom practice (Petersen, Baker & Weber, 2010). The survey is grounded within the Trans-theoretical Model of Change (or TTM) which arrays human change behavior along a five-level continuum from "contemplation" to "maintenance" stages. The survey poses a general prompt or stem, respondents rate themselves along several parameters relevant to their overall readiness to change. Each parameter is assessed along a five point scale/continuum (corresponding to the TTM levels). Scales are aggregated to produce a summary mean score. The score is further normed according to score ranges corresponding to each of the five TTM levels. The survey was completed by each participating early childhood classroom teacher and leader in all intervention centers at two points in the project: first, at baseline in later summer/early fall 2012 after initial meetings between coaches and their assigned classrooms (see further in discussion of accompanying baseline interview, below); and second, in late fall 2014 (into early winter 2015), at the conclusion of PD sessions. Coaches did not complete the parallel rating at baseline due to their lack of sustained engagement with their assigned center staffs. Instead coaches used the ratings as one set of prompts for a baseline interview with each teacher. Coaches did complete parallel ratings in 2014/2015.

Baseline individual interviews with teachers and center leaders. As part of becoming acquainted with each of their assigned teachers and leaders, each coach conducted individual interviews of approximately 45 minutes. Coaches were entered into the evaluation project's IRB for the limited purpose of conducting these interviews, and UIC staff trained all coaches in the procedures for safeguarding the confidentiality of interview and the protection of consented materials including audio recordings. Assigning these baseline interviews to coaches served two purposes: first, to allow coaches to engage their coachees in in-depth conversations with a uniform protocol; and second, to minimize time demands on coachees by consolidating evaluation and coaching information needs within one protocol. The interview session began with each coachee (teacher or leader) completing the "Stages of Change" (SOC) questionnaire. The SOC protocol included a numeric ID code for the coachee in a packet provided to the coach. Upon completion of the protocol and discussion of the consent document, the interview began by inquiring into the coachee's reasons for their SOC ratings. Further topics included the coachee's perceived strengths and deficits as a classroom teacher, perceived priorities for improving practice, and strongest beliefs about ECE teaching practice. The interview concluded by allowing the coachee an opportunity to change any SOC ratings based on the interview conversation. Procedures were instituted for coaches to store and safeguard all consented materials until returning them to the UIC evaluation team for secure storage and analysis.

Baseline and group interviews with teachers and center leaders. In the same baseline period (late August through September 2012) coaches also audio-recorded group interviews with teacher classroom teams and the leadership team in each center. The leadership team interviews were jointly conducted by the two coaches assigned to each center. The primary purpose of this interview was to deepen information about the organizational culture of the center – the routines of daily classroom practice and center management, the degree of inclusion of staff in center decision-making; understandings of "quality" in ECE teaching and leading, and prior patterns of PD and training supported by each center. As with the individual interviews, the preliminary consent discussion established norms for group discussion and individual participation. Procedures were instituted for coaches to store and safeguard all consented materials until returning them to the UIC evaluation team for secure storage and analysis.

Annual follow-up group interviews with center teachers within age group cohort. The UIC evaluation team conducted follow-up group teacher interviews annually in the fall of 2013 and 2014. These interviews sampled beyond the teacher teams to include available teachers in each center who were teaching students of similar age (i.e., birth-3 and PreK levels). Group sizes typically varied from four to eight interviewees. The dual focus of these follow-up interview cycles included understanding the experiences and outcomes of the PD activities, and tracking intended changes in the climate, culture, and organizational routines of the intervention centers. In addition, coaches conducted one final round of group interviews with teacher teams in early 2015 with a specific focus on understanding changes in practices of lesson study over the course of the PDI project. These interviews were integrated into the composite baseline and follow-up interview record for teachers across the 2.5 year span of the PDI project.

Annual follow-up individual interviews with center leaders. The relatively small cohort of supervisors, owners and directors across the four intervention centers permitted the conduct of individual follow-up interviews by the UIC evaluation team in late fall 2013 and 2014. Distinct interview protocols were

created for direct supervisors and director/owners although a common core of questions for all leaders was maintained. These interviews, typically one hour long, were in-depth conversations about each of the leader PD contexts, the conceptual spine of the PDI (especially the 5 Essential Supports framework), the relationship with on-site coaches, and the experience of shifting mindsets around key leadership challenges like supporting collaborative routines among teachers. Interviews were conducted almost exclusively at the center locations.

Annual interviews (baseline and follow-up) with PDI coaches. The UIC evaluation team conducted individual interviews with the eight PDI coaches in summer 2013 and fall 2014. These interviews had four primary purposes: 1) to gauge the development of organizational capacity in their assigned centers using a protocol geared to the 5 Essential Supports framework; 2) to explore issues in the implementation of the PDI among teachers and leaders; 3) to explore evidence for growth in key areas intended by PDI among teachers and leaders; and 4) to investigate how coaches perceived growth in their own PD practice and understanding of key PDI conceptual frames as the Initiative proceeded. Findings and direct coach recommendations from the summer 2013 interviews were aggregated and summarized for the Ounce implementation team in considering PD design adjustments in the last year of the PDI.

Center staff background survey. In fall 2013, a survey was administered to teachers and leaders in all four PDI intervention centers. The purpose of the survey was to clarify the demographic, educational, and employment histories of the PD participants as well as exploring key ECE issues such as levels of work-related stress, job satisfaction, and career aspirations. A majority of question formats paralleled those used in the national FACES survey (2012 version) to permit comparisons with a national normed sample. The survey was administered via handheld tablets (e.g. iPads) at each of the intervention centers with a participation rate of over 90% of teachers and leaders. Participants were assigned a survey ID number to assure confidentiality but also permit linkage of individual teacher responses to corresponding centers and classrooms.

Chapter 4 SELECTION AND CHARACTERISTICS OF THE PDI INTERVENTION CENTERS

The Ounce's i3 proposal specified the recruitment of four community-based early childhood centers to serve as intervention sites. These centers would capture a useful if not encompassing range of typical administrative and demographic circumstances found within the City of Chicago. The proposal also specified that all selected centers would already be affiliates of Head Start and, if possible, Early Head Start (administered through the Department of Family and Social Services), as well as affiliates of the Chicago Public Schools through its Community Partnership and Prevention Initiative programs. Finally, the proposal specified geographic diversity within the City of Chicago as a valuable asset to the project.

Beginning in February 2012, the Ounce of Prevention Fund issued a Request for Applications to participate in the development of the Professional Development Initiative (PDI). The RFA was advertised through the Ounce's affiliate network and publicized to all Centers in Chicago with Head Start and CPS affiliation through the Chicago Department of Family and Support Services (DFSS). The advertisements indicated critical inclusion criteria, primarily joint affiliation with Head Start and the Chicago Public Schools' Community Partnership and Prevention Initiatives, excluding school-based centers. The advertisements invited qualifying ECE organizations (a total of 45 centers in Chicago) to attend an informational meeting as the necessary portal to receiving an application packet. Two informational meetings were held in February 2012 with 16 attendees; the deadline to submit an application for consideration was March 20, 2012. Six community-based ECE Centers applied within the deadline to participate in the project.

A selection committee comprised of eight project stakeholders, including representatives from CPS, DFSS, and the Ounce of Prevention Fund, was tasked to select four centers to participate. The Ounce implementation team provided each committee member with a ranking protocol for reviewing applicant responses to a number of open-ended questions in the application. Committee members were asked to evaluate readiness: 1) to align the organization's mission to evidence-based approaches; 2) to assess willingness of both teachers and leaders to engage in a comprehensive, long-term PD process; 3) to participate in research and evaluation processes; 4) to use data for continuous improvement; 5) to put in place organizational systems to support student and family engagement; 6) to partner with CPS elementary school principals to facilitate successful kindergarten transitions. Regarding criterion #2, leaders were required to submit statements from potential teacher participants that they were genuinely and voluntarily interested in participating. The Ounce implementation team retained for itself the review and ranking of organizational qualities such as: a) strong reviews by ECE accreditors (e.g. Head Start); b) staff willingness to participate; c) location in high risk communities serving high needs families; and d) quality of plan for making staff available to participate in PDI activities. In addition, the Ounce implementation team-conducted site visits to all six applicants including interviews with center administrators and teachers.

In March 2012 the Ounce announced the selection of four community-based centers as intervention sites: three for-profit centers (referred to as Center2, Center3 & Center4) and one not-for-profit satellite

location of a large Chicago social service agency (referred to as Center1).[2] One of the for-profit centers included two locations with distinct demographic characteristics. In what follows, where appropriate and possible, we will distinguish the characteristics of these two satellite locations (referred to as Centers 4A & 4B). All Tables are included in Appendices 4A through 4E.

Characteristics of Host Communities

The primary aim of the PDI is to develop a framework for job-embedded PD that would prove both powerful and sustainable for ECE centers serving low income communities. Therefore, we begin by asking if the four centers (and five locations) selected for the PDI intervention are located in communities with populations and conditions characteristic of high need urban settings. In Chicago, a long social science tradition has focused on tracking a wide range of social and economic indicators in 77 large geographic neighborhoods. The table in Appendix 4A captures several demographic, economic, and educational indicators for the four large Chicago neighborhoods that contain the four PDI intervention centers, compared with the City of Chicago as a whole, for calendar year 2013.[3] The table in Appendix 4B shows the census tracts that encompass each PDI intervention center, allowing comparisons with both City of Chicago and national averages. Several patterns are evident in comparing these two tables.

First, the four communities meet the goal of reflecting Chicago's geographic and demographic diversity. The communities range from far north (Rogers Park) to central city (Near South Loop to near southwest (West Englewood), to far southwest (Ashburn). With the exception of predominately African American West Englewood, the three remaining neighborhoods offer significant representations of African American, Hispanic, and White residents. At the census tract level (Appendix 4B), the predominance of non-White residents increases, suggesting that the issues faced by these populations across Chicago's neighborhoods are likely to be reflected in the pedagogy and practices of the four PDI intervention centers.

Second, in terms of socio-economic conditions prevailing in 2012, the four host communities reveal four rather distinctive profiles. Evidence of the greatest socio-economic distress is found in West Englewood, a section of Chicago that has known concentrated poverty for decades and was particularly affected by the economic downturn of 2008.[4] On almost all social and economic indicators in 2012, West Englewood lagged behind the other three PDI communities and the City of Chicago—whether one considers median family income, employment rate, or high school and college graduation rates. Examination of health indices revealed that West Englewood had high rates of crime and infant mortality (over 13 deaths per

[2] The social service agency was in fact an affiliate partner of the Ounce of Prevention Fund, which served as its Head Start delegate agency. However, because the development project did not involve interactions with Head Start delegate agencies, this relationship was deemed not to represent a potential complication or conflict of interest for the agency's participation in the grant.

[3] Source: MetroSource Community Data Snapshot drawn from the 2013 American Community Survey, 2009 – 2013. These data summaries were the most proximate and publicly available data summaries for the Chicago 77 Neighborhoods.

[4] See: a) http://www.chicagohealthatlas.org/place/west_englewood; b) http://www.chicagosfoodbank.org/site/PageServer?pagename=hunger_research.

100,000 residents), yielding one of the City's highest "Hardship Index" levels, 89/100.[5] Several indices of poverty are even more pronounced in Chicago Housing Authority's (CHA) census tract in West Englewood. The table in Appendix 4B indicates that median income in CHA's immediate neighborhood did not exceed $12,000. Close to 3 out of 4 families were receiving SNAP aid and over 1 of 4 adults was without health insurance.

Two other PDI host communities, Rogers Park and Ashburn, present both similarities and contrasts. On the one hand, both neighborhoods feature significant White, Black, and Hispanic populations, and received similar "Hardship Index" ratings from the City of Chicago (39 and 37, respectively). While located at opposite ends of the city, they reported similar levels of per capita income in 2012 ($23,939 for Rogers Park; $23,482 for Ashburn), although Ashburn's median income level was much higher. Each community features moderate to strong employment rates reflecting large numbers of both working and middle class households. In other respects, however, Rogers Park and Ashburn are like night and day, particularly for families raising young children. Rogers Park is among the city's most ethnically, linguistically, and socio-economically diverse sections of the city, with a relatively young working and immigrant population. Residents of this section are predominately apartment dwellers, are well served by public transportation with the highest rate of public transit use, and enjoy a wide range of commercial and cultural amenities. At the same time the gaps between haves and have-nots in Rogers Park are appreciable. Over one-third of residents with school-aged children living in the census tract surrounding Center2, for example, live below the federal poverty line, lack health insurance, and qualify for food stamps.

Ashburn, by contrast, is a section dominated by single family homes built largely in the 1950s and a commuter lifestyle involving longer distances driving to work. The population is older and largely blue collar with less than 20% of residents holding a Bachelor's degree in 2012. Population increased, employment remained strong, and marriage rates high in the period between 2008 and 2012, with housing vacancy rates among the lowest in the city. By all appearances, Ashburn is the most stable of the four communities selected for the PDI intervention with amenities such as parks more available to residents than in geographically denser communities like West Englewood and Rogers Park. Yet Appendix 4B also indicates that poverty is a vital reality in the census tract that includes the two locations of Center4. Housing costs are markedly higher than in the three other communities and well over half of the residents qualify for and use food stamps. The area is served conveniently only by bus lines and over one-third must drive more than 45 minutes to work implying high commuting costs. There are signs that Ashburn is a working class community under increasing financial pressure that could complicate the decisions of young families around child care and early childhood education.

Finally, Chicago's Near South Loop community, home to PDI's Center3 presents clear and obvious contrasts to the other three host communities. This community has experienced rapid gentrification since the mid-1990s as evidenced by its 55.5% growth rate for the period 2008-2012 and the predominance of housing built after the year 2000. While pockets of poverty continue to exist on the margins of this area –

[5] For the Hardship Index of Chicago's 77 neighborhoods, see the website of the Chicago Department of Public Health: https://data.cityofchicago.org/Health-Human-Services/Census-Data-Selected-socioeconomic-indicators-in-C/kn9c-c2s2

note that 15% of families with school-aged children fall below the federal poverty line in Center3's immediate area (Appendix 4B) – affluence is the dominant pattern. Median income is the highest of the four PDI communities, employment exceeds 90%, and rates of college graduation are twice those of Chicago as a whole. At the same time, Near South Loop is somewhat unique in its racial diversity. While half of its residents are white, the remaining population mixes African Americans with Asian and European immigrants helping to account for about one-third of non-English speakers in Center3's immediate neighborhood.

We conclude this section from the dual angles of convergence and variation in community conditions for development research. On the one hand, three of the four communities hosting the PDI intervention in 2012 were predominately minority with evidence of high to moderate concentrations of poverty and associated risk factors for families and young children. Therefore, these communities are highly relevant settings for testing the impact of the PDI intervention. At the same time, design and development research views variation as providing valuable information for testing adaptations of core interventions and otherwise examining the robustness of interventions across important differing contexts for implementation. In this regard, each of the host communities for PDI reflects distinct and important contexts of urban education from conditions of pervasive, concentrated poverty through mixed income circumstances as well as the dynamic of gentrification. The PDI's community contexts appear also to provide a significant opening to investigate context-driven design adaptations.

Demographic and Socio-Economic Characteristics of the Intervention Centers

A key objective of the PDI center selection process was to impact the professional learning of urban ECE centers serving high needs families and students, particularly students of color. To what degree did the selection process yield four centers that would meet this criteria? We begin by examining the characteristics of center families and students. The table in Appendix 4C draws upon city-wide Head Start program data to compare the demographic, economic, and selected educational characteristics of students in the four for-profit PDI locations compared with the Chicago city-wide averages in spring 2012. (Comparable data were not available for the PDI not-for-profit center location.)

The data indicate that the four for-profit PDI intervention locations are serving student and family populations that align well to the goals of the i3 grant. Students in all four locations are predominately minority albeit with varied combinations of African American and Hispanic identities. In two centers, Spanish is the primary language of at least half of the enrolled children. A large majority of homes are single-parent in composition, although we note that our count includes households that may also include active roles for grandparents, non-related guardians, and males (related or unrelated) taking an active role in a child's upbringing. In four locations, over 90% of families meet minimum income thresholds (i.e. are "under-income") that regulate qualification for Head Start subsidies. Finally, three of the four PDI locations serve over twice the number of special education students as the average Chicago Head Start center. We conclude by noting that the absence of families in several categories like homeless, TANF, or even migrant reflects the focus of Head Start on families with employed parents – in many respects, the working poor.

Organizational Characteristics of the PDI Intervention Centers

An important aim of the PDI project is to develop high quality embedded PD routines that can be both seeded and sustained within broadly "average" community-based Head Start-funded early childhood centers. The presence of Head Start is seen by the Ounce of Prevention Fund as providing a necessary foundation in quality ECE practices for seeding and rooting more ambitious routines of embedded PD. To what extent, then, did PDI's selection procedures yield a set of pilot centers that mirror the organizational characteristics of urban Head Start centers serving high needs communities? And what variations in organizational characteristics does this group of centers afford to PDI as potentially fruitful design and development challenges?

The table in Appendix 4D provides an overview of fiscal and pedagogical characteristics of the four PDI intervention organizations at baseline in spring 2012. The table reveals four unifying characteristics: First, the constituents of all four centers qualified for federal free or reduced lunch subsidies with few exceptions which is consistent with the incidence of poverty in 3 of 4 centers' surrounding communities as well as Head Start enrollment policy guidelines. Second, and consistent with the Ounce's application guidelines, all four centers were combining Head Start funding with two State of Illinois funding streams administered by the Chicago Public Schools: Preschool for All (targeted to PreK level students) and Early Childhood Prevention Initiative (targeted to age levels 0-3, or infant and toddler students). The lone not-for-profit center also included Early Head Start funds, which would have significantly increased budgetary resources available to its infant and toddler students. Third, three of four centers were serving students age birth through five, while a fourth was preparing to initiate an infant practice as the PDI began. This meant that they were seeing the development of many children across most of the early childhood years. Finally, all four centers came to PDI with recent experience with elements of embedded PD, and in particular, the presence of coaches from the Chicago Public Schools funding programs on a periodic basis to observe teachers and provide feedback to practice. Thus, while the PDI centers were serving high needs students and families, they were also recipients of federal and state-level funding and receiving some on-site PD supports to improve classroom practice.

There is also considerable heterogeneity across the four centers, with particular attention to the following elements:

- *Overall Size of Enrollment, Staffing, and Financial Resources*. The centers varied in organizational scale from Center1, with close to 200 students and 63 staff, to Center4, with about 100 students and 25 staff split between two store-front locations.
- *Differences in Facilities and Physical Location*. All four of the PDI centers were situated somewhat differently in relation to their immediate neighborhoods. The largest center was a satellite location of a large, storied social service organization with a multi-million dollar budget and a large central support staff. It occupied a modern, three-story facility with a prominent security staff to monitor and regulate traffic from the low income, high crime surrounding community. Two other centers were street-level facilities with secure entries monitored by program staff. The fourth center was located within a large apartment complex and drew a significant number of patrons directly from that building.
- *Differences in Organizational Cultures*. In addition to scale, we noticed significant differences in organizational climate and culture. The large, not-for-profit center's culture was noticeably more bureaucratic with strong (and sometimes "siloed") demarcations between professional roles and responsibilities. Problems of communication and maintaining relational trust were strong challenges

for leaders in this setting. To varied degrees, the three smaller for-profit PDI centers featured higher levels of personalism in leader-teacher relations with both family and friendship relationships crossing boundaries of authority and decision-making.

- *Differences in Indicators of Quality*. There were significant differences among the four centers in the length of time they had participated in programs of quality improvement – notably Head Start – as well as how they had fared in recent evaluations of quality practice. Years of participation in Head Start varied widely from 36 years to less than two years. This did not, however, necessarily correlate to success in quality assurance evaluations. PDI's intervention centers ranged on both the CPS and Illinois QRS assessments from the low (Center4) to high (Center2) ends of the quality spectrum.
- *Differences in PDI Involvement*. The centers differed in the proportion of classrooms and staff that were included within the full intervention in the PDI. This difference derived from the number of participant slots that the Ounce of Prevention Fund could accommodate within the limits of the grant. There was concern this disparity could impact the degree of penetration of the PDI into the organizational norms and routines of the PDI centers.

Workforce Characteristics

Finally, we ask: To what extent were the teachers who participated in the PDI broadly representative of the characteristics of urban Head Start teachers? And to what extent will the professional learning of these teachers provide evidence of the suitability of the PDI design for similar teachers in similar centers? The table in Appendix 4E summarizes selected characteristics of lead teachers in the PDI intervention centers obtained from a professional background survey administered at the halfway point of the project, i.e., about Fall 2013. While not a baseline measure, it does provide a valuable snapshot of several critical demographic and professional attributes of the PDI sample compared with the national Head Start sample of lead classroom teachers of the same year (i.e., Family and Child Experiences Survey (FACES), 2013). In certain respects, the PDI sample is quite comparable to the FACES national sample. Not surprisingly, both samples are overwhelmingly female and the proportion of age groups is generally similar. The same proportions in both samples had chosen a field of post-secondary studies that included early childhood education, and had completed at least 6 early childhood credits to qualify for ECE accreditation.

In three other respects, however, the PDI and FACES samples clearly diverge. First, the PDI teacher sample is roughly three-quarters African-American, while Hispanic and White teachers are significantly under-represented in comparison with national figures. Second, over half of the PDI lead teachers have two or fewer years of experience in the early childhood classroom in comparison with 1 in 5 teachers in the national FACES sample. In terms of educational levels, more than 60% of the PDI lead teachers have an Illinois teaching certificate or license compared with just over one-third of the national sample. The proportions of teachers with various educational credentials are comparable across samples except at the highest levels. 10% more PDI lead teachers have at least a Bachelor's degree, and over 25% of the PDI lead teachers have a graduate or professional degree (as opposed to 11% in the national sample). While the PDI lead teachers do not differ in age from national patterns, they do appear to have invested more time in gaining educational credentials before entering into full time ECE classroom instruction.

Chapter 4 Summary and Implications

In this chapter we investigated two related questions: First, did the PDI selection process yield intervention centers serving high needs students and families? Second, did the selection process yield an intervention group with enough demographic and organizational variation to inform adaptations to the

core PDI design that are useful to large subgroups of early childhood centers? The evidence from our analysis supports answers of "yes" to both questions. On balance, we find that the four PDI intervention centers (in five locations) are serving high needs children and families, and are surrounded by "feeder" communities with similar demographic, social, and economic conditions. At the same time, the centers vary in type, size, enrollment demographics, and physical lay-out in relation to their immediate neighborhoods. It is likely that these and related differences will yield design adaptations of considerable utility to important sub-groups of centers and teachers. In sum, we find that the Ounce's approach to site recruitment, which PDI's designers characterized for us as "intentional and qualitatively purposeful," produced the necessary conditions for fielding and testing significant design improvements through the full grant period.

Our inquiry did surface a few aspects of the site selection process that could limit the generalizability of the emerging PDI design. First, the response rate to the February 2012 RFP was unexpectedly low, which in turn limited the options of the Ounce in terms of diversifying key features of the PDI center cohort. Secondly, the PDI teacher cohort is disproportionately African American, with relatively low representation of Hispanic teachers, at least in comparison with the national FACES sample. It is not clear whether teacher demographics in PDI reflect broader selection factors among Chicago mixed-funded Head Start Centers that would lead centers with higher proportions of Black teachers to apply. It does mean that PDI findings may be somewhat more relevant to understanding the PD of African American ECE teachers than that of other teacher ethnic groups.

Third, the Ounce included in the application process a requirement for center leaders to include only teachers and teacher teams who were genuinely interested in participating in their ambitious PD design. It was left to each Center director to determine the process for obtaining statements of interest and establishing the teacher and classroom intervention lists. This approach was deemed necessary by the Ounce design team to attract applicants, to assure the voluntariness of teacher involvement, and to improve the odds of successfully "rooting" the PDI in each center without undue teacher resistance. In addition, grant funds were insufficient to include all classrooms in each center in the intervention conditions. Randomization of assignment to the intervention condition was considered inappropriate to this early phase of PDI development. However, two limiting implications arise from this approach to selection. On the one hand, teacher interest is clearly built into the conditions of this development project making generalizability to teachers with less intrinsic interest in professional learning difficult to ascertain. On the other hand, while our subsequent teacher interviews uncovered no evidence of coercion from leaders to participate, and our implementation results demonstrate high levels of teacher engagement, it is not possible to preclude that non-voluntary considerations played a role in the participation decisions of some teachers. This is a "wild card" feature of teacher participation that our evaluation has remained vigilant about in interviews and fieldwork.

Chapter 5 FIDELITY OF PDI IMPLEMENTATION

Under the Education Sciences Reform Act of 2002, the U.S. Department of Education's National Center for Education Evaluation and Regional Assistance was created within the Institute of Education Sciences. In an effort to use research to improve the U.S. educational system, an initiative called the What Works Clearinghouse (WWC) was developed to assess the rigor of intervention research. The WWC identified several elements of intervention research designs that are intended to increase confidence in findings, including standards for assessing fidelity of implementation to the intervention (U.S. Department of Education, 2011). The Investing in Innovation (i3) grant program required the inclusion of an implementation study that adhered to the WWC standards. As such, the purpose of this chapter is to report findings from our fidelity of implementation study. We begin by introducing the conceptual framework guiding our study design. We then provide an overview of how fidelity was measured. Lastly, we share our findings and interpretations.

Measuring Implementation Fidelity of the PDI

The overall purpose of the implementation study is to explore issues of fidelity of implementation and to document the fidelity of implementation of the PDI at the coach, teacher, direct supervisor, center leader, center, and PDI program levels. Three criteria for measuring fidelity of implementation serve as a guiding conceptual framework (Dane & Schneider, 1998; O'Donnell, 2008):

1. Adherence—whether the key components of the PD are implemented as designed;
2. Duration—the number, length, or frequency of the PD implemented; and
3. Participant responsiveness—the extent to which participants are engaged by the PD activities.

In sum, these criteria measure "fidelity to structure" of the PDI (Mowbray et al., 2003).

Research Questions for Evaluation of Implementation

Four research questions serve as a guide to measuring fidelity to the structural components of the PDI:

1. Were the key components of the PDI implemented as the program designers intended? If so, how? If not, why?
2. Was the PDI activity engaged and received by the participants as the program designers intended?
3. Over time, are PDI functions becoming institutionalized with fidelity within the community-based ECE centers? Which components of the PDI must be implemented to the original model versus components that may be modified, eliminated, and/or added in order to support this transition?
4. How feasible is the implementation of the PDI in community-based provider settings? What threshold characteristics do community-based organizations need to engage the PDI productively? What contextual issues mediate successful implementation with fidelity?

Key Components and Fidelity of Implementation

Based on the evaluation logic model (see Figure 3-2), six key components are measured for fidelity of implementation, which include:

1. Coach Induction and Community of Practice Implemented by the Sponsor Organization
2. Professional Development Initiative Implementation
3. Coach Professional Development

4. Teacher Professional Development
5. Direct Supervisor Professional Development
6. Center Leader Professional Development

Each key component is comprised of indicators, which specify what is observable regarding the component, and therefore helps determine what is being implemented as planned (Appendix 5A: Description of Key Components and Indicators).

Data Collection and Analysis Plan

We measured indicators related to the implementation of PDI contexts for learning once per year for three years. Each time point corresponds to a different phase of implementation and consists of differing intended hours of PD per participant.

Table 5-1 Expected PDI Participation Mapped to Stages of Implementation

Time Point	Implementation Stage	Hours/Coach	Hours/Leader	Hours/Teacher
1. April 2012 – August 2012	Program Installation	119	n/a	n/a
2. January 2013 – December 2013	Initial and Innovation	181	32.5 - 42.5	67.5
3. January 2014 – November 2014	Full and Sustainability	181	32.5 - 42.5	67.5

Several data sources were employed to analyze the extent to which the intended goal was being met. Sign-in sheets were collected to document the participant attendance to the PDI contexts for learning. Instructional outlines and handouts from the learning contexts were collected to document the content of implementation. Teachers and leaders were asked to complete a formative assessment called the KWLH, which is a graphical organizer designed to support the learning process as well as assess conceptual learning over time. Rates of KWLH completion were calculated in order to measure the advancement of participant knowledge based on the theoretical premise that completion of such formative assessment in itself leads to metacognitive development. We designed a relational database to support highly accurate calculations of actual rates of attendance and other estimates of PDI dosage (e.g. rates of completion of formative assessments) against intended rates of implementation.

Fidelity of Implementation Threshold Development

We developed a fidelity matrix in order to determine the threshold levels of fidelity for each key component and establish a clear plan for analysis. Drawing on literature in the field and Head Start Performance Standards, we developed the first draft of the fidelity matrix. Our first design defined implementation by events such as the number of contexts for learning for teachers implemented in a year, and as such, we aimed to track the number of PD events implemented during each PDI module. This began a several month process in which we engaged in conversation with the PDI designers that helped us authentically develop a rating system that was sensitive enough to accurately capture variance in implementation. The first phase of our partnership involved the Ounce clarifying what we had interpreted as accurate PDI dosage. The second phase included presenting early implementation data and preliminary fidelity ratings to the Ounce. We used methods of face validity to ask: based on our field observations of implementation, are these ratings representative of what we are seeing? Using data to inform our discussion was instrumental in realizing that the original bar we had set was unrealistic.

Moving forward in the revision process, we further discovered that our definition of implementation by number of events was in itself undesirable. Discussions of the examples of how other i3 projects were measuring fidelity from the NEi3 project director's meeting and additional review of the Head Start Performance Standards informed our decision to translate the number of PD events into PD hours. We also developed thresholds that indicated a common percentage of hours that had to be met for each indicator. Turning events to hours more accurately represented the experience of a JEPD model. Establishing common levels of expected hours by a set percentage allowed for greater consistency and clarity in the analysis of implementation data.

Rolling Up Fidelity Scores to the Program Level

The final fidelity ratings were based on point systems aligned to a pre-determined benchmark. Certain indicators were assigned points to designate low, mid, and high levels of fidelity. Whereas a center would not earn any points for low levels of fidelity, several could earn points for mid-levels of fidelity. Once calculated, the points were "rolled up" into a construct level score that determined one final dichotomous rating. This rating indicated whether the center met fidelity (yes/no). Dichotomous ratings were required by the Department of Education's implementation oversight process (i.e. NEi3) as an outcome criterion to be reported by all i3 implementation studies.

Fidelity Results

Implementation of the PDI is situated within a paradigm shift in PD. Transitioning PD from a traditional "one-off" delivery mode into a job-embedded cycle of inquiry mode requires a renewed investment in understanding how and under what conditions adults learn best. The PDI addressed this challenge by engaging leaders, teachers, and their PDI coaches in parallel learning cycles to develop specific knowledge, skills, and dispositions to improve classroom supportive organizational systems and practices, instructional planning and implementation, and fidelity in the delivery of PD intended to enhance children's early achievement. The findings reported in this section help us understand whether the key components were implemented with fidelity as intended and whether the participants engaged with the PDI as the PD designers intended. Overall, our evidence in *Table 5-2* indicates that the key components were implemented as intended and that ECE leaders, teachers, and coaches successfully engaged with intensive, job-embedded PD (JEPD), as indicated by meeting fidelity at the program level overall.

Table 5-2 Component Level Fidelity of Implementation Findings for Years 2 and 3

	Year 2		Year 3	
Key Component	***Score***	***Met Fidelity****	***Score***	***Met Fidelity****
1. Coach Community of Practice	100%	**Yes**	100%	**Yes**
2. PDI Implementation	50%	No	75%	**Yes**
3. Coach Professional Development	100%	**Yes**	100%	**Yes**
4. Teacher Professional Development	100%	**Yes**	100%	**Yes**
5. Direct Supervisor Professional Development	0%	No	100%	**Yes**
6. Center Leader Professional Development	75%	**Yes**	100%	**Yes**

**** More than 75% of centers implemented component with fidelity in order to meet overall program fidelity***

Meeting fidelity of implementation for the indicators related to coach development was consistently high all years, as the eight-coach cadre consisted of experienced professionals who are deeply committed to program quality improvement. Variation in implementation and attendance for leaders and teachers was more evident. Several contextual factors helped us to understand why this variation occurred in the initial phase of implementation, which resulted in not meeting fidelity for two of the six components in year two. However, the evidence suggests that once these factors were addressed, fidelity to the model improved during full implementation in Year 3.

When the PDI coaches were asked to reflect on the extent to which they followed the instructional outline, as collaboratively designed, *Figure 5-1* indicates that the coaches adhered to the instructional outlines for learning labs and reflective practice groups at high rates of fidelity. In particular, 94% of the coaches reported that they followed the instructional outline for the learning labs nearly 100% with no modifications or with limited, specific modifications. And, 73% of the coaches reported that they followed the instructional outline for the reflective practice groups nearly 100% with no modifications or with limited, specific modifications. Our observations of learning labs and reflective practice groups confirm high levels of adherence to the instructional content and methods. We note that when modifications were made, they were either to extend or reduce the amount of time spent on an activity in response to the needs of the learners.

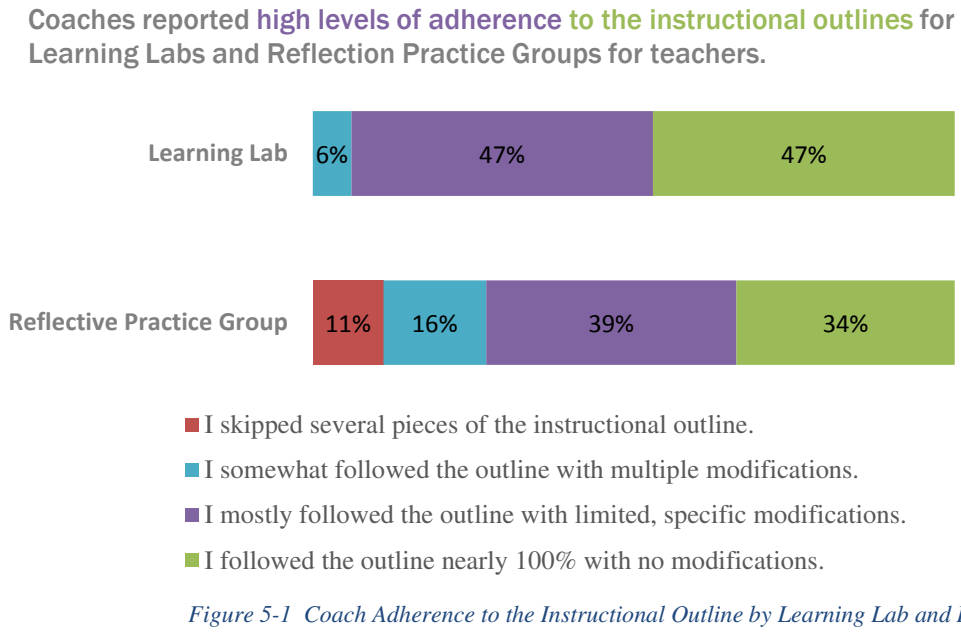


Figure 5-1 Coach Adherence to the Instructional Outline by Learning Lab and RPG

Factors Promoting Fidelity

The evidence indicates that overall the PDI was implemented with fidelity as the designers intended. But, how was fidelity met? A handful of key factors appeared to support implementation of the PDI model with fidelity. First, program-specific training that builds implementers' confidence in their ability to use the intended methods of the intervention often contributes to moderate to high levels of fidelity (Dusenbury, Brannigan, Falco, Hansen, 2003). Evidence from the coach induction survey suggests that

most coaches emerged from the induction phase with enhanced confidence to introduce the model in their assigned centers as seen in *Figure 5-2*.

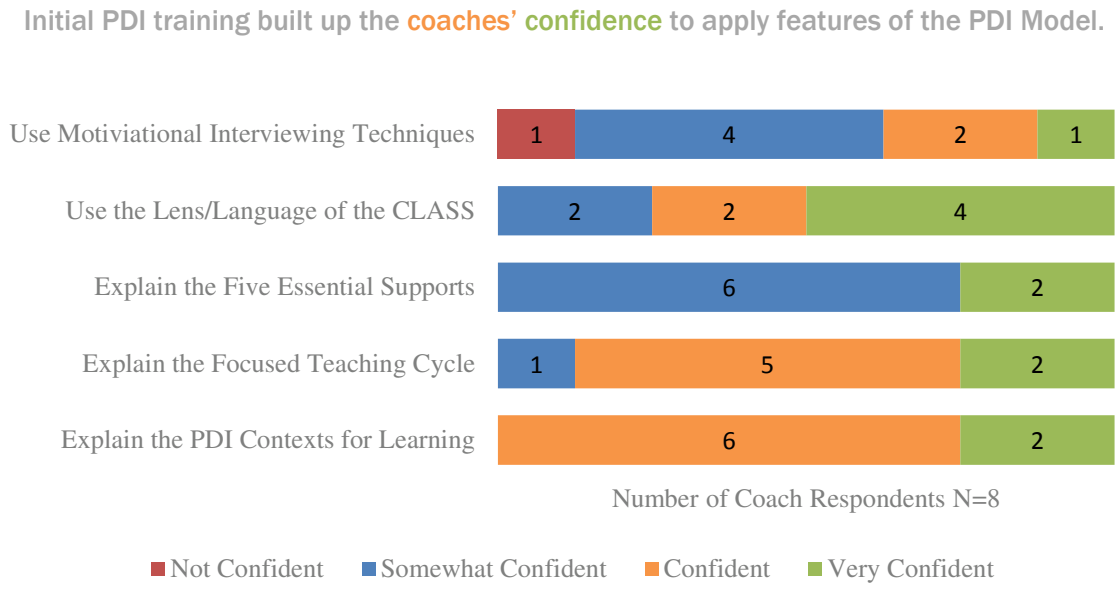


Figure 5-2 Coaches Self-Assessment of their Confidence to Apply Features of PDI Model

Second, implementers who espouse positive attitudes toward the intervention strengthen fidelity to the model (Dusenbury, Brannigan, Falco, Hansen, 2003). In the case of the PDI, at least 6 of 8 coaches emerged from their initial training with a heightened excitement and commitment to the model. Foci of enthusiasm included:

- ***The comprehensive focus of the model***, what one coach referred to as the intention to be "inclusive and holistic." Five (5) of the coaches mentioned their appreciation for the intention to address the Centers and the PDI as inter-locking units that need to address all aspects of ECE work that impact the delivery of quality teaching to students. As one coach put it, *"The comprehensive nature of this project makes me hopeful for change in quality for the children, families, and ECE professionals that we are attempting to serve."*
- Three (3) coaches specified ***the systems-building focus of PDI***, especially in relation to the support of continuous improvement efforts in their centers. This seems very allied to the themes of "comprehensiveness," so that 7 of 8 coaches expressed enthusiasm for PDI's intention to address the capacity of the center beyond the isolation of individual classrooms. As one coach observed, *"…there is a constant awareness that there are systems that must be built and maintained in order to build the supports that leadership needs to advance teachers and family support members' efforts on building positive outcomes for children."*
- Four (4) coaches also appreciated the intentional focus of PDI on ***support for coaches*** as they learn to operate within a comprehensive framework. One coach put it this way: *"Even though I feel overwhelmed sometimes, I like that I am learning new approaches with a higher level of understanding and rigor."* Another coach described the coach community of practice in this way: *"I am surrounded by an amazing group of people every week. To listen to everyone's experiences, opinions, and insights is extremely powerful...I am learning so much from listening, participating, and being challenged."*

Third, initial program-specific training is not enough to support fidelity over multiple years of implementation. Ongoing supports that facilitate change in attitude about the model's core objectives are another factor that promotes fidelity to the model (Guldbrandsson, 2008). Our analysis of individual coach interviews found that the majority of the coaches reported that their community of practice successfully developed routines for professional collaboration that helped them continuously improve, as one coach said, "*I really like to hear about what other coaches are going though and to find out that they are going through some of the same things that I am. It is good to reflect in a group like that, because you can hear other coaches' perspectives*." Several other coaches spoke to the complexity of design fidelity and they reported how the coach community of practice supported their ability to implement the PDI with high fidelity. One coach said, "*So, I like meeting with the coaches, because we can always check in. Those meetings help me tremendously –you know, understand, conceptualize, and think about where I need to head. So that's been good.*" Another coach said, **"***If I didn't have that weekly check in at the coach meetings, I would not have as much fidelity. It is too hard to maintain*." As such, the coach community of practice successfully invokes a sense of collective responsibility toward sustaining high levels of adherence to the PDI methods, content, and frameworks.

Fourth, feedback on one's instructional practice is a critical driver of implementation fidelity (Wallace et al., 2008). The PDI required the completion of several reflection and documentation forms intended to provide constructive feedback on implementation. One such example is the coaching cycle feedback form for teachers and coaches. This form was developed to gain insight into the coaches' fidelity to the PDI goals as well as track how teachers' responded to these goals. In total, this data set represents 180 coaching cycles and 720 hours of coaching conducted across all four PDI sites between March 2013 and June 2014. The PDI coaches submitted 144/180 feedback forms yielding an 80% completion rate whereas the teachers submitted 300/433 feedback forms totaling a 69% completion rate, in which 98% of teachers who completed the forms responded to the open-ended questions.

Initially, as seen in *Figure 5-3*, several of the teachers reported a more global, non-PDI content driven focus to their coaching cycle such as one representative teacher wrote, "*To become a better teacher and planner for children.*" In response to this feedback, the PDI coaches expressed difficulty in striking the right balance of following the teachers' lead with that of focusing the teachers' attention to the PDI content goals. Moreover, the model purveyors (the Ounce) hypothesized that inadequate internalization of the Motivational Interviewing framework contributed to the development of that tension for coaches. As such, the model purveyors embedded additional Motivational Interviewing training in the coach community of practice to increase their understanding of the science of behavior change. As a result, the coaches were able to adjust their practice in ways that was responsive to the teachers' interests in relation to the PDI content goals simultaneously. Over time, the teachers' reported a focus on goals that were much more aligned to the GOLD and CLASS frameworks, as represented by a sample of teachers' explanations of the focus of their coaching cycles in Module Four:

- "*We were focusing on concept development, quality of feedback, and getting the children involved more in brainstorming but most of all concep t development,"*
- *"Engaging children in real world connections," and*
- *"Parallel talk and narrating what the children are doing."*

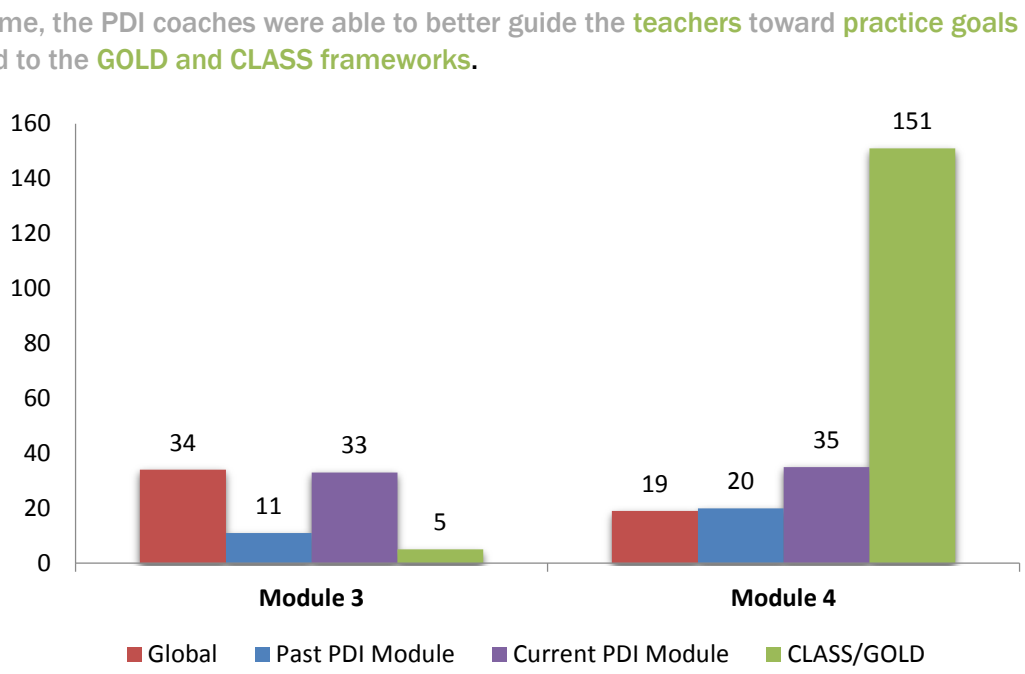


Figure 5-3 Teacher Change in Perception of the Focus of the Coaching Cycle

Lastly, much like the implementers, the intervention participants who adopted positive attitudes toward the intervention also strengthen fidelity to the model (Dusenbury, Brannigan, Falco, Hansen, 2003). Evidence from the leaders and teachers' evaluation of their satisfaction with the Learning Labs and Reflective Practice Groups remained high throughout implementation (Appendix 5B: Leader and Teacher satisfaction with Learning Labs and Reflective Practice Groups). While complex models that require coordination by many people such as the PDI model tend to reduce fidelity (Dusenbury, Brannigan, Falco, Hansen, 2003), the leaders and teachers enthusiasm for a strengthened professional learning community led to greater fidelity to the PDI content, processes, and mindsets.

Barriers to Implementation Fidelity

Our analyses surfaced a few barriers that prevented centers from meeting fidelity for 2 of 6 key components over the course of the project, and both occurred during initial phases of implementation. The two components are:

1. Key Component 2 - PDI implementation, consisting of eight indicators intended to measure the number of expected hours of PD for each participant as well as implementing those hours in a two month time frame (*Table 5-3: Key Component 2 Construct-Level Score*).
2. Key component 5 – Direct Supervisor Professional Development, consisting of four indicators intended to measure direct supervisors engagement with the PD and advancement of knowledge (*Table 5-4: Key Component 5 Construct-Level Score in Year 2*).

As previously explained in the section "Rolling Up Fidelity Scores to the Program Level," the final fidelity ratings are based on point systems aligned to a pre-determined benchmark. For example, the benchmark is the lowest total number of points a center could receive in order to receive points toward meeting fidelity. And, certain indicators were assigned points to designate low, mid, and high levels of

fidelity. Whereas a center would not earn any points for low levels of fidelity, several could and did earn points for mid-levels of fidelity. Once calculated, the points are rolled up into one final dichotomous rating indicating whether the center met fidelity (yes/no).

Our analyses at the indicator level revealed that the measures of implementation for direct supervisors and center leaders and their corresponding engagement with the PDI received the lowest levels of fidelity and therefore no points for that indicator (*Table 5-3: Key Component 2 Indicator Construct-Level Rating in Year 2* and *Table 5-4: Key Component 5 Indicator Construct-Level Rating in Year 2*). When rolled up in the total score, it was these measures that created the greatest barriers to achieving overall fidelity on those key components during Year 2 of implementation.

Table 5-3 Key Component 2 Indicator Construct-Level Rating in Year 2

Key Component 2 Indicator PDI Implementation:	Center1	Center2	Center3	Center4
1. For Teachers	**Mid**	**Mid**	**Mid**	**Mid**
2. For Teachers in a compressed timeframe	**Mid**	High	High	High
3. Of consultation contexts for direct supervisors	**Low**	High	High	High
4. Of consultation contexts for direct supervisors in a compressed timeframe	**Low**	High	High	**Low**
5. For direct supervisors and center leaders	High	High	High	High
6. For direct supervisors and center leaders in a compressed timeframe	High	High	High	High
7. Of consultation contexts for center leaders	High	High	High	High
8. Of consultation contexts for center leaders in a compressed timeframe	**Low**	High	High	High

Meeting expected levels of fidelity for key component 2 is challenging because it requires that centers swiftly develop systems that embed routines for collaboration into their daily operations. This can raise several questions for leaders including how to coordinate meetings in relation to other required meetings, how to provide coverage for teachers so that they are able to meet together, and how to secure the funding to support JEPD. Additionally, initial installation asks leaders and teachers to quickly embrace a new perspective about PD, in general. It's like asking a person to run a marathon who has hardly run a mile. Our interview data with leaders and teachers confirm that their initial response to the PDI model was one of overwhelm. For instance, several leaders expressed concerns regarding the time commitment required by the PDI, as one leader reflected on how she shared with her colleagues, "*Wait, how many meetings are we expected to attend. How are we going to make this work?*" Another leader also initially wondered, "*Just what did we get ourselves into?*" Several of the teachers expressed similar concerns about how to manage the amount of hours expected weekly. One teacher shared:

> *It seemed like you saw her [our coach] so much, it was like here she come. And I mean once she got in the room, it was good but, it was like oh, here we go again because it felt like it was so much all the time, you just was like oh, my goodness, I'm so tired -- I have to get this done and then she wants to talk about this and you would have this one thing on your mind. And you know*

that she's going back to what you were talking about -- that's not where I'm at today. And then you would have to become present and you know, just get to work. But, for a while it was like oh, how do we fit this in here? And how do we make this work?

One can characterize the initial response to the degree of commitment as shock and awe, which can create initial barriers to implementation fidelity.

Table 5-4 Key Component 5 Indicator Construct-Level Rating in Year 2

Key Component 5 Indicator Direct Supervisor:	Center1	Center2	Center3	Center4
1. Attendance to PDI contexts for learning for center leaders	Mid	Mid	Mid	Mid
2. Attendance to embedded PDI contexts for learning for teachers	Low	Low	Low	Low
3. Attendance to the consultation contexts for direct supervisors	Mid	Mid	Mid	Mid
4. Advancement of knowledge	High	High	High	High

Because the PDI logic model expects direct supervisors to be most engaged in sustaining JEPD for teachers beyond the grant period, there were additional participation expectations for them. Specifically, the PDI expected that direct supervisors attend the lesson-planning meeting for one teaching team per month and the teacher RPG every other month in order to observe the way in which the PDI coach facilitated such sessions. When asked why attendance to the lesson planning meetings lagged behind their attendance to the teacher RPG, several direct supervisors explained that planning to attend group events is much easier to schedule, because the group events were often on a day that they closed for PD. Research on implementation confirms that the integration of intervention activities into regular operations such as regularly scheduled whole center meetings, as in the case of the PDI does increase fidelity (Gottfredson et al., 2000).

In contrast to the group events, the lesson planning meetings were held during hours of operation at the level of classroom teaching teams and the majority of direct supervisors struggled with protecting their time for instructional leadership. For example, one direct supervisor said, "*I know lesson planning is important, but I find it difficult to meet for lesson planning when the coach meets with my teachers.*" A few direct supervisors also expressed confusion about the expectation of the PDI, as one mentioned, "*I didn't understand why I was supposed to be there* [in lesson planning meetings] *when the coach was there*." It is plausible that the presence of coaches in settings like lesson-planning prompted a degree of role confusion for direct supervisors in relation to their supervised teachers. When the expectations became clearer to the direct supervisors, there was promising evidence that they would engage fully with JEPD, as was found in Year 3 of the implementation study.

Institutionalization of PDI Features

Although the PDI always envisioned direct supervisors playing a vital role to the sustainability of key features of JEPD, it was not until the final year of implementation that expectations were clarified and additional systems of support were introduced. Specifically, the PDI encouraged direct supervisors to set a goal of allotting 25% of their time per week for instructional practice. In order to accelerate the transfer

of responsibility of JEPD from PDI coaches to direct supervisors, a couple of adjustments were made to the model. For instance, the PDI coaches implemented additional hours of consultation with direct supervisors in order to provide more one-on-one support. And, rather than expecting direct supervisors to implement all nine PDI contexts for learning for teachers in a two-month cycle, the focus was reduced to two PDI contexts for learning in a one- month cycle. The PDI coaches helped the direct supervisors in preparing for and facilitating teaching team lesson planning meetings and age-level reflective practice groups (RPGs).

Table 5-5 Comparison of Supervisor Attendance to Teacher Learning Cycle

	Oct 2012 – Nov 2013		Dec 2013 – Nov 2014	
Context	# Conducted by coaches	% Attended by Supervisor	# Conducted by coaches	% Attended by Supervisor
Lesson Planning Meetings	129	15%	124	47%
Reflective Practice Groups	64	83%	64	94%

Clarifying expectations and installing additional systems for support for the direct supervisors resulted in an 11% increase in supervisor attendance to RPGs, and an impressive 32% increase in supervisor attendance to teacher team lesson planning sessions as seen in *Table 5-5*. During this transition, our evidence also indicates that the direct supervisors increased their active role in facilitating the RPGs over time as seen in *Figure 5-4*. From an organizational leadership perspective, these data represent a substantial increase in supervisory commitment and arguably sustainable approach to JEPD in ECE community-based centers.

Over time, the Direct Supervisors Increasingly Facilitated Reflective Practice Groups for Teachers.

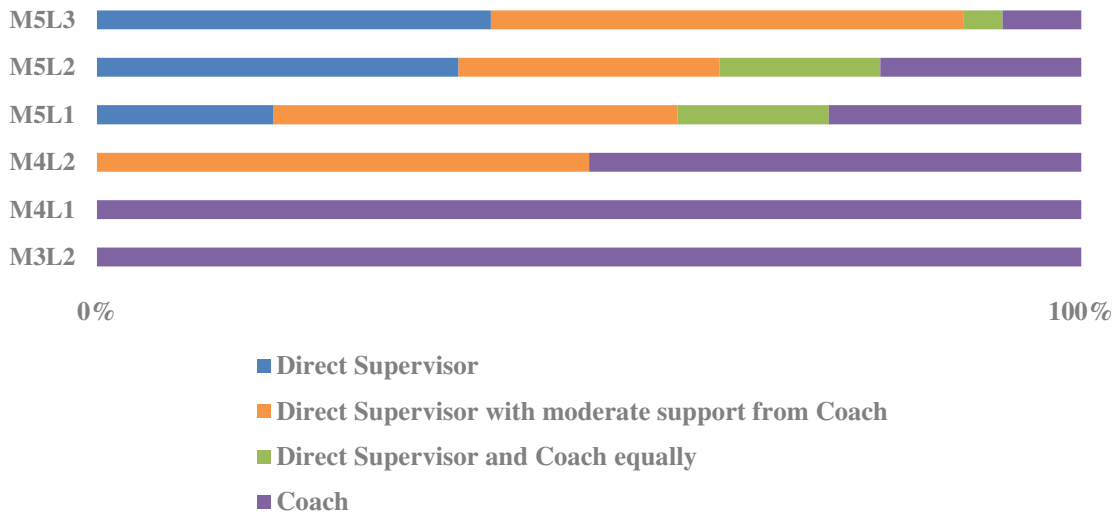


Figure 5-4 Direct Supervisors' Role in Facilitating Reflective Practice Groups for Teachers

Feasibility of PDI Implementation in Community-Based Early Childhood Centers

Meeting fidelity of implementation suggests that implementing high quality JEPD is feasible in community-based early childhood centers. Several organizational characteristics of the community-based

ECE sites enabled productive engagement with the PDI. First, the leaders at the PDI site were supportive of the intervention. When administration approves an intervention model, their enthusiasm for the model encourages teachers to embrace the model (O'Connell, 2007). Second, as previously discussed in "Chapter 4: How Were the Intervention Centers Selected?" the sites' leadership demonstrated enthusiasm for the PDI and involved their staff in the decision-making required of the application process. High interest levels and seeking staff input about their participation in the intervention has been known to increase buy-in and therefore fidelity (Greenberg, Domitrovich, Graczyk, and Zines, 2005). Lastly, integration of the intervention into regular ECE center activities can help reduce redundancy and make the most of limited resources (Dusenbury, Brannigan, Falco, & Hansen, 2003). When the majority of the leaders decided to align the PDI meetings to their previously scheduled in-service PD days, they were demonstrating that they value the program while also ensuring that their staff would be more likely to receive the intended dosage. Overall, our evidence indicates that the aforementioned organizational characteristics are necessary to future implementation of the PDI with fidelity.

Conversely, a few contextual issues mediated successful PDI implementation with fidelity. First, whether the structure of the ECE site was a large, not-for-profit or a smaller, for-profit center appeared to affect implementation. For example, the leadership team at the large not-for-profit site consisted of several members and as such, faced many challenges in organizing a leadership team meeting schedule that was conducive to everyone's schedules. In fact, our fidelity findings at the center-level indicate that the not-for-profit experienced the greatest challenge in meeting fidelity of implementation of contexts for learning in a compressed timeframe. To complicate matters, the not-for-profit site also experienced the highest level of turnover within its leadership team. In addition, the fact that the large not-for-profit's mission crossed several social policy sectors (e.g., ECE, social service provision, health education) also meant that this organization has a long history of engaging with several intervention programs simultaneously, in comparison to the smaller, for-profit settings. While in many regards this was an asset to implementation, it also had the effect of making teachers more skeptical about the long-term value of PD initiatives, including the PDI in its initial stages.

Second, the site leadership required considerably more support from the coaches in establishing basic organizational practices needed to support JEPD. For example, center-wide calendars were non-existent at all of the sites at the start of the initiative. In order to even begin initial implementation, the coaches spent a considerable amount of time working with site leadership to develop a calendar to plan for the vast amount of PDI activities. It is in this regard that each site could benefit from a PD coordinator to ensure successful implementation and evaluation of the program (Gottfredson et al., 2000). During PDI implementation, the coaches adopted this role, but for future PDI implementation and/or for sustaining JEPD, hiring a coordinator that can act as a resource to successful implementation is recommended according to the implementation science literature (Dusenbury, Brannigan, Falco, & Hansen, 2003; Greenberg, Domitrovich, Graczyk, and Zines, 2005).

One of the most significant barriers to sustained JEPD beyond the PDI grant period will be financial feasibility. As such, the leaders will need to make decisions about which PDI features are most viable. By design all components of the PDI are indispensable, because of the interconnectedness of the routines for collaboration. Not surprisingly, providing coaching and the coverage needed for teachers to collaborate presents the greatest financial burden on the sites. Thus it is likely that the number of PD meetings and

coaching at the classroom level will be reduced. Those PD features that remain sustainable will likely become a function of the role and responsibility of the direct supervisor. When we asked center leaders which PDI features they feel most committed to maintaining, all 15 leaders valued the following features and envisioned supporting their direct supervisor by protecting their time for JEPD:

- Adopting the PDI lesson planning form as a center-wide protocol to support instructional practice;
- Continuing to protect time for teaching teams to plan lessons together on a weekly basis;
- Maintaining monthly center-wide reflective practice groups for teachers to examine their practice collaboratively; and
- Supporting annual center-wide meetings for the purpose of discussing classroom observation assessment data.

While the great majority of the center leaders felt confident in sustaining these features of JEPD, several also did express concerns regarding the human capacity needed to prepare the classroom observation data for such data discussion meetings. During PDI implementation, our evaluation team prepared these center-level reports for them. The leaders recognized that such support would no longer be available to their organizations moving forward.

In the case of the teachers, their views of which PDI features are sustainable aligned with that of their respective leaders. One exception was in the area of the coaching cycles. The teachers were quite vocal about the value of working closely with an expert in the field who they credited with being most helpful in affirming their current efforts while also challenging them to try new practices. In order to be able to sustain the coaching feature of the PDI, the teachers recommended that the PDI model allow for greater flexibility in coaching sessions with the idea that their direct supervisors could then facilitate this role. One representative teacher spoke to this when she said, "*I think one of the challenges was, when you know you was going to meet with your coach for an hour for just one of the four meetings, and then being able to carry on a conversation for an hour for each meeting. I always thought why can't we combine some of these meetings?*" We therefore suggest that it may be feasible for direct supervisors to sustain some coaching features of the PDI as long as they modify the model by combining or reducing some of the meetings.

Chapter 5 Summary

In summary, the key components of the PDI were implemented as intended. Overall, the ECE leaders, teachers, and coaches responded to the demands of an ambitious JEPD with high rates of engagement. Meeting fidelity of implementation for the indicators related to coach development was consistently high and met in all years. While initial coach training effectively prepared the coaches to initiate implementation at the sites, ongoing supports for coaches as found in the coach community of practice successfully enabled the coaches to rigorously implement the model to fidelity over time. Variation in implementation and attendance for leaders and teachers was more evident. Several contextual factors help us understand why this variation occurred in the initial phase of implementation, which resulted in not meeting fidelity for two of the six components. However, the evidence suggests that once these factors were addressed, fidelity to the model improved when full implementation commenced during the final year of implementation. Meeting fidelity of implementation suggests that implementing high quality JEPD is feasible in community-based early childhood centers.

Chapter 6 EVIDENCE OF LEADER LEARNING AND DEVELOPMENT

In this section, we will consider evidence that the Ounce PDI led to significant development of the capacity of leaders in intervention centers to support and facilitate professional learning and instructional improvement. Previously, we reviewed evidence that the PDI, as implemented, was able to consistently involve center leaders in a challenging and coordinated program of embedded PD. While time was required to establish the Leader Learning Cycle and its components to high levels of fidelity, our implementation data indicate that the center leaders internalized the conceptual framework of the Five Essential Supports by the final year of the project. In turn, direct supervisors were transitioning to lead roles in sustaining new protocols in lesson planning within teacher teams and reflective practice within age-level Professional Learning Communities (PLCs). A remaining question is, "Did center directors and supervisors experience and accomplish the kinds of conceptual growth and 'transformation' intended by the ambitious PDI design?"

We begin by reviewing just what the PDI asked of its center leaders in terms of its curriculum and agenda for professional growth. We then highlight several features of the PDI center leadership cadre that likely impacted its readiness for the challenges of the PDI at its outset. Finally we weigh evidence of transformation in knowledge, skills, and dispositions related to the practice of standards-based instructional leadership, as well as those features of the PDI which seemed most implicated in precipitating the growth that occurred.

The PDI Curriculum for Leaders: What Were Directors and Supervisors Asked to Learn?

Chapter 2 provided an overview of the PDI learning cycle for leaders, which broadly paralleled the sequence of the teacher learning cycle. Unlike the teacher learning cycle, the leader cycle alternated monthly between large cross-site convenings of the center leaders, and on-site consultation meetings involving each center's leadership team and its assigned PDI coaching team. In the first month, the leader cycle began with

FIGURE 6-1.
THE FIVE ESSENTIAL SUPPORTS AS ARTICULATED IN THE PDI

School Leadership: the catalyst for change, particularly through inclusive practices and a strategic, systems orientation.

Parent Community Ties: Strength of openness to parent concerns and connections to community institutions.
Professional Capacity: Quality of faculty and staff, collective commitment to change, focus on professional development, and extent of team culture.
Student-Centered Learning Climate: Whether schools have a safe, welcoming, stimulating, and nurturing environment focused on learning for all students.

Ambitious Instruction: Also referred to as "Instructional Guidance." References the degree of alignment of the curriculum, levels of academic challenge and press, and the equipment of teachers to advance learning.

Three key mediators include:

Relational Trust: Professional relations anchored in mutual respect, personal regard, and perceptions of competence and integrity amongst colleagues.

School Structural Characteristics like size and enrollment stability.

Surrounding Community Characteristics such as levels of social capital, the degree and concentration of poverty and related social problems.

(See Sybring et al., 2006; Bryk et al., 2010)

Figure 6-1 Five Essential Supports as Articulated in the PDI

the introduction of key information in a "leader learning lab," (or LLL) typically three hours in duration. This meeting would happen in a large meeting area, either in an Ounce of Prevention facility or a facility of the large non-profit PDI center. The LLL would be followed by two consultative meetings between on-site coaches and their assigned center leader teams – a full leadership meeting to survey center-wide issues, and a convening of the two coaches with the two direct supervisors to discuss issues specific to age-level teaching. Often the consultation would be scheduled to articulate to age level meetings with teachers, which in turn also allowed coaches to streamline their on-site visits. In the second month, the leaders once again convened across centers for a "reflective practice group," (or RPG). The RPG was intended to allow participants to share insights into the organizational and practice issues posed by the concepts introduced in the prior LLL and consultation meetings. Once again, two on-site consultation meetings followed the leader RPG.

Between July 2012 and November 2014, this two-month regimen delivered twelve modules of PD to leaders, with one-month breaks in December of 2012 and 2013, and July of 2013 and 2014. Based on our observations of the LLLs and RPGs, as well as a review of the agendas for these events, it is fair to conclude that little time in these meetings was left un-programmed. The 15 leaders who consistently attended these meetings absorbed an impressive range of ideas and information, and were asked to reflect on their learning using the leader's version of the KWLH formative assessment protocol (see description in Chapter 3, p. 22). At the core of the PDI curriculum for leaders were the following key elements:

1. *From theory to practice with The Five Essential Supports framework.* As presented earlier in Chapter 2, the "Five Essentials" framework formed the conceptual spine of the leader PD program across all 12 modules. The framework provides practitioners with a research-based model for how five broad domains of educator practice converge to sustain instructional improvement, as well as a set of factors that mediate their convergence (Sebring et al., 2006; Bryk et al., 2010). *Figure 6-1* provides a brief overview of the Five Essentials and their mediators. The model clearly grants primacy to leadership and leadership development as *the* critical drivers for elevating and integrating the other four essentials. In this regard, the model was a highly defensible choice for the PDI's "conceptual spine."

   That said, two aspects of the PDI's use of the framework should be underscored. First, the Five Essential Supports arose from a prodigious research effort, one which emphasized describing the inter-relations among the components of urban school improvement, e.g, school leadership, parent-community ties, professional capacity, student-centered learning climate, and instructional guidance. At the outset of the PDI, little work had commenced to translate the Five Essentials analysis into a granular guidance for practitioners. Indeed, the PDI was among the first attempts at such a translation in any sector of urban schooling. Second, no available study had addressed the relevance of the Five Essentials to small, community-based early childhood settings. Further, no adaptations of the framework for ECE settings existed for development of PD models. Thus from the outset, the PDI's development of leaders featured high levels of mutual (and occasionally cross-cutting) sense-making among Ounce designers, center leaders, and PDI's coaches, who were as new to the Five Essentials as their coachees. This was a rich situation for transformational reflection. It also meant that the "how" of translating each Essential into practice could at times be a focus of confusion and frustration as well as in-depth inquiry.

2. *A shared methodology for continuous inquiry and improvement*. Drawing upon theorists like Michael Fullan (2006), the Ounce's i3 grant proposal set forth the broad goal of inducting PDI leaders into an "*educational leadership perspective*" (Pacchiano et al., 2011, Appendix J, p. 15). A hallmark of such a perspective is the ability to organize instructional improvement activities and team culture around recurring, data-informed cycles of inquiry that iteratively test better designs for curriculum and instruction (Halverson et al., 2007; Smylie, 2010). In fashioning its own *Inquiry-Based Decision-Making Cycle* (IBDMC), the Ounce clearly drew on several extant models for continuous improvement cycling (Copland, 2003; Miletello et al., 2009) as well as the basic principles of action research. Like these models the effectiveness of the IBDMC depends on the growing capacity of leaders to select data relevant to problem diagnosis, to control the scale of data collections and iterative design adjustments, to build team capacity to implement with fidelity, and to manage progressive cycles at a sustainable pace (Smylie, 2010). Most research underscores that such capacity is difficult to build and sustain in urban K-12 schools (Payne, 2010). While the stages of the IBDMC were explained and reviewed in Learning Labs and RPG sessions, consultations with coaches were the PDI's intended location for practicing diagnostic, planning, and implementation skills. Thus, much depended on the grasp that coaches had on the meaning and purpose of each of the IBDMC's five stages of inquiry cycling.

3. *The CLASS: Mastering a "lens and language" for Ambitious Instruction*. One aspect of the PDI curriculum, which was already familiar to the leaders and supervisors was the Classroom Assessment System (or CLASS). The PreK version of the CLASS was a primary assessment tool used by the Chicago DFSS (Chicago Family and Support Service) and the Chicago Public Schools for both PD and accountability purposes. Trainings in the use of the CLASS were widely available to center leaders. For the Ounce designers, however, the potential of the CLASS within the PDI went well beyond data collection or monitoring classroom impacts. Given its thoughtful design, they saw strong parallels and overlaps between the "lens and language of the CLASS," its animating principles, and the instructional lens of the Five Essential Supports. Thus, PDI training modules consistently asked leaders to articulate the underlying "why's" of the CLASS domains and sub-scales, and frequently juxtaposed CLASS and Five Essentials concepts for reflection and comparison. The thrust was to make the "lens and language" of the CLASS become the default cognitive frame for understanding and interrogating classroom practice among directors, supervisors, and teachers.

4. *Reconstructing supervisory interactions through individual and collective reflection*. The PDI took seriously the challenge of inducting its leader participants into situations and experiences with the power to transform how they engaged teachers and one another. Specifically, the leaders were asked to apply the lens and language of the CLASS to their supervisory interactions with teachers by thinking about how to maintain positive climate, regard teachers' perspectives, and build teacher's conceptual understanding of practice. This approach was intended to transform supervisor-teacher interactions in ways that cultivated trusting relationships conducive to professional learning. As such, the goal with leaders was to promote reflective examination of their own leadership practices ("reflection out of the action") and to actively bring new concepts to bear in daily work with teachers ("reflection in the action"), particularly with the help of an observant coach. The PD sessions did compel leaders to grapple with the possible applications of ideas like "inclusivity," "trust," and "respect" as they played out in supervisory relationships, and to begin to hear the limitations in the

frames they were using to motivate others to change. Thus, the Leader Learning Cycle could be an uncomfortable and stressful process, punctuated with moments of "A-ha!" insight. The aim was not only to develop the participants into more "reflective practitioners," but to equip them with a general methodology for sustaining reflection in themselves and other center leaders.

5. *Building robust systems through "the power of shared protocols."* Another hallmark of the *educational leadership perspective* is the collaborative use of organizing rubrics and formats – protocols – to make norms and expectations visible, render practice public, facilitate reflection, and distribute opportunities for expression and influence (McDonald et al., 2003). In this regard creative facility with protocols is the *sine qua non* of the learning organization, its means for building clarity and consensus about any group's primary values and aims (Senge, 1990). They can also precipitate leadership development, particularly of the facilitative kind. As McDonald and associates put it, "One of the values of using protocols as learning formats, in our view, is that they can accelerate the development of facilitative leadership, and thus assist in the creation of new workplaces for educators" (2003, p. 13). Protocols in turn become the bedrock for building robust systems of support for professional learning and feed high quality data into regular cycles of inquiry.

   Yet it bears reminding that, among the challenges of leading and teaching in Head Start funded settings, there are a plethora of activities heavily anchored in layers of externally imposed standards, forms, and regulations. Forms and protocols thus become easily and pervasively associated with shallow compliance and external accountability (Rohacek et al., 2012). Shifting toward protocol-based learning in this context can require difficult re-culturing work within an ECE center among leaders who often view protocols as means to control rather than as openings to staff influence and input. This made experimentation with protocol-based learning a crucible for both struggle and self-discovery among leaders over the course of the PDI.

Responding to the PDI: Who Were the Leaders as Learners?

In February 2012, the Ounce designers met with center leaders who were interested in replying to the PDI RFP. While the Ounce developers may not themselves fully have realized the scope of the PDI's challenge, they were clear with applicants that the PDI would ask much more of teachers and leaders than any PD program they had previously encountered. In responding, the directors who led their centers into the PDI project expressed a wide range of concerns. While the leaders varied in the positivity or negativity of their attitudes toward teachers, three common themes emerged among the reasons that leaders gave for pursuing the PDI opportunity. First, the leaders all expressed dissatisfaction – some more acute than others - with the quality, consistency, and intentionality of the instruction that they were seeing in their center classrooms. As one director put it, "I am hoping for more teaching with intentionality and less monotony. I am hoping that my teachers will view themselves as serious professionals and treat the field of early childhood education as such." This does not mean that the directors did not identify areas of leadership practice that they knew were personal growth areas. But the thrust of the application narratives was that the locus and urgency of change in PD in their centers belonged chiefly to the teachers, and not center leadership. Note how another center's supervisor describes her hopes for the PDI:

> *I am interested in participating in the Ounce PDI because I believe in order for the staff to all be on the same page, and in order to make sure we all have a full understanding of what is being asked of us. This can only be done if people attend trainings and then come back and train the staff. After training the staff and the staff implements what they have learned then they can reflect*

on if it worked for them or if it didn't. This will help with the staff becoming more intentional and thinking about solutions that may or may not work.

Second, while directors were dissatisfied with pedagogy, they acknowledged that early childhood teaching and supervision is often fraught with stress, pressure, and competing demands, which constrain time and energy for reflection and systematic improvement. Therefore, a strong common desire in the applications was growing capacity among leaders both to provide clear and steady instructional guidance, and to build systems for protecting and stabilizing time for PD. "*Because the work is overwhelming*," wrote one director, "*supervisors are not always able to provide the reflective support teachers need because the emphasis is on 'getting the work done'…learning how to promote a team focus and how to support a learning space for staff and balance these competing needs would be beneficial to staff and ultimately to the families we serve*."

Third, one clear and common focus of stress in the lives of the PDI leaders involved relations with parents and the challenges of realizing "partnership" with parents. One director expressed a desire to deepen her staff's conceptual fluency as essential to "winning over" parents and heading off disagreements with parents around ECE goals and practices. "We come under attack by parents on occasion when they want to tell us what their children should be learning even in our infant/toddler program. We need to be so grounded in the knowledge of why we do what we do that it flows off the tongue without hesitation." Another director saw links between credibility with parents and teachers' depth of expertise with tools like the TS GOLD (Teaching Strategies GOLD – a nationally used early childhood assessment of teaching and learning). "I feel like utilizing TS GOLD will not only help to bridge the gap between program and home, it will also help in having parents view early childhood teachers as professionals." Our data also revealed several ways in which the self-perceptions and mindsets of leaders and teachers appeared to diverge at the start of the project – ways in which they indeed were not "on the same page." One of these areas involved how leaders and teachers viewed their own "readiness for change" as improvement oriented professionals. In Fall 2012, we administered the "Stage of Change Scale for Early Education and Care 2.0" instrument to both leaders and teachers as part of an individual induction interview with PDI coaches (*for protocol, see Appendix 1A Companion Volume*). Respondents were asked to provide a broad rating of their interactions with children, families, and co-workers along seven parameters related to change and personal development processes.[6]

The bar graph labeled Appendix 6A compares the average responses of 12 PDI leaders with 46 teachers who responded to the survey in fall 2012. On average, the leader cadre perceived itself as somewhat more advanced in readiness and actual activity around change than the teacher cadre. The difference between leaders and teachers was most striking in terms of professional identity. Eleven leaders felt confident in calling themselves "true professionals" on the basis of frequent experience making changes in their work lives. Teachers were more cautious in assessing their claim on a professional identity as well as their intentionality or commitment to changing and assurance that change was necessary. Interestingly, leaders and teachers did not differ appreciably in their perceived efficacy in facing obstacles. Teachers, however, tended to perceive having greater impact in regard to making changes in the lives of children.

[6] The SOC parameters include: a) intention to change; b) awareness of a need for change; c) Seeking information; d) Effect on children; e) Overcoming obstacles; f) social support; and g) professional identity.

Nonetheless, leaders had the edge in their sense of being supported by more than one friend or colleague in their efforts to change. Very few teachers (3) felt isolated in this regard, but only 6 of 46 teachers felt that they were part of a *professional community* that supported them in change.

Viewed from the angle of educational attainments, there was good reason for leaders to be more confident in their professional identities than were teachers. The bar graph labeled Appendix 6B compares the leader and teacher cadres in terms of whether they had completed bachelor-level and graduate-level training. These data came from our mid-PDI staff background survey in fall 2013 and represent a fair snapshot of staff in the PDI centers across the PDI implementation period. The asynchrony here is striking. All but one center leader holds a Bachelor's degree while a majority of leaders hold graduate degrees. The opposite is true for classroom teachers, although differences by teacher group are evident. Four out of five infant/toddler teachers held or were seeking associate degrees and very few held an earned Bachelor's degree. Among PreK teachers the split was close to even between those holding Bachelor's and Associate's degrees, with Bachelor's more common among lead teachers compared with teaching assistants. This suggests a clear status hierarchy along educational lines between leaders, PreK, and infant/toddler teachers.

Differences also emerged in the daily work experience of leaders and teachers, particularly around perceived stress and work satisfaction, based again on the mid-PDI background survey. The bar graph labeled Appendix 6C compares the reported levels of stress of teachers and leaders "on the job" and "not job related." A four-point scale ranging from "No or little stress" to "very stressful" was used. In terms of non-job stress, though some variation was evident, there was a distribution in each group across the stress levels with the majority of respondents reporting mild or moderate levels. Job-related stress diverged more clearly by role. All leaders reported mild to moderate ("pretty stressful") levels of stress, with no one using the extreme ratings at either end. Teachers were much more varied across the stress levels, with more infant/toddler teachers reporting little stress, and most PreK teachers reporting at least mild stress levels. It appeared that stress was a ubiquitous feature of the working lives of most leaders, but not at acute levels. Leaders might well feel that they experienced at least as much stress as many of the teachers they supervised.

The bar graph labeled Appendix 6D takes a similar look at levels of perceived satisfaction in three areas of work: salary, benefits, and scheduling. In general the majority of leaders expressed high to moderate levels of satisfaction in all three elements of their work lives. Over 20% of teachers were at least somewhat dissatisfied with their compensation and schedules, and over half were not happy with their benefits packages. This is not surprising given the widely acknowledged lag in teachers' salaries and benefits in the ECE sector in comparison with all other education employment (Committee on Early Childhood Care and Education Workforce : A Workshop, Institute of Medicine, & National Research Council, 2012). It also speaks to likely differences in perspective between PDI leaders and teachers in terms of the recognition of their "value added" and the fairness of their compensation for stress and effort.

To summarize, the PDI introduced itself to center leaders as a system for comprehensive organizational improvement that would engage leaders as well as teachers in an ambitious program of reflective PD. Collectively both the leaders' educational and credential levels, and their experiences of adapting to complex accountability regimens, engendered confidence in taking on the PD challenges presented by the

Ounce. At the same time, patterns in our data signaled that leaders tended to attribute challenges in their centers to conditions outside and beyond themselves, and tended not to see their leadership as a primary "part of the problem." At the top of the pyramid in their own centers, and accustomed to command and control, the leaders already saw themselves as seasoned professionals and change agents, possessing a bigger picture around their center's needs than that of their teacher supervisees. Their everyday experience told them that teachers were more subject both to stress and complaint, and thus had more distance to travel in becoming true ECE professionals. Such a mindset among leaders can yield what Robert Kagan and Lisa Lahey (2009) call an "immunity to change,"- that is, a tendency to cleave to old modes of practice even as they prove inadequate to the demands of a new, more expansive scope of practice. For several PDI leaders, naming and grappling with their own immunities to change was a critical and occasionally disorienting phase in the process of co-constructing ECE leadership around the Five Essential Supports.

Examples of the Leader Learning Cycle at Mid-Stream

In order to consider the learning that was possible for leaders within the PDI, it will help to sample a cross-section of two "leader learning cycles" (or LLC's, learning lab >> consultation meetings >> reflective practice group) at about the Initiative's mid-point. Starting in August 2013, and just entering the second year of the project, LLC Module 6 focused on the role of leaders in promoting "Child-Centered Supportive Learning Environments." This was followed by the start of Module 7 in October, covering the development of "Strong Ties and Partnerships among Families, Schools, and Community." In addition, each LLC reviewed and elaborated on the first three Essentials – Inclusive Leadership, Building Professional Capacity through Routines of Collaboration, and Ambitious Instruction – to encourage leaders to think about the Five Essentials as an interdependent conceptual system. Tables 6-1 and 6-2 provide case examples of learning trajectories experienced by two classroom supervisors and two center directors around Modules 6 and 7, as well as the promises and challenges of their understanding and use of the full Five Essentials Framework in their daily work as leaders to support teaching effectiveness and continuous improvement.

In addition to introducing the concept of "Child-Centered Supportive Learning Environments," Module 6 explored ways in which leaders must manage complex daily interactions between teachers, children, and parents in ways that keep leaders' Five Essentials knowledge and beliefs aligned with actual practices, especially under pressure and among equally reasonable yet competing priorities. For the direct supervisor featured in Table 6-1, the Learning Lab's attention to dilemmas of practice helped advance her grasp of the reality of ambiguity in daily leadership interactions. Four weeks later, at the end of the RPG, this supervisor can articulate the parallels between how she interacts with teachers, and how teachers will in turn interact with children. She also sees collaboration as key to unpacking daily leadership dilemmas. For the center director in *Table 6-1*, the Learning Lab provided compelling information about child brain development, and opened a forum to discuss a fundamental challenge now facing Chicago early childhood centers: the imminent requirement of Continuity of Care. The Lab also helped the center director identify a problem of practice – *fragmented focus* – as a shared challenge to examine moving forward with her peers. RPG reflections find this director thinking clearly about her role in establishing a learning community among leaders and teachers at her program, and demonstrate the active sense-making of several leaders around the Five Essentials as an interdependent system for building organizational conditions supportive of effective teaching.

A key departure point in the Module 7 Learning Lab was the historical strength of Head Start standards and frameworks in the area of family engagement. The Five Essentials framework contributes greater clarity about *how* Inclusive Leadership, Routines of Collaboration, Ambitious Instruction, and Child-Centered Supportive Learning Environments can facilitate deeper partnerships with parents around ambitious goal-setting for children's learning and development. Much attention in Module 7 focused on how Five Essentials-informed leaders can better use strong tools like the Head Start Parent, Family, and Community Engagement Assessment to support shifts in teacher mindsets and foster collaboration around parent engagement. Initially, both the direct supervisor and the director highlighted in *Table 6-2* evidenced problematic views of parents as partners, albeit in sympathetic terms: the supervisor seeks to "get parents motivated," while the director wants to increase parents' accountability. Yet, the supervisor comes away from the Lab ready to question her center's current strategies, with at least a suspicion that her center lacks the necessary integration and collaboration to engage parents successfully. At the subsequent RPG, the supervisor's locus of accountability has shifted noticeably inward, asking: "What are some ways I can make my engagement with other leaders, teachers and families more meaningful?" Her comment about reflecting before acting also bears the stamp of the "Inclusive Inquiry and Decision-Making Cycle," a protocol introduced in Module 2 to support Inclusive Leadership practices and, by the PDI's mid-point, a mainstay of the monthly coach-leadership consultation process. The director finishes the Lab thinking about parents as part of a team, and concludes the RPG feeling excited to explore Inclusive Leadership practices as a key to inviting deeper partnerships with parents. She appears ready to include system-building among her responsibilities in creating consistency in organizational supports – a principle central to the Five Essentials Framework.

As part of their November 2013 RPG, 12 PDI leaders and supervisors were asked to assess their engagement with the Five Essentials Framework on three dimensions: the "importance" they place on strengthening their organizational conditions, their "readiness for change;" and their "confidence to make and sustain changes" in their centers by applying Five Essentials principles. This "data snapshot" suggests three observations about the progress of PDI leader development throughout the Initiative. First, the mean rating of "importance" was an 8.4, with only one leader rating below a 7. This supports other project data indicating that the PDI leaders remain impressed and challenged by the Five Essentials as a valid guide to their efforts to become effective instructional leaders. Second, the bar graphs labeled Appendices 6E and 6F suggest that levels of "readiness" and "confidence" to make changes are related to the amount of exposure to that Essential through the PDI. The Essential Supports and practices of "Inclusive Leadership," which was introduced first among the Five Essentials to leaders, received the highest ratings for both readiness and confidence. Conversely, the most recently introduced Essential, involving engagement with parents and community, was relatively low in both ratings. This suggests that the PDI's intentional approach to iterative reinforcement of early material in later modules – e.g. returning to ask how inclusive leadership strategies might be employed to deepen parent engagement – is keeping leaders engaged with active skill-building in these areas. Third, while exposure may matter, the ratings indicate that leaders feel actively and confidently engaged across most of the Five Essentials. Average "readiness" is at least a "3" in all areas, denoting that most leaders are moving past contemplating and planning and are implementing active strategies and changes in each area. Average "confidence" exceeds "7" in four dimensions, signaling that leaders feel considerable assurance in moving forward with changes.

Arcs of Leader Learning During the PDI – Four Broad Themes

A full accounting of the shifts in knowledge, skills, and dispositions among administrators participating in the PDI is beyond the scope of this section. In terms of significance for overall improvement of teacher classroom practice, four broad trajectories of growth were well supported within our matrix of evidence.

Theme 1. Shifting views on inclusive leadership practices. In the early phases of the PDI, center leaders embraced broad concepts such as "inclusivity" and "relational trust" in their early reflections. However, in practice, they struggled to put aside habits of unilateral decision-making, and forays into gathering teacher input were understood instrumentally, as means to garnering teacher "buy in" and compliance. Across Year 3, more leaders began conceptualizing inclusivity, transparency, and consistent follow-through less as a means to an end and more as pervasive properties of learning organizations that support practice effectiveness and continuous improvement. From within this mindset, leaders began to understand that seeking teacher input on program-level policies and strategies for improving teaching and learning is essential to creating conditions for honest and more deeply thoughtful exchanges about problems of classroom practice (see Appendix 6G, Focus 1). As one direct supervisor expressed it:

> *I think another piece to that, that I've seen us grow in, is teachers being a little more aware and hands-on with their classroom environment and how to make that work for the children that they have in their classroom. Before, we had one person who would come in and kind of change everything around, and not necessarily look for the input of teachers, and not necessarily look for the input of what are the children like in your room. And now I feel like we're moving into a new culture where teachers are more engaged in that conversation about, well I feel like my classroom is one big open space, what do we need to do in order to define areas, or where before the teachers would just wait until that one person would come in….*

In part, this shift in mindset resulted from leaders having multiple experiences in Year 2 in which teachers responded positively to being solicited for input. As one supervisor said: "Most of my staff members are willing to help make changes, and support the changes that we make. This makes it easy to include them in decision-making because of this supportive behavior." The shift also reflected the experience of greater collegiality and mutual support within the leadership cadres. Another supervisor's comments were representative: "The administrative team supports my decisions to make changes and they actually get involved in the changes when they can." From the other end, a director observed: "Now I catch myself when I am contemplating unilateral decisions. I now stop and call a meeting with my directors in order to make decisions together." There also was consensus among center directors that by providing their junior administrators more latitude to map and solve problems, they reduced their own feelings of isolation and stress as lone decision-makers.

Table 6-1 Representative Learning Trajectories in Leader Module 6: Two Center Leaders

Case	Time	Reflection
Case 1: Classroom Supervisor #1	Learning Lab (8/20)	**What do I know now?** Child-centered and supportive practices look like: Teachers having a strong understanding of DAP (Developmentally Appropriate Practice) for young children and understanding how to take their lead from the children, and in turn leaders doing the same for teachers. When children are empowered and have a voice in their environment it supports strong social-emotional development which supports and builds children's capacity to become engaged in learning. **What do I want to know?** How to come to a place where all things work together and be OK with the results? **What have I learned?** Things are not always so black and white with beliefs, policies, and practices.
	RPG (9/17)	**What do I know now?** Learned that each situation, child and family, needs to be handled according to the needs that will make them successful. What we believe and know "what's right" and "what we value" can create dilemmas with our practice, policies, and procedures and the question: How do we make this all work? As a leader how to be sensitive to staff. So they in turn will be sensitive to the children and families they work with. **What do I want to know?** Working through collaborative efforts to deal with the issues that create these dilemmas.
Case 2: Center Director #1	Learning Lab (8/20)	**What do I know now?** An environment that is safe for children's exploration, without fear - A place children can develop their self-identity and integrate the culture of their family - Caregiver who understands the importance of the environment and focus on providing that environment for the growth and development of children. Continuity of care is a system that is in the process of full implementation. Teachers receiving training on Continuity of Care and coaches providing support in what it looks like can help teachers create a supportive environment. **What do I want to know?** Because it seems with our work that we can be all over the place in our thinking and action, my effort is to ***focus*** more on a particular…. **What have I learned?** Information I have previously learned about the development of a child's brain is information I think should be discussed more with teachers and administrators. The knowledge should help in teachers' interaction with children and help administrators support teachers in their work.
	RPG (9/17)	**What do I know now?** Importance of relationships w/parents, teachers, and creating an environment where staff, and parents are open to learning with and from each other. Having practices in place that staff encourage and support each other and recognize knowledge and strengths each individual has. .... Allowing time to discuss and solicit ideas from staff or all who are involved to create environments that appreciate and support individual thoughts, comments, and ideas. **What do I want to know?** Tips and techniques on getting support from staff to create a learning community.

Table 6-2 Representative Learning Trajectories in Leader Module 7: Two Center Leaders

Case	Time	Reflection
Case 1: Classroom Supervisor #2	Learning Lab (10/15)	**What do I know now?** Parents need to know what their child is learning, where their child is academically, and be able to support classroom learning. The more involved with the school community, the better parent understanding of the whys and hows associated with school readiness. **What do I want to know?** How do you get parents motivated to be a part of child's development when parents have so many other concerns? **What have I learned?** Makes me start thinking about what strategies we as an agency have in place to get parents engaged. The reminder that in order for parent engagement to be a success, all components need to collaborate in making it happen.
	RPG (11/19)	**What do I know now?** To have a quality program, everyone should be involved, relationships need to be built, and it should be on collaborative efforts…To make this work, I believe it should start with leadership to make this happen and to get others to buy in… Leaders should open up the questions of how we can build these relations. **What do I want to know?** What are some ways I can make my engagement with other leaders, teachers & families more meaningful? Start reflecting on where I am with accomplishing these relationships before moving forward.
Case 2: Center Director, Center #2	Learning Lab (10/15)	**What do I know now?** It's vital that parents are involved in their child's learning and development shows that children are better prepared for school readiness. This helps parents be more accountable with engaging with their children. Parent engagement also builds relationships with their children…. **What do I want to know?** How can we invite parents/families in this framework and working with FSS to implement framework as well? **What have I learned?** Having the parents being involved in their child's education and development and making the parent feel part of a team. Having families involved increases child outcomes and relationships within school and community.
	RPG (11/19)	**What do I know now?** How inclusive leadership plays a vital role in our roadmap to success as an agency to improve child and family outcomes. Implementing inclusive leadership will help improve consistency with best practices, relationship building with children, families, and staff. **What do I want to know?** Want to continue learning about how to expand and strengthen strong ties with partnerships among families and schools and strengthening our systems to support this. Strengthen our family and community engagement framework. Start the 1st phases of continuity of care plan and providing PD around Continuity of Care.

Theme 2. Evolving understandings of leading ambitious instruction. The second observable shift in mindset and behavior involved more sophisticated understandings of the meanings of "ambitious interactions and instruction." This was accompanied by greater confidence among directors and supervisors in their own abilities to support more effective lesson planning and instruction. Particularly important was the leaders' more consistent integration of the CLASS "lens and language" into their supervisory dialogues with teachers. This had two complementary and salutary effects (Appendix 6G, Focus 2). It sharpened leaders' own grasp of the emotional, organizational, and cognitive dimensions of excellent early childhood instruction making them keener observers and analyzers of teacher-child interactions. It illuminated the parallels between the challenges that teachers face with calibrating their interactions for children's learning, and those faced by supervisors in calibrating their responses to support the learning of their assigned teachers – an insight that became known within the PDI as "the parallel process." For the majority of leaders, this insight into the applicability of the CLASS "lens and language" to their own supervisory work became a powerful influence toward adopting a "side by side, shoulder to shoulder" attitude with teaching colleagues. As one leader appreciatively expressed it:

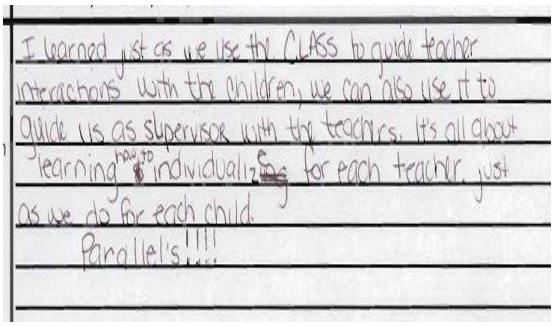


Figure 6-2 An Excited PDI Supervisor Grasps the "Parallels" – Leader Module 4

> *So knowing that the same practice that supervisors expect teachers to use with the children in relation to the CLASS, we should be doing the same thing, so yeah, instead of teacher sensitivity I need to be like supervisor sensitivity. That was really important for me, because as a supervisor sometimes you can seem intimidating and you know so to them that may be a negative karma, to a teacher, like "I don't feel like I can go talk to Ms._____ … So, make sure that I create a positive climate for them to come speak to me or what have you and then I think by knowing that, that changed the way I communicated with them and made sure that certain things…were evident in my interactions with them. So that was the really huge one for me to take.*

As leaders applied the "parallel process" to their interactions with teachers in the phases of the learning cycle, we noticed a shift in leadership perspectives from narrow "transactional" concerns to more expansive "transformational" concerns – and particularly, the goal of fostering thoughtful practice and instruction. This was particularly clear in the learning path of Paula Gonzalez (pseudonym). Paula was hired by her center shortly after the start of the PDI to take on the dual roles of 0-3 supervisor and associate director. This was her first leadership position after several successful years of teaching. Her primary challenge was to help her center prepare for the transition from a grade-level structure to "Continuity of Care." As such she embraced the broad goals of the PDI as a way to lead teachers beyond what she called "surface-y" relationships with children, a kind of shallow knowledge of children incompatible with Continuity of Care.

However, as a novice leader, Paula felt a strong urge to demonstrate her own competence and the power of her ideas both to her teachers and superiors – a mindset she named as her tendency toward "tunnel vision." This urge often conflicted with reminders from her coach to think inclusively about teacher input, and ask generative questions rather than dictate unilateral solutions. Thus, the early months of the PDI were confusing and stressful for Paula, experienced sometimes as repressing her own ideas in the service of teacher voice, as if she was being asked to "let go of a piece of myself." Initially she processed this in

transactional terms, as a tricky problem of negotiating power between herself and her teachers. As she put it, "How do you find the balance where some things are non-negotiable and there are some things that are and does everything have to be negotiable? I think this [is] important. I don't feel like this is up for negotiation. And then it is like, ok, if I were a teacher how would I feel if someone ... you know, it is a lot of work."

Other challenges emerged as well, such as learning to solicit teacher insights through open-ended questioning – a demanding MI (Motivational Interviewing) skill – or learning to closely observe a teacher's interactions with students "over the shoulder," a posture she experienced as rude and intrusive. After about a year, the PDI's combination of logistical and psychic challenges had begun, somewhat painfully, to shake her loose of narrow constructions of power and practice. "Things are not always so black and white with beliefs, policies, and practices," she reflected during the Module 6 learning lab, and wondered, "How to come to a place where all things work together and be OK with the results?" Her struggles even brought her to question her continued involvement. As she later related:

> *I feel like if you're halfhearted then you are just going to come out of it burnt out…That was a talk I had to have with myself too. It's, like, I'm in or I'm not. Somewhere there was a midpoint where I was, kind of, like, teetering and, you know, I'm, like, this is either going to make me or break me…and I say that, because this is intense; the verbiage and the, you know -- you've got learning curves like this.*

Happily, this work began to pay off for Paula and her teachers in the second half of the project, as she progressively shifted her leadership focus from negotiating influence, to promoting deeper thinking and reflection on teaching. What precipitated this shift? It certainly helped that her center director Tamara was experiencing a similar transition in supervisory style, away from a focus on immediate action, and toward the facilitation of greater reflection on the part of her direct supervisors. Asked in her final interview about the impact of the leader learning cycle on her own supervisory approach, Tamara reflected:

> *It has changed the conversations I'm having. It's more so when they present like oh this is what's happening in a given classroom I ask them more about their thinking about it. So I don't jump to, 'Well did you do this, did you do that and have you tried this.' It's more of like, 'Well what do you think about that.' And so I think the posture I have is different. It's more listening for where their learning is at as well with the teachers and then seeing are there maybe gaps in their understanding that I can see or is there something that we can maybe even read together that can help us to understand this a little bit more.*

Another catalytic factor for Paula was consistent engagement with her coach in her teachers' cycle of lesson planning, observation sessions, and reflective practice groups. For Paula, the act of collaborative planning was especially vital both to her own ability to think about her teachers and her own thinking, and to help her teachers "dig deeper when it comes to planning for children." In turn, consistently experiencing the integrity of her teachers' struggles with "digging deeper" helped spur four converging developments in her own mindset. First, it strengthened her resolve to become more disciplined in her own preparation for planning activities—not something that came naturally to her. Second, it piqued her interest in mastering tools like the CLASS which both deepened her observational acuity and sharpened her practice of the "parallel process." Third, it solicited a renewed and genuine sympathy for the daily dilemmas of ECE teaching, and a respect for her teacher's capacity to grapple with those dilemmas.

Finally, and most strikingly, establishing firm routines of collaborative planning, observation, and reflection allowed Paula to enthusiastically grant her 0-3 teachers greater latitude to experiment with varied practices that would, in turn, become the focus of disciplined reflection and discernment. That is, her relationship with her teachers evolved to combine elements of real teacher autonomy with a collective commitment to test and improve promising practices. A month after the end of the PDI, for example, Paula convened her teachers to plan a parent education event. The focus was to build parent understanding of gross motor development. Paula led off by soliciting ideas for a common, unified approach that would gather all parents across the classrooms into one learning session, which she assumed would be easier for teachers. Several teachers counter-proposed that each classroom develop demonstrations for their own parents as a way to both inform and build relationships with parents. Paula's positive response to this proposal reflects just how foundational teacher *thinking* had become to her understanding of ambitious instruction and her role in instructional guidance:

> *So with that I can see that teachers are actually thinking, they're not like oh I just want to do this, and then you know they move on. They're really trying to figure out what's going to work. I'm sure it's going to be a trial and error thing. But I think for me it's the awareness now, and how do we keep building on that awareness, and how do we keep the thought of the difference between involvement and engagement [with parents], and the difference between, you know, just providing an activity, as opposed to providing an activity with intent, and outcomes, and goals.*

Theme 3. Becoming systems builders in the area of instructional guidance. The third theme is related to the Essential support of Ambitious Interactions and Instruction. Leaders in all four centers have gradually embraced the importance of building a coherent system of instructional guidance and supports for teachers that intentionally links and integrates teams of educators with supportive routines for productive collaboration (Appendix 6G, Focus 3). At one level, this has simply involved recognizing areas of relative disarray in the daily life of the center, and making both individual- and team-level commitments to establish publicly available planning calendars, set and protect time for teacher planning, and pull together clearer manuals and policy guidelines.

One coach's notes on a supervisor's growth in this regard were representative: "Through additional consultation, [this supervisor] has been debriefing, reflecting and preparing for next steps on a consistent basis. She now plans her calendar to include time with the classroom teams." Beyond more organized routines, though, this emerging systems perspective involves a shift away from enforcing compliance with top-down routines – a deeply engrained pattern in the traditional early childhood education supervisory mindset – toward collaborating with teachers to cultivate routines for generating practice effectiveness and continuous improvement. Another coach described her supervisor coachee: "[She] is working hard to be a supportive and better educational leader/supervisor. She looks for ways to improve her staff meetings, to get people together to meet (coverage for the classrooms), to expand their resources, to work on her 'quality of feedback' to them during the meetings she attends… She also implemented the Continuity of Care model this fall…created the master plan and then executed it and it has gone well. She is creating a staff handbook and policy manual."

This third theme is an extension of Theme 2, in that leaders continued to grow in their enthusiasm for the "power of protocols," both their ability to draft effective protocols and collaborative routine formats, and

their capacity to enlist teachers in disciplined use of protocols (Appendix 6G, Focus 4). In particular, the use of clear and manageable center-wide protocols in key areas like lesson planning (the Focused Teaching Cycle and Weekly Lesson Planning Discussion protocol) and regular review of assessment data (Focused Teaching Cycle and ERS/CLASS Data Dialogue protocols) has been helpful in reducing staff anxiety about providing coherent instructional guidance and change processes generally. As one director noted: "Staff are more open to change, are not as intimidated by data that offers support [for making] needed changes."

Shared center-wide protocols have also helped staff engage the challenges of Continuity of Care by replacing traditionally idiosyncratic age-level professional identities with routines common to all age levels, thus facilitating teachers' transitions to instructing new child age levels. For these reasons we see directors expanding the use of protocols center-wide to classrooms not previously participating in the PDI. As one coach observed: "[The director] has also made some changes in how she supports her team…she is making intentional efforts to support [supervisors] in building routines for observation and reflection. She has recognized that supporting routines of collaboration means supporting the routines of her supervisors." And while direct supervisors experienced the transition to inquiry-focused protocols as a challenge, they also experienced the utility of protocols in anchoring more thoughtful planning and practice. As one DS put it:

> *I still find protocols hard, but I do see the purpose. I'm not a questioner. Like my mind kind of thinks very literally, so asking those open-ended questions to kind of get deeper, [my coach] used to have to really push me to get there. So that's not something that came naturally. So can I see this happening? Yes. But I know my weaknesses. I really saw them happening when I put the effort to plan behind them, because then I can think about those things ahead of time, and think about what questions I want to ask and think about like -- so again, planning is the driver to make all this happen.*

Theme 4. A growing commitment to job-embedded routines of continuous professional development. One way to summarize these themes in leader mindset shifts is in terms of a commitment to program- and job-embedded routines of PD (Appendix 6G, Focus 5). While most PDI leaders continue to evolve in their grasp of job-embedded PD, they are quite clear in their determination not to regress to the days of out-sourced, "one-off" PD trainings with limited impact on organizational capacity. Instead, while the learning curve has been challenging, directors and supervisors have emerged from the PDI with excitement about their roles as instructional leaders who support and conduct PD of new and experienced staff. As one direct supervisor reflected: "I believe that every year brings its own challenges, to continue to grow as an individual within a learning institution, change is inevitable…we need to be willing to look within ourselves to be effective leaders and teachers for our community of learners."

A great deal of weight for successfully embedding collaborative routines into the daily and weekly rhythms of the PDI's centers fell to direct supervisors, some of whom were just undertaking their first leadership position. Direct supervisors were personally tasked in the last year of the project with assuring that 25% of their weekly time was spent in classrooms and with teachers – planning lessons, observing instruction, and reflecting "out of the action." To do this required fundamentally restructuring their schedules and a set of role expectations that assumed that direct supervisors should be everywhere at all moments of the day.

One lesson from this study is that today's young Early Childhood leaders are adaptive, strategic, and often creative in responding to such challenges. Alicia Thompsen (pseudonym), for example, was slowly learning to balance dual roles as the 0-3 direct supervisor and the center's associate director in early 2014 when the transition of PDI responsibilities to direct supervisors became more urgent. She embraced the purposes behind the 25% weekly time benchmark, but as she told us, "…often times the assistant director role will take precedence, depending on what the situations were, so it was difficult at times to get that solid time in the classroom or being a teacher leader…." Her simple but ingenious solution reflected not only an understanding of ECE culture, but also a rising personal capacity to set functional boundaries that served the broader aims of protecting collaborative time:

> *But once I was made aware of this expectation of – ok 25% of my time, 10 hours a week, I actually had to set up a system. The system became if I allotted time to be in the classrooms or my role as the teacher leader I put on a red apron, and that meant that anything that was not related to me being in the classroom, working with those teachers, or meeting with those teachers or whatever, the time I was spending with them was allotted for. It would have to wait until I took off the red apron. Because like a lot of times I would be in the midst of it and get interrupted and then it made giving good feedback to the teachers [hard], because of the interruptions. So the red apron became my way.*

Interestingly Alicia's donning of the red apron was targeted at least as much to her fellow administrators as to teachers. And over time, the intent behind the apron opened a systems conversation around leader communication that became an even more effective anchor for protecting supervisory time. As her PreK counterpart Jane (pseudonym) recalled, "I think...that was kind of her you know initial warning, started with…'don't disturb' but now I think that we've all been enlightened a little, she doesn't have to do that. That was kind of a signal…." The signal helped advance a more systemic and collaborative approach to "coverage" than had previously been considered attainable in this center:

> *…we sat down and we have been reassigning certain things…I know for like our 0-3 program we have more classes then we do for a 3-5. So for Ms. Thompsen (pseudonym) to get into the classroom would require like double time because she has double the classrooms. So I've been brought in to help with that load and taking over a couple classrooms, so that we can provide the support that we need for teachers and not have it all on one person. So that's our step…And then I think we are working together more as a team, like we are always looking and reflecting, OK, well this didn't work and why didn't it. So let's now try this in order to help, and then just understanding how we ... all the pieces of the puzzle fit together and being a little bit more vocal. "Oh, I realize you know you haven't been able to go in the class this week, is there something I can do to help with that." You know, trying to fine tune so that we can have a system that works.*

Revisiting the Stages of Change Scale in 2014

At the end of Year 3, directors and supervisors in all four centers once again assessed their stance toward sustaining ambitious program- and job-embedded PD for themselves and their teachers, using the Stages of Change (SOC) Scale. The bar graph labeled Appendix 6J compares the average ratings of the 12 leader respondents in 2012 with the group of leader respondents in 2014. Five of these leaders contributed data to both groups. While there were 7 relative newcomers to the 2014 cadre, the data indicate that this group was more solidly in the zone of "Action" than the leader cadre of 2012. In particular, more 2014 leaders

were taking action around seeking information for professional learning, were feeling more confident that their actions would impact children's learning, and felt more empowered to overcome challenges. More 2014 leaders were also feeling supported by more than one ally within their organization.

We also asked coaches to rate their assigned leaders independently using the same SOC measure in fall 2014 (see bar graph, Appendix 6H).[7] In most cases, the ratings of leaders and coaches aligned closely, averaging just above 4 (i.e., 4.2 for leaders, 4.0 for coaches). No leader-coach difference exceeded one point. Eleven of 12 leaders rated themselves in the range that the SOC characterizes as the "Stage of Action"; that is, their readiness for making changes advanced beyond "Contemplation" or "Preparation to Change." The one exception (Center1, Supervisor 2) was a newcomer to the PDI who saw herself more in the "Stage of Preparation," although her coaches rated her as more advanced. Another interesting case is Supervisor 1 in Center4, who spent most of the PDI as a teacher before moving into a supervisory role. She rated herself as solidly in the "Action" stage. But her coaches, who clearly were focused more on her emerging leadership skills, saw her more at the stage of "Preparation." These differences are meaningful, and we think they reflect accurately the deepening professionalism of the PDI leader cadre as reflected in their KWLH and interview responses across the three years of the project.

Chapter 6 Summary

We began this chapter by asking whether center directors and supervisors actually accomplished the kinds of conceptual growth intended by the PDI design for leader learning. We conclude from our analysis that the PDI leader learning cycles were successful in supporting the majority of center leaders to critically examine their current leadership conceptions and grapple authentically with a challenging set of new leadership principles. The PDI learning experiences appeared especially effective in broadening narrow "transactional" leadership frames to include the more inclusive and ambitious mindsets associated with a "transformational" leadership repertoire (Donaldson 2008; Leithwood et al., 2011). Is there evidence that particular features of the PDI design were catalytic for leader PD? Three broad features stood out in our analyses.

First, there was an exceptional synergy between the curricular focus of the PDI – and especially the transaction between the Five Essentials Framework and the CLASS assessment – and the two-month cycle of learning labs, on-site consultations, and reflective practice groups. Both the Five Essentials and the CLASS provided leaders with the kind of "optimal" cognitive stretch that was sufficient to initiate the deconstruction of entrenched ideas and mindsets "out of the action." The job of the leader learning cycle was to sustain engagement with these ideas "in the action," and through phases of discomfort as well as insight, until more complex understandings of leader practice could emerge. Generative insights such as the "parallel process," for example, really arose from a collective inquiry into the idea of inclusivity, on the one hand, and the challenge to make better use of the CLASS as a tool of instructional leadership in everyday practice, on the other. Lesser content, even run faithfully through the three-phase learning cycle, would not have yielded the degree of professional growth that some leaders demonstrated by the end of the project.

[7] Recall that the SOC is on a scale of 1-5, with ratings advancing from Precontemplation → Contemplation →Preparation →Action →Maintenance.

Second, it is important to point out that leader learning in the PDI was actually a doubly-embedded process, involving both job-based consultations with coaches "out of the action," and increasing integration into the varied phases of the teacher learning cycle "in the action." Embeddedness of leader learning within the teacher learning cycles created weekly opportunities for leaders to translate new principles into keener instructional observation, stretch their comfort zones in areas like generative questioning and data dialogue, and receive regular feedback about their efforts. For some leaders it was also sustained engagement of leaders in collaborative planning activities with teachers that slowly shifted the appreciation of leaders for the capacities of their teachers thus opening greater space for teacher initiative and input to decision-making. In short, careful scaffolding of leader engagement with teachers by coaches did emerge as a feasible and effective means both to equip supervisors as instructional leaders and to re-culture ECE centers toward more ambitious instructional practices.

Third, the creation of a cross-site professional learning cadre (PLC) for learning labs and reflective practice groups also yielded powerful learning opportunities for leaders and complemented the immediate practice focus of the job-embedded team consultations with coaches. For leaders whose daily professional experience is often limited to their center buildings, the cross-site meetings provided a welcome venue both for collaborative learning and professional encouragement. Role-alike working groups provided directors and supervisors with concrete ideas in areas like the protection of time for collaborative routines. Most importantly, though, PDI cross-site labs and RPG's helped to sustain a continuity of collective focus on shared problems of practice over months and indeed years. Directors gained a broader, data-informed comparative frame for assessing the progress of their centers. And director supervisors benefited from exposure to the organizational perspectives of directors and business owners. As the KWLH record of this project attests, the cross-site PLC did cohere with time to become both a safe zone and a stretch zone in which center leaders could remake their practices and, to a considerable degree, themselves.

Chapter 7 EVIDENCE OF TEACHER LEARNING AND DEVELOPMENT

In this chapter we consider evidence that the PDI advanced teacher knowledge, skills, and mindsets in ways that increased teaching effectiveness. The PDI asked teachers to explore their professional identity by attempting to redefine their pedagogical narratives. In response to Michael Fullan's (2007) critique of traditional PD, the model purveyors (the Ounce) responded by designing a model that aims to deprivatize teaching through engaging teachers in multiple, collaborative contexts for continuous learning. Our implementation data presented in Chapter 5 suggest that it is feasible for teachers in community based ECE centers to engage in intense cycles of job-embedded professional development (JEPD). In this chapter, we address the question: Did the PDI model shape the teachers' pedagogical narratives to be more accurate, coherent, and comprehensive?

We begin by reviewing what the PDI asked of the teachers in terms of its curriculum and methods for professional growth. We then present several characteristics of the teachers participating in the PDI that likely impacted their growth trajectories. Finally, we assess evidence of advancement in knowledge, skills, and mindsets related to instructional practice.

PDI Curriculum for Teachers: What were the teachers asked to learn?

The integration of new information and progressive practices requires affiliation with people and ideas within a community of practice (Kuh, 2012; Wenger, 1998). The PDI provides teachers with multiple collaborative contexts for learning. Specifically, the learning lab is intended to build knowledge, the coaching cycle aims to systematically support application of that knowledge with the intended goal of improved classroom practice, and the reflective practice group (RPG) is designed to structure collaborative reflection and examination of practice. Learning within a community serves as a catalyst for the deconstruction and reconstruction of knowledge and practice.

As discussed in Chapter 2, the PDI learning cycle for teachers aimed to guide teachers toward an approach that: a) aligned their curriculum, instruction, and assessment practices to the Illinois Early Learning Standards (IELS) and curriculum and development goals for infants, toddlers, and preschoolers; and (b) employed routines of collaboration that encourage reflection intended to improve evidence-based decision-making. Conceptually, the PDI asked the teachers to understand and employ the Focused Teaching Cycle, which encourages teachers to be reflective practitioners (Schön, 1984). When "out of the action," teachers were to engage in a structured and collaborative lesson planning practice that is mindful of standards, curriculum goals, child and classroom assessments, and parent input. When "in the action," teachers were to consider how to best respond to children based on their observations in the moment.

The content of the PDI for teachers was grounded in "pedagogical content knowledge" (Shulman, 1986/1987) aligned to the CLASS framework (Pianta, La Paro, & Hamre, 2008). Shulman's (1986/1987) concept of pedagogical content knowledge can be summarized as knowledge about what is taught (curricular content), who is to be taught (children), and how to teach (teaching methods) (Rojas, 2008). Specifically, the curriculum for teachers consisted of theories of socio-emotional developmentally appropriate practice. *Powerful Interactions: How to Connect with Children to extend their Learning* (Dombro, Jablon, & Stetson, 2011) was the core text of the PDI curriculum for teachers.

Responding to the PDI: Who were the teachers as learners?

Female teachers predominantly served the children in the PDI Centers. Figure 7-1 indicates that the majority of the PDI teachers self-identified as African American. Therefore, the evidence of teacher learning presented in this chapter is most representative of an African American female experience of JEPD.

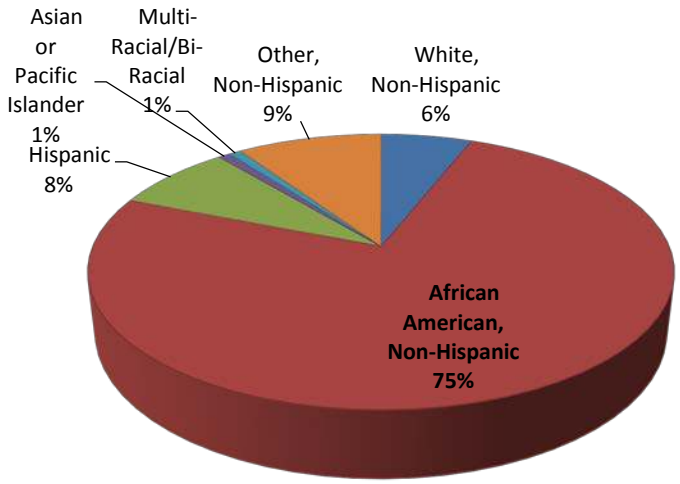


Figure 7-1 PDI Teacher Racial & Ethnic Diversity - Sample Size 93

Overall, the teachers interacting with children in PDI Centers are experienced. 32% of the teachers reported one to ten years of teaching experience in ECE classrooms and 23% reported eleven to twenty years of ECE classroom experience. Although collectively the PDI teachers have several years of classroom experience, 64% had less than four years of experience teaching in Early Head Start or Head Start classrooms.

In addition, the PDI centers had well-qualified teachers. 65% of the children in PDI centers had teachers who earned a Bachelor's degree or higher degree. Moreover, the majority of the teachers with an Associate's degree or higher (82%) studied early childhood education or child development. In regards to the teachers' understandings of quality teacher-child interactions, 51% of the teachers reported having had Classroom Assessment Scoring System (CLASS) training prior to their participation in the PDI. When comparing teachers working with children of differing developmental ages, preschool teachers in PDI centers had attained higher educational achievement in comparison to teachers working with infants and toddlers as seen in Figure 7-2. These trends indicate that the PDI teachers entered into this JEPD model with strong qualifications, which may mean that the growth trajectories presented in this chapter are most representative of teachers with higher levels of educational attainment. When comparing the PDI lead teachers to that of the National ECE HS teachers (Appendix 7A: Comparison of Lead Teacher Characteristics by PDI and FACES), the two groups shared similar backgrounds in terms of experience and qualifications. The most significant departure in these two samples is in the racial make-up of the teachers' identities. Whereas 32% of the national sample is African American, 73% of the PDI lead teacher sample self-reported as African American. Again, the experiences of teachers engaging in JEPD are limited to understanding those of African American female teachers serving children and families in community-based HS centers in the City of Chicago.

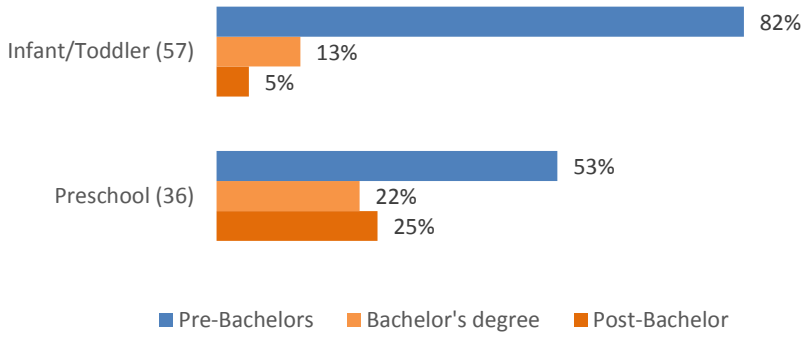


Figure 7-2 Educational Attainments by Infant/Toddler and Preschool Teachers

Teacher Readiness for Job-Embedded Professional Development

Conceptually, the PDI recognized the importance of preparing and engaging teachers in making the necessary changes that can lead to improvement in their professional lives in relation to change in classroom practice behavior. Readiness to change is defined as the alignment between the internal (motivation, values, beliefs, and self-efficacy) and the external resources (organizational and social support) that are intended to support intentional change of behavior (Peterson, 2012). Prochaska & DiClemente (1983) developed The Transtheoretical Model (TTM) of Change, which describes five stages individuals traverse in order to resolve a problem (pre-contemplation, contemplation, preparation, action, and maintenance). Drawing on TTM, Montes, Peterson & Weber (2011) constructed the "Stage of Change Scale for Early Education and Care 2.0" (SOC) instrument. In fall 2012 and fall 2014, we administered the SOC to teachers in order to better understand their readiness for change (*for protocol, see Appendix 1A Companion Volume*). Respondents were asked to provide a broad rating of their interactions with children, families, and co-workers along seven parameters related to change and personal development processes.

During initial implementation (fall 2012), many teachers saw themselves straddling the transition area from the "Preparation Stage" to the "Action Stage." The PDI teachers were ready to make a change or actively involved in making a change in their work as educators. Their readiness for change likely contributed to the successful implementation of the PDI overall as detailed in Chapter 5. Our data also suggest that the themes of teacher learning presented in this chapter are most representative of teachers who are internally prepared for changing their behavior. Research suggests that teachers who are open to change are less likely to demonstrate resistance to intense cycles of JEPD (Prochaska & Velicer, 1997). Ultimately, our evidence suggests that the teachers were ready to engage in the PDI.

Arcs of Teacher Learning

Adult learners often further develop through experiencing the construction, deconstruction, and reconstruction of what is referred to as the life narrative (Rossiter, 1999). Indeed, the ability to construct a narrative is fundamental to human meaning making (Bruner, 2002). By extension, the identity formation and development of teachers can be understood as a form of narrative structure and process. In particular, teachers form pedagogical narratives in order to better understand and transform their practice. These narratives define a way of being as a teacher. Through multiple contexts for learning for teachers, the PDI aimed to shape the teachers' pedagogical narratives. In the following sections we present evidence of how the PDI routines for collaboration shaped the teachers' pedagogical narratives to be more accurate, coherent, and comprehensive overtime.

Deprivatization of Teaching. Teachers are often expected to do complex work in isolation. Fullan (2007) argues that deprivatizing teaching is essential to moving educational organizations toward a culture where teachers see themselves as learners. Collaborative efforts are promising and yet challenging practices used to deprivatize teaching (Kuh, 2012). Such efforts included teachers observing each other and teaching team meetings where "debate on the quality and effectiveness of their instruction" is encouraged (Fullan, 2007, p. 36). Prior to PDI participation, the majority of teachers reported that they rarely experienced opportunities for collaboration. As evidence in Chapter 5 indicates, the PDI supported leaders in the development of systems that provided time for teaching teams to lesson plan and examine their practice collaboratively. Next, we will look at how the routines for collaboration specifically advanced the

teachers' lesson planning practice. Then we will discuss how collaboration influenced their reflective practice.

Collaborative Lesson Planning. Prior to the PDI, the most common form of "collaborative" lesson planning involved informal discussion throughout the day. As one teacher said, "*Most often we do not get a chance to actually sit down to plan together. Instead, we have a lot of verbal conversations about what we plan to do for the children, what we've seen and what would be a good activity for that week.*" Although informal planning is better than not planning at all, protecting time for teachers to focus solely on planning allows teachers to design intentional learning environments primed to extend each child's learning (Epstein, 2007). The PDI understood that if teachers were to change, then they would need a framework and job aide to do so. As noted earlier in this chapter (as well as Chapter 2), the PDI provided the teachers with a framework called the Focused Teaching Cycle. This framework for effective teaching encourages teachers to better understand how Standards and Curriculum Goals, Observation and Child Progress Data, and Teacher-Child Interactions inform their mindsets, methods, and practices in the classroom. In addition, the PDI introduced a lesson planning protocol intended to bring focus and guidance to lesson planning meetings.

After three years of PDI implementation, the majority of teachers reported that with the support of their direct supervisors they now had a system for scheduling and protecting time for a weekly lesson planning meeting. The major exception to the development of this system came from the teachers serving children in the infant classrooms, as one teacher explained, "*as far as sitting down together, we really don't have the time. I mean it's hard because they just aren't on the same schedule. So, we pretty much talk to each other as we go through our day; trying to write down what we can on the lesson plan form.*" But, the infant teachers agreed with the toddler and preschool teachers in that they all expressed a strong desire to remain committed to planning collaboratively, because they see the benefit of learning from each other. One teacher described it this way:

> *Hard to believe, but at one point we would just assign one teacher to plan for the week –'it's your week.' Now, it's always a team effort. We use the tools of the CLASS and the early learning standards and the teaching strategies objectives to develop ideas that I myself would have struggled with on my own. Now we talk about what we are seeing and what we want to do to respond. So sitting down together, we share ideas and we learn from each other. Yea, I mean things that I have trouble with my collaborative coworker will have an idea to help us plan for dealing with that issue.*

Implications of the Focused Teaching Cycle on Collaborative Lesson Planning. After two years of exposure to the Focused Teaching Cycle and lesson planning protocol, the teachers also described how their lesson planning processes had improved significantly. In general, the Focused Teaching Cycle helped teachers come to understand that lesson planning is a cyclical process informed by reflection on learning standards and developmental goals, assessments aligned to the standards, and documentation of children's learning and development. One teacher explained,

> *Well a year ago, lesson planning was all based on the required curriculum, that is the kit, not necessarily the observations, but the kit. I got everything from the kit. I didn't think about what the children wanted to do. It was just the kit. The kit says, 'Trees.' We're doing trees. But now it's more intentional. The PDI taught us how to use our observations and talk with the parents about problems that they were having to do the lesson plans, to plan and re-plan, and then observe, and*

> *then plan again. So it's kind of a continuous cycle with the way the PDI taught us how to do lesson planning as opposed to every week just doing trees, trees again. And, I think it's helping a lot. At least we have more of a focus of knowing what they [the children] need as opposed to just doing the lesson planning.*

Much like this teacher, several others now recognized the importance of goal-focused plans rather than activity-focused plans as well as the importance of using child progress data for individualization in lesson planning (see Appendix 7B: Representative Quotations of Reconstructing Teachers' Use of Standards and Child Progress Data for Individualization in Lesson Planning). Moreover, several teachers credited the PDI with helping them to strengthen their observation practices, which they were able to apply to the instructional planning process. For instance, one teacher described the change in her practice this way: "*Observing the children, I guess before I wasn't really-- I was just planning based on what I thought would be fun. I never threw in the observation of this child, like think about 'oh maybe she would do better like with the paintbrush.' Before the PDI, I never did that."* Another teacher explained how adopting the practice of using observations to inform planning allowed her to better extend learning. As she explained: *"When you observe a child and then you make the plan and then observe that they're really enjoying it, then you can expand on it, you know, take it to another level."* In short, the PDI routine of collaborative lesson planning along with the Focused Teaching Cycle framework helped the teachers' deepen their understanding of the lesson planning process.

During the final interviews in 2014, teachers of both age levels credited the PDI's Focused Teaching Cycle with also helping them understand how to use the Teaching Strategies GOLD Learning Objectives (GOLD) in connection with the Classroom Assessment Scoring System (CLASS) to aid in their planning process. The teachers often described this improvement in their practice with statements like, "*We know now how to really put these tools together.*" Another said,

> *Knowing how to use those tools together is what gave me great confidence in what I'm doing, because I can pull those books down and we can think about the focus of our lessons. Sometimes these books disappear from our room, our first step is to hunt them down like a bloodhound-it's like oh, my goodness, I need that. Ya know, you don't figure out how to start your lesson plan without them.*

Still another teacher said,

> *It's [lesson planning] been more concept-oriented. We're trying to put the GOLD and CLASS into it. We can get specific goals instead of just an activity for the plan, and then afterwards we can discuss, 'oh, this is what I saw.' So I think it's getting more to thinking about the concept we want to work on with the child. And, we want to include a goal for ourselves –what CLASS dimension are we working on too.*

Our finding was further supported by the evidence found in the analysis of the coaching cycle feedback forms for teachers in which teachers reported a substantive increase in how much the GOLD and CLASS became the focus of their lesson planning. On balance, our evidence suggests that the PDI advanced teacher knowledge, skills, and mindsets in ways that allowed them to be more strategic in their integration of the GOLD and CLASS tools to inform planning.

Collaborative Examination of Practice. In addition to building systems to support weekly teaching team lesson planning, the PDI also encouraged the development of routines for the examination of practice among teaching teams of the same age level on a monthly basis. The Reflective Practice Group (RPG) was intended to cultivate teacher dispositions toward collaborative examination of practice. Because observing each other's practice is not feasible, the PDI provided video cameras for the teachers to film themselves in action for the purpose of sharing at the RPG. In addition, the PDI coaches developed a protocol that offered teachers guidance regarding the preparation and introduction of the video clip as well as analysis and discussion after viewing it.

Evidence from the coaches' reflection and documentation of their RPG facilitation indicates that this learning context did cultivate teacher dispositions toward collaborative examination of practice. The analysis indicates the following three themes: 1) the teachers' investment in collaborative practice increases with examination of their own classroom video; 2) over time the teachers' ability to provide constructive, critical feedback on each others' practice develops; and 3) the teachers expressed enthusiasm for the time and space to share and collaborate (see Appendix 7C: Evidence of the PDI Advancing Teacher Collaboration). During our interviews with the PDI teachers, they credited the use of video as a powerful tool for becoming more aware of each other's effective practice behaviors that encourage them to reinvent their practice. For example, one teacher said, "*The video presentation when all the classrooms were together was the best, because you got the chance to see all the wonderful things other teachers was doing and where you could adopt some of their ideas or modify some of the things that they was doing for your own classroom.*"

The teachers also commented on how analyzing their practice through the video helped them better understand the areas of their practice in which they need to improve. One teacher shared,

> *But the video really shows you the classroom. It shows you your team. It shows you your practice. It shows you what the children are doing. So just to be able to see everything and what you actually did in the room, and then be able to discuss what you did and did not do with the other teachers-it's always very beneficial for me.*

Another teacher echoed that same sentiment by stating,

> *The video helped me see where I needed to change my practice when I didn't realize it before. Like this one time in one of the videos I saw myself standing up talking to the different children a lot. When I thought about it, I felt like I was really towering over them. So, I made sure to sit down at their eye level more --you know and it just makes you correct what you see wrong and help you get it right.*

Another teacher stated that the use of video to examine their practice was valuable because it makes for a reliable, transparent review of your teaching, as she said,

> *the video gives us the feedback that sometimes you know as a teacher, you might not want to hear -- I mean to hear it relayed from somebody else, it's different. Whether the comments are positive or something that you need to work on, watching the video of yourself you have to be responsible for your behavior.*

The use of video to examine practice was a powerful tool that helped the teachers' deconstruct and reconstruct their pedagogical narratives that lead to more effective practice over time. However, it is important to note that time and experience were required before the teachers became more open to the idea of being filmed. In fact, our evidence confirms that the great majority of the teachers were resistant to being filmed at first. One teacher recalled,

> *Yeah, we sure didn't want to be filmed. Remember, we're like let us know so we can look our best [lots of laughs]. In all seriousness, I don't think most of us ever really liked being filmed ever. But we saw it as necessary. I mean the bigger picture is what really mattered most -- like superseded the fact that I don't want to be taped. Seeing yourself and other teachers helped us in being able to put things in perspective.*

The structure of the RPG helped the teachers become more committed to the use of video, because of their appreciation for their constructive feedback. One teacher summed it up well,

> *Just the conversation, the interaction, just being able to bounce ideas off of each other just really gave us a way to say oh, yeah, I could do that. Why didn't I think of that? Because there was so many moments where I was just like, I could have -- why didn't I think of that? But, I think because* ***we were so isolated*** *and doing things kind of independently, being able to come together and dedicate that little piece of time to just have those conversations was most valuable in terms of thinking of things that you wouldn't have thought of by yourself.*

Moreover, the teachers credited the whole PDI and its intense cycles of JEPD for helping them develop professional relationships with each other. For instance, one teacher explained,

> *The PDI also brings you together as a team, because you get to learn more about who you work directly with. I mean you get to understand each other's strengths and weaknesses so you can balance each other out in the classroom. When we learned about temperament, we also learned a lot about each other's personalities. We just learned a lot about how to support each other.*

Several teachers relayed similar views, often saying, "*We got each others' backs now*." The PDI routines for collaboration fostered the development of professional relationships that allowed teachers to trust each other with providing critical feedback on each other's practice. Ultimately, the positive relationships teachers formed also gave the teachers the experience of an emotionally supportive environment for learning much like they intend for the children they teach. Not only did PDI help the teachers work in less isolation, but it also supported teacher-to-teacher social-emotional development (Jones, Bouffard, & Weissbourd, 2013).

On Becoming an Intentional Teacher. Deprivatizing teaching through routines of collaboration presented PDI teachers with an opportunity to redefine their professional identity. When the PDI introduced content related to the early learning standards, the teachers were asked to reflect on what it had meant to them. One of the teachers said, "*When people ask me what I do for a living, I tell them that I provide childcare. Now I am going to tell them that I am a professional brain developer. These standards tell me that I am providing more than just care.*" This is one example of how the PDI influenced the teachers' pedagogical narrative to be more comprehensive. That is, several of the PDI teachers can see how they have become more thoughtful and intentional in their practice in that they "act with specific outcomes or goals in mind for children's development and learning" (Epstein, 2007).

The previously cited evidence of the increasing accuracy, coherency, and comprehensiveness of their instructional planning and reflective practice indicates that the PDI teachers were teaching with greater intentionality by the end of the implementation period. One teacher emphasized that,

> *"…the biggest challenge for me was in a sense execution because I think being intentional is hard, especially if you are not accustomed to doing that. And I think that was something new across the board, being intentional. We do what we do, we do it but, now you want us to say why -- and this new word that came about three years ago, intentionality. You have to be present, you have to be an active listener, you have to be this and you have to be that. That was the biggest challenge that I think we all overcame both individually and as a whole age-level across the board. I know we focused on a lot -- using open-ended questions and that was hard but, that falls under being intentional. And I think those little things were the biggest challenges for me. Because like I know I have to do this, I have to plan for it and then come with those questions in mind -- and you get started and it's like man, I had it and some days you're like -- shoot, I know Ms. DeVray (pseudonym) was like you did it, you said it, which helped me know when I did ask the open-ended questions we had planned. And so, it was just like, just trying to overcome that and push each other to be more intentional."*

As this teacher notes, being intentional in one's practice is challenging. In addition to encouraging teachers to use open-ended questions, the teachers also credited two other content areas as being instrumental to becoming more intentional in their practice. Specifically, the teachers referenced the concept of being present 38 times, the power of the iceberg metaphor 34 times and theories of temperament 57 times as the most impactful and highly valued content. One teacher explained,

> "*Well, number one, learning how to stay present, maintain focus on what you're doing, how to look beneath the surface [iceberg metaphor] when you're trying to figure out a situation, and the temperament of a child were all important to me. Also, learning to intentionally plan for how to follow their lead and observe more what they are doing was beneficial. Oh, and looking at your temperament and you could compare your temperament with the child that helped me a lot."*

While some teachers demonstrated greater advances in becoming more intentional, all of the teachers were exposed to the concept and could see the value in becoming more intentional, as one teacher said, "*We must teach with a purpose*."

Revisiting the Stages of Change Scale in 2014

Considering that asking teachers to engage with JEPD requires a level of change in their traditional expectations of PD, one would wonder if such changes are sustainable? To investigate this we re-administered the "Stages of Change Scale for Early Education and Care 2.0" near the end of the initiative (fall 2014). A total of 48 teachers were administered the SOC in 2014, of which 31 had completed the SOC in both 2012 and 2014. The majority of responding teachers in 2014 (75%) saw themselves in the "Action Stage," or actively involved in change. Table 7-1 indicates that in four of the seven parameters for change, the teachers intensified their motivations for change. The greatest gain in readiness for change was in how the teachers saw themselves as able to maintain change with vigilance, as the "Maintenance Stage" ratings shifted from 0% in 2012 to 13% in 2014.

Table 7-1 PDI Teachers' Stage of Change by 2012 and 2014

7 SOC Parameters	Assesses the teacher's...	SOC 2012	SOC 2014
1. Intention	intention to make a change	Preparation[9]	**Action**
2. Awareness	awareness of the need to make a change	Action	**Maintenance**
3. Seeking Information	interest in learning new information about her practices	Preparation	**Action**
4. Effect on Children	beliefs about the extent to which making a change would have an effect on children	Action	Action
5. Overcoming Obstacles	beliefs in her ability to overcome obstacles to change	Action	Action
6. Social Support	beliefs about having social support	Action	Action
7. Professional Identity	beliefs about seeing herself as a professional	Action	**Maintenance**
Total SOC Score	on the 7 SOC Parameters	46% Preparation 54% Action	75% Action 13% Maintenance

Moreover, we inquired whether changes in the teachers' "readiness to change" from 2012 to 2014 reached statistical significance. Employing a paired sample t-test procedure, statistically significant differences were found favoring 2014 in the SOC overall score ($p < .001$) and specifically for the sub-scales of Intention ($p < .001$), Awareness ($p < .001$), and Professional Identity ($p < .001$) (see Appendix 7D: Testing for Increases in Readiness to Change of PDI Teachers from 2012 to 2014 Using Paired Sample T-Test Procedure). As seen in Figure 7-3, the strongest difference occurred in the Awareness sub-scale, which suggests that the teachers concluded their participation in the PDI with a commitment to remaining aware of the need to make changes in their classroom practice.

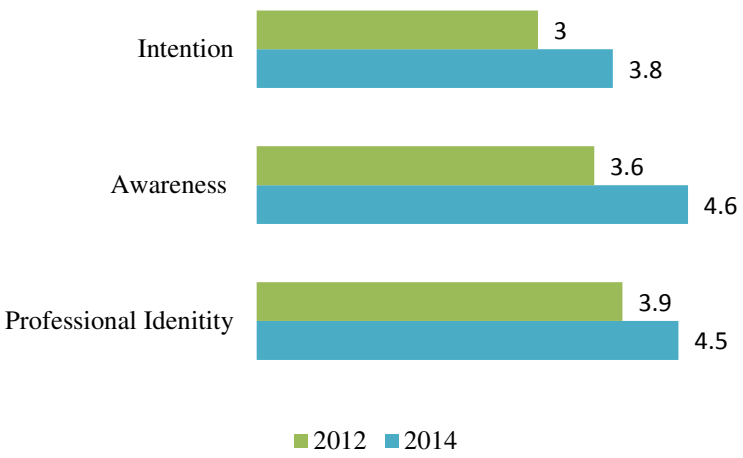


Figure 7-3 Teacher Readiness to Change on Three Sub-Scales of the SOC by 2012 and 2014

Although the strongest difference emerged in the sub-scale of Awareness, the differences in Intention and Professional Identity sub-scales are noteworthy. Increased readiness to change in these areas implies that the PDI teachers are much more confident in their ability to make intentional change and to see themselves as professionals. On balance, the increases in teachers' readiness to change were not the result of chance; therefore the PDI teachers are much more likely to not relapse into their less effective classroom practice routines overtime.

When we asked to provide an example of a teaching practice that helped explain why they were actively engaged in change, the teachers most cited the following themes as reasons for their intentions:

[9] The SOC distinguishes five stages of change within the following score bands: a) "Precontemplation (1 – 1.4); b) Contemplation (1.5 – 2.4); c) Preparation (2.5 – 3.4); d) Action (3.5 – 4.4); e) Maintenance (4.5 – 5).

Lesson planning process

-I would like to improve my lesson planning skills, to include more data analysis. To do so I am planning for more formative assessments and carving out more time for planning.

-By using the CLASS, it has taught me to allow children to learn and explore in a different way. My planning process is much different now.

Collaborative relations with co-workers

-The Ounce meetings/trainings/workshops have made me think a different way in how to see children and families (ex. what is underneath the iceberg). As well as with my co-workers, I can learn who they are and implement what I learned from the Ounce (what is underneath the iceberg).

-Being more positive and nurturing to my children, families, and coworkers, and looking below the iceberg before I judge.

Intentional interactions with children and co-workers

-The changes I have made has made me more conscious of my work as a teacher and realizing how important it it to be present in the lives of children. Just to be more intentional.

-I have learned a lot about the CLASS and it has helped me be more mindful about my actions.

Commitment to continuous learning

-Because practice makes you better. Learning is an ongoing process.

-I can't go back to my old ways, because of what I've learned to be the professional that I am when it comes to working with families, children, and coworkers. I now know things that I did not know before about being present and intentional for the children and families. How important it is to ask open-ended questions and how to observe the children. I've learned the importance of documentation and lesson planning. I love the changes that I've made to work with children, families, and co-workers.

When asked to provide an example of a work experience that helped explaine why they were ready to change their beliefs about the social supports available to them, the teachers most cited the collaborative climate at their centers and their supportive relationships with co-workers and administrative staff as reasons for why they feel they can make a plan for change. For example:

Collaborative Climate

-I live and grow in an active community that supports changes, the changes are positive in how they impact lives.

-There is a team environment that supports me.

-My center as a whole supports each other.

Supportive Relationships

-I am able to talk to my director and present my ideas. She supports them and even helps when I need more than verbal support.

-Coworkers are supportive in sharing and when I want to change lesson plans I have people who often make suggestions (help me).

-Our teaching team and administrative staff usually support the changes I suggest or recommend. We give thought to how the changes will affect everyone involved.

-I have continued to further my education in child development and although it has been tough, I have been receiving help from my coworkers and director. I really appreciate them.
-I have a coworker who always says change is good, stick with it, don't give up. I'm here if you need me. So I know I have support.
-My coworkers in the center I work in can be supportive of change if we all believe it is benefitting everyone especially the families and children in a good way. So if it's a good idea, I do believe they are supportive. They often even give feedback on how to better the idea.

The SOC evidence suggests that the teachers benefitted from their collaborative efforts in ways that increased their commitment to change. During the final interviews, the teachers specifically indicated that they were not only able to complete the whole PDI planning process, but that they are also confident in their ability to carry out the process without their coach or direct supervisor present. Several teachers explained that they valued and understood the process so much so that they are able to teach the process to their colleagues who had not participated in the PDI previously. And, in moments when they might regress to an old habit, several teachers felt that there is always a team member who will remind them to stick with their improved method of planning by asking them all to think about, "*What would the Ounce say*?" Across the four PDI centers, teachers now have intentions to sustain their collaborative efforts, because they know that the work they do is complex and they prefer to no longer work in isolation.
So far, we assessed whether the contexts for learning for teachers advanced teacher knowledge, skills, and dispositions as intended by the PDI. Although variation is apparent and to be expected in terms of depth of advancement, our evidence suggests that the PDI did help the teachers develop a more accurate, coherent, and comprehensive pedagogical narrative. Next we consider evidence of PDI's impact on classroom practice using the Classroom Assessment Scoring System (CLASS) as the primary measure.

Impact Study for Pre-Kindergarten Teacher-Child Interaction Outcomes

We assessed change in teachers' classroom practice through direct observations using the age-appropriate Classroom Assessment Scoring System (CLASS) tool conducted by reliable CLASS assessors. The teacher observation outcome measures in the impact study included the PreK CLASS Emotional Support, Classroom Organization, and Instructional Support domains in PreK classes based on available data.[10] Data for each of the PreK CLASS domains were collected in the 2010-2011 and 2011-2012 academic calendar years with post-intervention data collected in 2015. Baseline and post-intervention data were collected from multiple classrooms within each center in the study. However no single classroom had both baseline and post-intervention data. The classroom level data were aggregated at the center level in order to establish baseline equivalence and to measure the intervention effect for each PreK CLASS domain outcome at the center level.

QED Pre-Post Design to Test PDI Impacts on PreK CLASS Measures

An Ordinary Least Squares Linear Regression model was applied to the aggregated PreK CLASS domain data to establish baseline equivalence for the impact studies. The analytic sample size for each CLASS impact study varied based on available data. The center characteristic control variables included in the models to establish baseline equivalence and to measure the PDI impact were: percentage of students in families living below the poverty line; the percent of families experiencing unemployment; the education

[10] There were insufficient infant and toddler CLASS observation data to measure the PDI effect

level of parents (those with a Bachelor's degree or higher) based on 2012 census data; and whether a center was funded through Early Head Start and/or the Pre-School for All program.

Statistical Analyses to Measure Intervention Effects

Baseline equivalence was established by calculating the intervention center effect size in standardized standard deviation units (Hedge's g) in PreK CLASS domain scores between PDI intervention and comparison centers, and comparing the difference in intervention and comparison center effect sizes to the NEi3 <.25 standard deviation unit standard. Hedge's g, a variation of Cohen's d measure of effect size, corrects for small sample sizes. At baseline, the Emotional Support and Instructional support measures were stronger in the intervention centers, and Classroom Organization measures were slightly lower than comparison centers. Each CLASS domain effect size fell below the NEi3 threshold of <.25 for establishing baseline equivalence as seen in Table 7-2. This means the PDI centers and comparison centers' CLASS observation scores were not statistically different at the start of the intervention period.

The OLS Regression models used to measure PDI effects are listed in Appendix 7E. The baseline measures for each of the PreK CLASS domains under study were included in the impact models to adjust for the differences among centers at baseline when measuring intervention center impact.

Table 7-2 Baseline Equivalence Estimates for the Pre-Kindergarten CLASS Measures

CLASS Measure	Intervention Centers (N)	Comparison Centers (N)	Baseline Unadjusted Intervention Mean (SD)	Baseline Unadjusted Comparison Mean (SD)	Standardized Baseline Difference*
Emotional Support	3	7	5.04(.64)	4.89(.56)	.19
Organizational Support	3	12	4.92(.52)	5.00(.92)	-.10
Instructional Support	4	8	3.43(.31)	3.41(.73)	.02

*Intervention and comparison center difference after adjusting for the baseline measure.

Results of QED Pre-Post Regression Analyses for PreK CLASS Measures

Whether a teacher received PD through an intervention center had a positive effect on CLASS Emotional Support (g = 1.15), Classroom Organization (g = .19), and Instructional Support (g = .83) after controlling for baseline measures and center characteristic covariates. However, the effects presented in Table 7-3 did not attain statistical significance at the p = .05 confidence level. Statistical power in these analyses was substantially reduced due to the small sample size.

Second Analytic Procedure: Looking at Growth Trends Within the PDI Classroom Sample

Additional studies were conducted to assess classroom growth in the Infant, Toddler, and PreK CLASS measures over a three-year period. CLASS data were collected for intervention classrooms at the Infant, Toddler, and PreK levels at three time points: late fall/early winter 2012-2013; late fall/early winter 2013-2014; and winter/spring 2015. While we knew that the number of classrooms with three full years of CLASS data would be small, we deemed the numbers for Toddler classrooms (N = 11) and Pre-K

classrooms ($N = 8$) to be sufficient for a preliminary assessment of effect sizes associated with three-year trends. Only two classrooms at the Infant classroom level accrued three years of data, and thus were not analyzed to detect effect sizes. The CLASS domain and dimensions for the Infant, Toddler, and PreK classroom levels are listed in Table 7-4. The Infant CLASS domain area of Responsive Caregiving is a composite scale of the dimension measures, while the Toddler and PreK CLASS domains and dimensions are separate measures.

Table 7-3 Pre-Kindergarten Post-Intervention Impact Results

CLASS Measure	Intervention Centers N	Comparison Centers N	Unadjusted Intervention Mean (SD)	Unadjusted Comparison Mean (SD)	Impact Effect Size (Hedge's g)	Impact Standard Error	p-value
Emotional Support	3	7	6.00(.17)	5.35(.73)	1.15	.71	.41
Organizational Support	3	12	5.75(.26)	4.92(1.16)	.19	1.02	.85
Instructional Support	4	8	3.13(1.36)	2.19(.79)	.83	.63	.26

Table 7-4 CLASS Domains and Dimension Measures by Age Category

INFANT CLASS	TODDLER CLASS	PRESCHOOL CLASS
Responsive Care Giving	**Emotional and Behavioral Support**	**Emotional Support**
Relational Climate	Positive Climate	Positive Climate
Teacher Sensitivity	Negative Climate	Negative Climate
Facilitated Exploration	Teacher Sensitivity	Teacher Sensitivity
Early Language Support	Regard for Child Perspectives	Regard for Student Perspectives
	Behavior Guidance	**Organizational Support**
	Engaged Support for Learning	Behavior Management
	Facilitation of Learning and Development	Productivity
	Quality of Feedback	Instructional Learning Format
	Language Modeling	**Instructional Support**
		Concept Development
		Quality of Feedback
		Language Modeling

Figure 7-4 presents the unadjusted means for the Infant classrooms with available data. The mean Infant CLASS measures show steady positive growth over the intervention period. No statistical analyses were conducted to measure a possible effect size due to the small sample size (N = 2) of Infant classes that had CLASS observation data for 2013, 2014, and 2015. The unadjusted means for the Toddler and PreK CLASS domains and dimension measure are listed in Appendix 7F and 7G by age category and year.

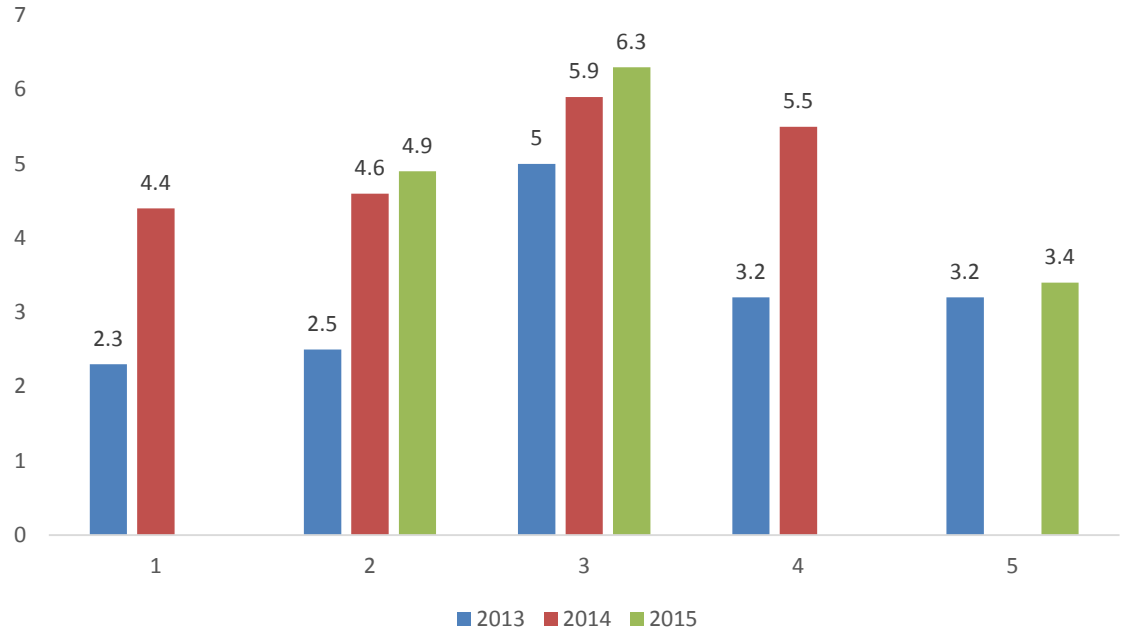


Figure 7-4 Infant CLASS Unadjusted Means in Years 2013, 2014, 2015 for Five Classrooms

The unadjusted means for the Toddler CLASS Emotional and Behavioral Supports and Engaged Support for Learning domain measures increased over the 3-year period with varying rates of growth by domain and dimension measures (Appendix 7H). The PreK CLASS Emotional and Behavioral Supports and Classroom Organization domain measures increased over the 3-year period, and Instructional Supports measures remained the same. The dimension measures within each domain demonstrated variable growth over time (Appendix 7I).

Repeated Measure Procedure for Toddler and PreK Classrooms

We employed a repeated measure analysis of variance procedure (RM_ANOVA) in order to examine the strength of improvement trends in Toddler and PreK CLASS assessment outcomes at the classroom level. The RM_ANOVA procedure tests whether the means of three or more metric variables are the same within the same cases (i.e., the null hypothesis), including variables measured across successive time points (Park, Cho & Ki, 2009). We used the SPSS General Linear Model to perform the calculations (IBM SPSS statistics version 22).

Five assumptions must be met for RM_ANOVA to be employed with validity. These include: a) the sample size is much smaller than the population size; b) the sample is representative of the target population; c) observations are independent within and across time points; d) variables follow a multivariate Gaussian (i.e. normal) distribution in the target population; and e) sphericity, i.e., "…the condition where the variances of the differences between all combinations of related groups (levels) are

equal" (Laerd Statistics, 2015).[11] Conditions a-d could be met reasonably for CLASS observations in the large sector of urban Head Start community-based centers. Because the assumption of sphericity is considered the most vital requirement for RM_ANOVA validity, we examined sphericity statistics (provided by the SPSS procedure) for all analyses and applied the Greenhouse-Geisser correction if required (indicated in tables labeled Appendices 7J and 7K).

Results of Repeated Measures ANOVAs for Toddler and PreK Classrooms

The repeated measures ANOVA results indicate that the differences in mean scores were not statistically significant for any Toddler or PreK classroom domain or dimension measure across the three years (see tables labeled Appendices 7J and 7K). A limitation to this analysis is the small sample sizes for the CLASS measures. It is worth noting that two distinct trends are suggested in the bar graphs situated in Appendices 7G and 7I for both the Toddler and PreK classrooms. First, in the dimensions associated with the Emotional Supports and Organizational Support domains, the general three-year trend is noticeably positive and ascending. For the 7 PreK classrooms, for example, the trajectory in the "Teacher Sensitivity" dimension rises steadily from early 2013 (5.3) to early 2014 (5.7) to early 2015 (5.9). In addition, the trajectories for the dimensions "Behavioral Management" and "Productivity" move solidly into a range of high quality interactions between preschool teachers and children. Second, in the dimensions associated with the instructional supports domain, progress is evident in the first half of the initiative (2013 -2014) followed by a "slide back" in the second half of the initiative (2014-2015). This "slide back" pattern in instructional supports is relatively uniform across all PDI classrooms, and does not comport with analyses of additional data sources that indicate the teachers were in fact advancing in their understanding of how to intentionally plan for high quality teacher-child interactions. It is plausible, for example, that the apparent decline derives from the following:

The delayed emphasis of instructional supports in the core curriculum of the PDI cycles for learning. Specific content related to the Toddler CLASS dimensions, "Quality of Feedback and Language Modeling" and PreK CLASS dimensions, "Concept Development, Quality of Feedback, and Language Modeling" is most apparent in the coaches' instructional outlines and captured in our observations of Learning Labs and RPGs during the last year of implementation.

The coaches previous professional experience with employing the CLASS in their coaching practice. Several coaches conceptually understood the CLASS as a tool, but they were hesitant in providing formative scoring feedback to the teachers as part of the coaching cycles. The only classrooms to make

[11] According to the Laerd Statistics guide: "Violation of sphericity is when the variances of the *differences* between all combinations of related groups are not equal. Sphericity can be likened to homogeneity of variances in a between-subjects ANOVA…The violation of sphericity is serious for the repeated measures ANOVA, with violation causing the test to become too liberal (i.e., an increase in the Type I error rate). Therefore, determining whether sphericity has been violated is very important. Luckily, if violations of sphericity do occur, corrections have been developed to produce a more valid critical *F*-value (i.e., reduce the increase in Type I error rate). This is achieved by estimating the degree to which sphericity has been violated and applying a correction factor to the degrees of freedom of the *F*-distribution" (see https://statistics.laerd.com/statistical-guides/sphericity-statistical-guide.php)

consistent progress in their CLASS outcomes were linked to the coach who had the most experience with the CLASS and integrated the language and examples of high quality interactions from the start of PDI implementation.

The reality that improving in the instructional supports CLASS domain is the most challenging developmental "stretch" for teachers, because it requires consistent meta-cognitive and meta-regulation of practice that teachers are challenged to translate into practice thoughtfully. One teacher said it well,

> "*the biggest challenge for me was, in a sense, execution, because I think being intentional is hard, especially if you are not accustomed to doing that … I know we focused a lot on using open-ended questions and that was hard but, that falls under being intentional … Because like I know I have to do this, I have to plan for it and then come with those questions in mind -- and you get started and it's like man, I had it and some days you're like – shoot."*

The transition from coach facilitated to direct supervisor facilitated teacher learnings cycles when the direct supervisors were working to develop and improve their skills. Key to the sustainability of essential features of the PDI model was to prepare direct supervisors for the role of JEPD facilitator. One could expect the quality of the direct supervisors' facilitation to be lower during the second year of implementation when they were still learning how to support teacher learning.

To conclude, the positive trends in emotional and organization supports for both Toddler and PreK classrooms in these pilot PDI data suggest that the teachers made progress in creating a positive context for learning. However, their ability to consistently execute instructional supports that extend learning for children remains the hardest facet of ECE practice to master, and thus is a work in progress. Although evidence presented earlier in the chapter suggests that the PDI shows promise in advancing the teachers' pedagogical knowledge and dispositions, it is likely that change in teacher instructional practice requires more time, even with coaching and other scaffolding.

Chapter 7 Summary

We employed two analytic procedures to measure the impact of the PDI model on Infant, Toddler, and PreK classrooms using the CLASS assessments. The first analysis was conducted with PreK pre-intervention CLASS observation data collected in the 2010-2011 and 2011-2012 academic calendar years with post-intervention data collected in 2015 to calculate the PDI effects on CLASS Emotional Support, Classroom Organization Support, and Instructional Support. The linear regression analysis results showed no difference between PDI centers and comparison centers in PDI growth between pre-intervention and post-intervention scores. A second analysis was conducted to assess whether the trajectories of CLASS scores in PDI centers over the intervention period years 2013, 2014, and 2015 differed at a significant level. The repeated measures ANOVA results for both toddler and PreK classrooms indicated that these differences were not statistically significant.

A limitation to both analyses was the small sample sizes for the CLASS measures, which substantially reduced statistical power. In the first analysis, there was insufficient data to measure the PDI effect sizes for the Infant and Toddler CLASS data. The data used in the PreK class were aggregated at the center level because there were no pre-test and post-test measures for a single classroom across any of the centers. In the second analysis, there were two centers with Infant CLASS observation data for the three-

year period, which limited our ability to assess whether improvements in scores over time were significant. A larger classroom level sample size for CLASS data would have raised the statistical power of the classroom level studies, and allowed more statistical procedure options to measure PDI effect sizes. An examination of trends in average social-emotional and organizational support domain scores did suggest an improvement trend at the infant, toddler, and PreK levels. From another angle, the percent of infant, toddler, and PreK classrooms providing mid-to-high levels of instructional practice also appeared to increase (from 0% in 2013, to 67% in 2014, and 76% in 2015). We find that further study is warranted to see if these trends prove significant in a larger sample of ECE classrooms.

Chapter 8 PDI IMPACTS ON CHILD LEARNING AND DEVELOPMENT

Drawing on the Five Essential Supports for School Improvement Framework (Bryk et al., 2010), the PDI model aims to support early childhood leaders' development of organizational systems that provide teachers with routine opportunities for collaboration intended to enhance instructional practice thereby improving developmental outcomes for children. Extensive research on the Five Essential Supports found that K-12 schools with strong indicators on three of the five essential supports are ten times more likely to improve in comparison to schools with weak supports (Bryk et al., 2010). And, most salient to the PDI's theory of change, a sustained weakness in one of the five supports reduced the chances of an improvement initiative's success to less than 10%. The PDI applies this research to early education by recognizing that improvements to teaching are achieved and sustained by improvements to the conditions and supports for teaching. The promise of this conceptual framework in K-12 schools leads one to consider whether such a systems perspective can also improve early childhood education settings. In this chapter, we present results on two analytic designs in order to measure PDI impact on child development. First, we provide an overview of the child development outcomes we measured for the impact study. Next, for each design, we review the study sample and our analytic procedures. Then, we present our results and interpretations for each design.

Child Developmental Outcome Measures for the Impact Study

We analyzed seven early childhood development outcomes to determine the impact of the PDI model on children's learning in intervention centers (PDI centers) versus comparison centers where teachers were not exposed to these PD activities. The GOLD Teaching Strategies assessments were used to assess the children's developmental progress in Social and Emotional, Language, Cognitive, Literacy, and Mathematics learning. Child data were collected throughout a two-year intervention period to obtain child level baseline data, quarterly growth measures, and summative learning and development outcome measures. Subgroups of children were also administered the GOLD English Language Acquisition (ELA) objective items, and the Bracken School Readiness Assessment (BSRA). [1] The GOLD Teaching Strategies subscale scores were standardized, and normed based on a scale of 200 – 800 so development scores are comparable across age levels. The GOLD ELA objectives were in raw score form, thus a composite scale score was computed using Rasch calibration (see Appendix 8A). The GOLD Teaching Strategies Literacy assessment was used as a proxy measure for the BSRA baseline measure. The BSRA assessment standardized scores range from 40 to 160 for the impact measure.

Impact Study Participants

The child sample population (N = 1,162) consisted of children who were enrolled for either one or two academic calendar years of instruction during the PDI intervention period between the fall of 2012 and the spring of 2014 for the GOLD Teaching Strategies subscales, and between the spring of 2012 and the spring of 2015 for the Bracken School Readiness Assessment. Children in the analytic sample ranged in age from 2 months to 61 months. These children were administered the GOLD Teaching Strategies subscales on a quarterly basis. Thus there were 7 possible progress "checkpoints" for measuring student growth over the length of the intervention impact study period for children who were a part of the study in

[1] The Bracken School Readiness Assessment was a pre-test post-test design. Thus there were no quarterly growth measures.

the fall of 2012 until the final check point in the spring of 2014. The children who entered the study in the fall of 2013 were administered the GOLD subscales over 4 checkpoints including the final spring 2014 checkpoint. There were five PDI sites in each impact analysis. Children enrolled in intervention centers for either one or two academic years were included in the sample to assess whether there was an incremental intervention effect if children were enrolled in PDI intervention centers for a longer period of time, which would inform decisions about future program implementation. Not all children were assessed at both baseline and post-intervention time points for all of the domain measures. Thus analytic sample sizes varied across the subscale measures. The number of comparison centers in the study varied by child outcome based on the analytic sample at the child level. The BSRA was administered in May of 2015 to children in 11 early childhood centers (5 intervention, and 6 comparison) who were identified by center directors as transitioning to Kindergarten in Fall of 2015. The final sample of 58 children for the BRSA analysis was comprised of children who were administered the BSRA and also had GOLD Literacy baseline data between the spring of 2012 and the spring of 2013. The sample sizes for the study participants at the child and center level are summarized in Table 8-1.

Table 8-1 Study Participants

Measure Name	Baseline and Impact Intervention Group N	Baseline and Impact Intervention Centers M	Baseline and Impact Comparison Group N	Baseline and Impact Comparison Centers M
GOLD Social Emotional	199	5	907	37
GOLD Language	198	5	908	37
GOLD Cognitive	195	5	897	37
GOLD Literacy	192	5	863	36
GOLD Mathematics	194	5	852	35
GOLD ELA	35	5	87	14
GOLD Literacy (For BSRA)	29	5	29	6

First Analytic Procedure

In this study design, we consider that children are nested within a larger early childhood center, where a child's level of development is considered to be dependent on the unique environment of the center they attend. Thus children's scores are often more homogeneous within centers, which must be considered in measuring an intervention effect size across centers. Hierarchical linear models (HLM) are used in nested designs to model the variance in an outcome based on both individual and group level characteristics. Partitioning these two sources of variation in the children's development scores yields an overall average score (the grand mean) across children that accounts for both the child level and center level contributions to the variability in overall scores (Raudenbush & Bryk, 2002).

Establishing Baseline Equivalence

An important preliminary step in implementing a pre-post quasi-experimental design was to assure that the intervention and comparison samples are equivalent on the target measures before the intervention

was administered. A two-level HLM model[12] was used to establish baseline equivalence between PDI centers and comparison centers on the GOLD Teaching Strategies subscales, and BSRA proxy baseline measure (the GOLD Literacy subscale for the BSRA sample of students). Baseline measures were standardized based on students' age in months at the time of the baseline assessment. The models used for this analysis are in Appendix 8B. Baseline equivalence was established by calculating effect sizes in standardized standard deviation units, (Hedge's g) in the children's levels of development at baseline between intervention and comparison centers, and comparing the difference in intervention and comparison center effect sizes to the <.25 standard deviation unit standard set by the National Evaluation Investing in Innovation Fund (NEi3). For each of the baseline measures, children in intervention centers had lower scores on average than their peers in comparison centers. The difference in the children's average pre-test baseline scores between intervention and comparison centers meant that the sample of children were closely matched in their expected development at baseline as seen in Table 8-2.

Table 8-2 Baseline Equivalence for GOLD Teaching Strategies and BSRA Measures

Measure Name	Baseline Intervention Group N	Baseline Comparison Group N	Baseline Unadjusted Intervention Group Mean (SD)	Baseline Unadjusted Comparison Group Mean (SD)	Standardized Baseline Difference (Hedge's g)*
GOLD Social Emotional	199	907	489.75(91.95)	506.12(88.70)	-0.14
GOLD Language	198	908	484.63(89.14)	507.31(85.81)	-0.16
GOLD Cognitive	195	897	486.03(87.19)	511.08(85.26)	-0.25**
GOLD Literacy	192	863	506.35(77.70)	524.98(79.44)	-0.06
GOLD Mathematics	194	852	509.13(85.62)	533.02(79.06)	-0.17
GOLD ELA	35	87	3.33(1.93)	3.69(1.97)	-0.08
GOLD Literacy (BSRA)	29	29	504.76(51.46)	502.66(42.44)	-0.19

* Intervention and comparison center difference after adjusting for student age (in months) at the time of their baseline measure. The standardized baseline difference is calculated by dividing the parameter estimate by the pooled standard deviation for the pretest measure. Consistent with the WWC standards, baseline equivalence is established if the standardized baseline difference is <0.25 standard deviations (U.S. Department of Education, 2013). Hedge's g, a variation of Cohen's d, corrects for small sample sizes.
** Standardized baseline difference is g = -.248 < .250

Child Development Impact Model

A two-level HLM model was applied to the GOLD Teaching Strategies and BSRA to measure the PDI center effect size versus comparison centers, adjusted for the homogeneity of scores and student characteristics that may influence development outcomes within centers, as well as the across-center variability in students' post-intervention learning and development scores. Children's spring 2014 GOLD subscale post-intervention development measures and spring 2015 BSRA scores were the outcome variables for the intervention impact studies.

[12] HLM baseline and impact cross-sectional models were applied using HLM 7 software (Raudenbush et. al, 2013).

Child Level Characteristics (Level 1 of the HLM Model)

Several child level covariates were added to the impact models to account for contributions to the children's score variability when measuring the intervention effect. Table 8-3 presents the child level characteristics considered for the final impact model, which included: gender, race, if a child was on an Individual Family Service Plan (IFSP), or if a child had an Individualized Education Plan (IEP) in additional to their time enrolled in an early childhood center during the intervention period. Of these covariates, whether a child was on an IEP had a statistically significant impact on the child's overall scores for the GOLD Social Emotional, Language, Cognitive, Literacy, and Mathematics subscales, and was included in these impact models. The children's age-standardized baseline measures were included in the impact model to account for variation in the children's baseline development scores. Children's age in months in the Spring of 2014, and whether they were enrolled in a PDI center in the fall of 2012 (our two-year enrollment group), or the fall of 2013 (our one-year enrollment group) were included to account for variability in scores related to children's age and length of time enrolled in PDI centers.

*Table 8-3 Child Level Characteristics**

Child Level Characteristics (N = 1,162)*	Mean(SD)
Female	.50(.50)
Black	.74(.44)
Latino/a	.22(.42)
Other Race/Ethnicity	.04(.19)
IEP	.06(.23)
IFSP	.01(.10)
Primary Language not English	.15(.35)
Spring 2014 Age in Months	48.87(13.27)
Two-Year Enrollment in PDI Center	.27(.45)
One-Year Enrollment in PDI Center	.73(.45)

*Does not include GOLD ELA or BRSA subgroups

Center Level Characteristics (Level 2 of the HLM Model)

At the center level, clusters of centers with similar characteristics (matched centers) were identified through a propensity scoring procedure, and these matched centers were used as covariates to ensure that PDI centers were being compared to similar comparison centers when measuring the intervention effect. The matched center variables were dummy coded for each analysis, with the most populous center, a not-for-profit, used as the reference group. Other center level characteristics that were controlled for in measuring the intervention effect size included the 2012 center level percent of families living in poverty, percent unemployed, percent of those with a Bachelor's degree, and whether a center was supported through Early Head Start and/or Pre-School for All funding (see *Table 8-4*). These additional center level characteristics were not included in the BSRA-3 model due to issues of multi-collinearity.[3]

[3] Multi-collinearity denotes a situation in which many center level covariates are moderately to strongly correlated within this smaller subgroup of students making it difficult to determine which center level variables were contributing toward variability in students' average development scores.

For each impact model. The student level (level 1) and center level (level 2) covariates were centered around the grand mean. Thus the grand mean coefficient Y_{00} on the post-intervention measures reflects the overall mean across centers, adjusting for the homogeneity within centers at the student level. The impact HLM models are in Appendix 8C.

Table 8-4 Center Level Characteristics

Center Level Characteristics (N = 42)	Mean(SD)
Intervention Center	.18(.38)
Child Assigned to Site 1 Group (reference)	.40(.49)
Child Assigned to Site 2 Group	.19(.39)
Child Assigned to Site 3 Group	.10(.30)
Child Assigned to Site 4 Group	.17(.38)
Child Assigned to Site 5 Group	.14(.35)
2012 Percent Families Below Poverty Line*	.33(15.71)
2012 Percent Unemployed 2012*	.18(8.70)
2012 Percent Parent BA Degree or Higher*	.24(18.86)
2012 w EHS Center Based*	.35(.48)
2012 State PreK PFA Funding*	.53(.50)

*Covariate was not included in the BSRA Impact Model

Results –First Analytic Procedure

After controlling for the children's baseline measures, and other child and center level characteristics, the centers receiving the PDI intervention did not have a statistically significant effect on the children's spring 2014 development assessment scores across all domains studied for children exposed to the intervention for either one academic year or two academic years as seen in Table 8-5. For example, the GOLD Social Emotional average score for children across schools was $Y_{00} = 581.91$, and the intervention center impact estimate was $Y_{01} = 19.01$ with a standardized effect size of $g = .22$, $p > .05$. This means that children in PDI centers did score (on average) 19.01 points higher than their peers in comparison centers, accounting for the age-standardized baseline scores, and other child and center level characteristics. However, this positive trend did reach not statistical significance. We did not detect any significant interaction effects of the PDI on post-intervention scores for children enrolled in PDI centers for two-years versus one year.

Table 8-5 Impact Results for GOLD Teaching Strategies Subscales and BSRA

Measure Name	Impact Unadjusted Intervention Group Mean (SD)	Impact Unadjusted Comparison Group Mean (SD)	Impact Effect Size (Hedge's g)	Impact Standard Error	p-value	Minimum Detectable Effect Size (MDE)*
GOLD Social Emotional	584.83(85.41)	586.51(85.25)	0.22	14.13	.19	0.48
GOLD Language	579.39(92.66)	588.91(91.85)	0.17	14.61	.29	0.46
GOLD Cognitive	587.77(101.16)	597.29(99.50)	0.23	13.66	.11	0.40
GOLD Literacy	589.45(86.76)	601.94(88.43)	0.06	11.12	.61	0.37
GOLD Mathematics	592.68(92.79)	610.34(84.79)	0.09	11.54	.51	0.39
GOLD ELA	5.00(1.67)	5.22(1.79)	0.25	.74	.56	1.35
BSRA	97.55(11.18)	96.93(14.30)	0.20	7.52	.75	2.05

* A **minimum detectable effect** (MDE) **size** was calculated to determine the smallest effect size that would be statistically significant using a two-tailed test with the alpha level of .05 and 80% statistical power (Bloom, 1995) given the current sample size. A larger sample size would likely increase the statistical power of the study.

Second Analytic Procedure: A More Granular Look at Rates of Student Growth

We applied a three-level HLM longitudinal growth model in the GOLD Social Emotional, Language, Cognitive, Literacy, and Mathematics domain areas for a sub-sample cohort of 358 children who were in the PDI centers during the full two-year PDI intervention period to assess children's growth trajectories in the GOLD developmental domains over the 7 progress checkpoints between fall of 2012 and spring of 2014. HLM has the flexibility to provide parameter estimates based on what time-series data points are available when data are missing at random (Raudenbush & Bryk, 2002). At each progress checkpoint 1-3% of data were missing at random (MAR), with the exception of the summer 2013 checkpoint, where 28% of the data were missing due to the children's lack of attendance in the summer period versus the academic year. Since the summer 2013 progress checkpoint data was not missing at random, we decided not to use this data point in assessing the children's growth trajectories over the intervention period. The 6 measures of progress (for each GOLD domain area) (Appendix 8D) were considered to be time-series measures of children's development at level 1 of the three-level HLM longitudinal model, which are nested within children at level 2, with children nested within ECE centers at level 3. A linear HLM longitudinal growth model with intercepts- and slopes- as-outcomes, (Raudenbush & Bryk, 2002), was selected as the best fitting model to estimate the children's average growth rates based on the Bayesian Information Criterion (BIC) which favors more parsimonious models versus the Akaike Information Criterion (AIC) or chi-square goodness of model to data fit measures (O'Connell & McCoach, 2008).

Three-Level HLM Growth Model Specification

In the level 1 model of the time-series measures, TIME was coded as 0, 1, 2, 3, 4, 5 to establish the initial status (baseline) measure as point 0, with each successive time point to be interpreted as the average

growth rate for the children in each of the domain areas between each progress check point. The level 2 model included group-centered child level dummy variables to account for the differences in a child's instructional age group during each data collection period in estimating the PDI effects on the children's average initial status (baseline measure), and average rate of growth. The level 3 model included the PDI center dummy variable (TREAT). Matched center dummy variables were included in the model with the largest center, a not-for-profit, as the reference group for the remaining 4 for-profit centers. These clusters of centers were included in the models to ensure that intervention centers were being compared to similar comparison centers when measuring intervention effects (see Appendix 8E).

Figure 8-1 plots the trajectory of unadjusted group means for the intervention and comparison GOLD Social Emotional sub-scale measures across the 6 progress checkpoints included in the model. (Similar plots for the remaining subscales are provided in Appendix 8F.) While same-age children in PDI centers were lagging in development in comparison to their counterparts in non-intervention centers in fall 2012, they appear to have closed the gap significantly by spring 2014.

Results –Second Analytic Procedure

Table 8-6 summarizes the results of the child growth models for intervention and comparison children with two full years of enrollment in their PDI centers. To aid in reading Table 8-7 we may consider the outcome for Social Emotional development in more detail. The mean initial status score across both PDI and comparison centers on the GOLD Social Emotional measure was γ_{000} = 554.55. The PDI center average initial status was γ_{001} = -47.44 points lower than comparison centers, and the p-value indicates the difference in initial status scores for children across the intervention and comparison centers was not statistically significant, which we would expect to see in interpreting the initial status as a baseline measure for the rate of growth. The average growth rate for all children was 24.62 points across the checkpoints, while children in PDI centers experienced a positive growth rate versus comparison center peers γ_{101} = 9.23, $p < .05$.

Modeling children's growth trajectories over the two-year period with six GOLD Teaching Strategies observations per student (with exceptions) yielded statistically significant intervention effects on the children's Social Emotional development with a medium effect size[4] (δ = .60, p <.05) as seen in Figure 8-1. In the area of GOLD Language development, children in PDI centers made close to significant gains over their peers in comparison centers, (δ = .43, p <.10) at a 90% confidence level. Students' Cognitive, Literacy, and Mathematics growth rates were not statistically different than peers in comparison centers.

[4] The effect size calculation used is δ = Intervention Coefficient*Duration/Pooled SD of the Unadjusted Means (Feingold, 2015), where Duration = 5 (the subsequent time points after the initial status).

The PDI had a positive impact on closing the gap in Social Emotional Learning and Development for those children with two years of PDI exposure.

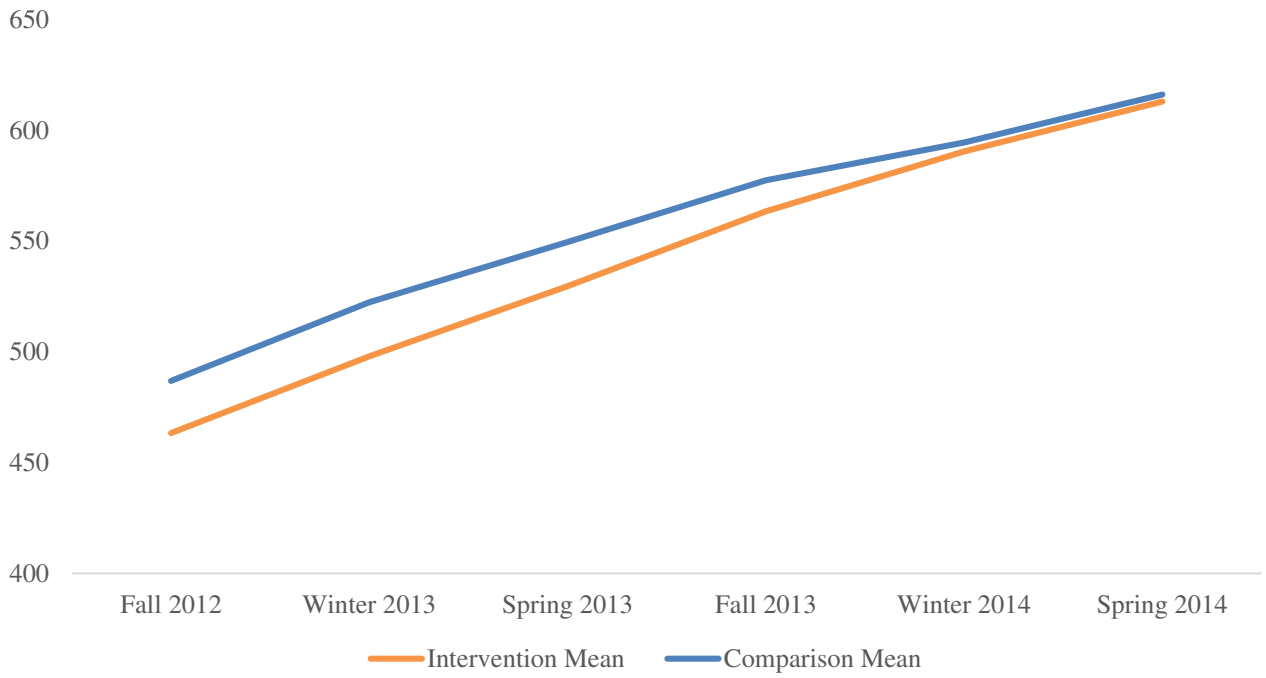


Figure 8-1 GOLD Social Emotional Unadjusted Mean Growth Trajectory

Table 8-6 PDI Model Effect Sizes on Student Growth Fall 2012 through Spring 2014

Measure Name	N PDI	N Comparison	Y_{000} Mean Initial Status	Y_{001} PDI Initial Status**	Y_{100} Mean Growth Rate	Y_{101} PDI Growth Rate**	Y_{101} Standard Error	δ Effect Size	p-value
Social Emotional	55	301	554.55	-47.44	24.62	9.23	4.16	0.60*	0.03
Language	55	301	552.66	-50.04	26.69	7.51	4.15	0.43	0.08
Cognitive	55	299	558.53	-54.18	28.41	4.66	3.85	0.24	0.23
Literacy	55	295	567.51	-40.22	24.7	1.12	2.97	0.07	0.71
Mathematics	54	299	573.48	-36.62	24.63	3.2	3.38	0.20	0.35

*p <.05, **Intervention versus the comparison reference group

Discussion

The sample used for this model consisted of children who were in the intervention study for two full academic years of the intervention period (n = 358) versus the sample used in the first set of models, where children were exposed to the intervention for one or two years (N = 1,162). The PDI model was designed for continuous improvement with changes occurring in model delivery over the intervention period. Children who were there for two full years were exposed to teachers involved in reflecting on

their own practice for the purpose of fostering strong teacher-child interactions in a classroom environment cultivated to improve the children's social emotional learning and development as the pre-cursor for cognitive and academic development. Modeling the children's growth trajectories over the two-year period yielded a statistically significant intervention effect on the children's rate of learning and development in the Social Emotional domain, with a near significant effect in the children's language development based on GOLD Teaching Strategies assessments over the intervention period.

These results reflect the PDI model focus on building teacher and child social emotional learning as the foundation for further development in the areas of cognitive and academic learning and development. These results are also in line with similar studies measuring ECE center program effectiveness on child level outcomes, which all yielded small to medium effect sizes. For example, the 2010 Head Start Impact Study tracked and compared child outcome data of three and four-year old children's point of entry into an ECE center program through the spring of their first grade year. Head Start program effect sizes ranged from d = .09 to .35 in language, literacy, and pre-writing outcomes for three and four-year-old children. A more targeted Head Start intervention to impact student outcomes was the Research-based Developmentally Informed (REDI) program, which focused on developing children's language and emergent literacy, and social emotional skills. The REDI program effect sizes ranged from d = .28 to .40 in social emotional skills at the end of a one-year intervention period in PreK classes (Bierman, et. al., 2014). The Chicago School Readiness Project intervention study showed positive effect sizes of d = .34 and .63 for vocabulary, letter naming, and early mathematics skills, and effect sizes between d = .37 and .43 for emotional regulation subscales (Raver, et. al., 2011).

Limitations

The center level sample sizes for the current study were 11 centers in the BRSA impact study, 20 centers in the GOLD ELA study, and a range of 40 to 42 centers in the GOLD Social Emotional, Language, Cognitive, Literacy, and Mathematics impact studies. Based on their simulation study, Maas and Hox (2005) suggest that a sample size of at least 100 group level units, (the center level in the current study), would be needed to obtain precise standard errors of model parameters when using maximum likelihood estimation. When there are 30 to 50 group level units, regression coefficients used to calculate effect sizes are unbiased, but the standard errors of the variance components may be low. Thus, the results obtained in the current study may be moderately biased due to the small number of center level units.

Chapter 8 Summary

The HLM analyses measuring the PDI effect for both one-year and two-year child cohorts (N=1,162) was based on a pre-post test analysis design which measured the children's developmental scores at the end of the intervention period accounting for baseline measures. The results for the GOLD domain measures, the English Language Acquisition subscale, and for the Bracken School Readiness Assessment indicate there were no significant intervention effects for the PDI model. However, a comparative time-series analysis using HLM longitudinal modeling for a subgroup of children who were in PDI centers for the full two-year intervention period (n = 358) yielded a statistically significant PDI effect in the children's average growth rates in social emotional learning and development with a medium effect size, and a near significant positive effect on children's language development. Close examination of the growth trends indicated that the PDI had a positive impact on closing the gap in intervention and comparison children's social emotional learning and development over the full two-year intervention period.

Chapter 9 Conclusions and Recommendations

This evaluation study employed a mixed methods design to investigate both the implementation feasibility and the developmental impacts of the Ounce's Professional Development Initiative (PDI) for leaders, teachers, and children over a three-year period in four early childhood centers located in high needs urban communities. The evidence presented in this report warrants the conclusion that the intervention centers were able to adopt and begin to internalize the routines of collaboration entailed in the Ounce's core PDI design. When considering all the work involved in re-organizing a center to support a concerted program of job-embedded PD, the ability to meet fidelity for the majority of the indicators is an impressive outcome of the implementation study. Furthermore, the PDI development project occurred in a period of accelerated change and some anxiety in the professional lives of Chicago's early childhood workforce. While Illinois was reorganizing its entire ECE Quality Rating and Improvement System during the implementation period, for example, Chicago Head Start centers were facing the challenge of restructuring to meet the practice requirements of "continuity of care." Meeting fidelity of implementation under these circumstances suggests that implementing high quality job-embedded PD is feasible in community-based early childhood centers facing significant constraints around human, social, and professional capital. It is also striking that the leaders and teachers within the four PDI intervention centers remained willing and able to overcome the many challenges that arise with intensive, job-embedded PD across the full span of the initiative.

Our study also surfaced evidence that both leaders and teachers did experience and begin to consolidate the transformations in attitudes, understanding, and practice intended by the PDI design. In the case of leaders, we found that the PDI learning cycles supported directors and supervisors to critically examine their current leadership conceptions as well as seriously grapple with more complex frames for understanding leadership practice. Indeed, the struggles that leaders expressed in our interviews and KWLHs paralleled closely the patterns of experience and change that research into instructional leadership development in K-12 settings also reports (e.g. Spillane, 2006; Donaldson, 2008). This includes the struggle to expand narrow "transactional" leadership identities – paradigms of exchange and reciprocity - to include the more inclusive and ambitious mindsets associated with collaborative and "transformational" leadership (Leithwood, Jantzi & Steinbach, 1999). Thus our study supports the view that ECE leadership development bears close affinity to leadership development in other educational domains, and has much to teach about general leadership challenges in education. This should not obscure the very real and distinctive features of community-based early childhood centers as settings for leader learning, along with the distinctive characteristics of ECE leaders and the roles they fill (Rohacek et al, 2012).

In the case of teachers, we found that the PDI routines for collaboration did help the teachers advance their knowledge, skills, and dispositions related to social emotional learning and development aligned to the CLASS and GOLD Learning Objectives Frameworks. In fact, these collaborative efforts grounded in content targeted to the children's social emotional development had the unanticipated benefit of developing dispositions of trust among the teachers themselves. As such, the teachers reconstructed their pedagogical narrative to be more aware of how they also require an emotionally responsive climate in order to advance their own professional practice. In addition, the PDI was particularly effective in shaping the teachers' pedagogical narrative to be more "intentional" (Epstein, 2007). The teachers' ability to plan

instructional experiences and reflect on their practice with increased intention shows great promise of having impact on children because "it is deliberate, focused on observing and listening to children, and a way of thinking that is both analytical and emotional" (Lewin-Benham, 2015, p. 3). The majority of the teachers concluded their engagement with the PDI prepared to sustain their readiness to commit to their newly formed professional identity, one that sees the power of collaboration and intentionality.

While small sample sizes at the center and classroom levels were a constraint on the range of our impact analyses, the study yielded preliminary evidence that distinguished the impacts of PDI on different categories of teacher and student outcomes. On the one hand, the data suggest a positive association between the transformation of leader-to-teacher relationships – the "parallel process" discussed in Chapter 6 – and improvements in the socio-affective features of teacher-to-teacher and teacher-to-student relationships over the course of the PDI intervention, as reported in Chapter 7. In turn, while there is no direct evidence from our study, it is plausible to propose that improvements in the socio-affective features of adult relationships in the PDI intervention centers were associated with stronger social and emotional growth among intervention students with two years of sustained exposure to their teachers' intensified PD, as reported in Chapter 8. We propose this association based on the strong emphasis of the PDI on the concurrent reconstruction of adult-to-adult and adult-to-student relationships, along with a body of literature supporting the link between student social-emotional development and the affective qualities of the early childhood setting (Howes, Hamre & Pianta, 2012; Collaborative or Academic, Social, and Emotional Learning, 2013). More granular, case-level analyses incorporating information about teacher, supervisor, and student dosage will be necessary to explore and validate these proposed linkages within our current PDI datasets.

Why then did we not see statistically significant student outcomes on the more academically specific areas of child development (as measured by the GOLD assessment), in areas like literacy, math, and general cognitive skills? At least two factors may have contributed to non-significant findings in these domains. First, and unlike other i3 early childhood projects, the PDI was not focused specifically on delivering curricular knowledge to teachers in any academic domain. Instead the PDI focused on broader pedagogical content knowledge and skills, particularly as codified in the CLASS assessment system, that serve as foundational principles and practices for delivering any category of academic content. Arguably an exception is the "Language Modeling" dimension of the CLASS Instructional Supports domain which does focus on helping students extend and elaborate their use of language elements. Attention to this dimension may be associated with the positive trend (approaching significance) that we noted in the area of students' language development.

Second, concepts such as "Ambitious Instruction" (the 5 Essential Support Frame) and "Instructional Supports" (the Toddler and PreK CLASS) were introduced for full discussion among leaders and teachers several months after the introduction of socio-affective features. In addition, the concept of Ambitious Instruction proved more complex to make sense of and implement for coaches, leaders, and teachers than did the more familiar and accessible concepts of positive emotional climate and emotional supports for learning. What does "ambitious" mean in relation to careful and respectful interactions with young children – a "child-centered" pedagogy? What does "instruction" mean in relation to following the child's lead, or valuing the contributions of play to a child's growth and learning? These were pressing questions for several coaches and their coachees throughout most of the project. Our body of evidence suggests that

re-conceptualizing early childhood teaching as "ambitious instruction" required more collaborative time than was true for "emotional supports," and thus had less time to impact the academic growth of students within the intervention centers. Given that PDI is a framework for professional learning that could easily accommodate academic-specific content within its cycles of inquiry, we believe that further research is warranted to investigate the potential academic impacts of PDI-like inquiry cycles on content-specific domains of early childhood development.

Based on the body of evidence amassed over three years and our evaluation team's close acquaintance with the implementation process and the adjustments to the PDI design over time, we offer the following six recommendations for future implementations of the model.

1. ***Initiate PDI with Intensive Preparation of Center Leaders***. The PDI began with a strong commitment to the proposition that the improvement of ECE instruction is fundamentally a matter of organizational capacity, and not simply of the cumulative enhancement of individual teaching skills. This implied significant attention to the leadership capacity of centers, particularly in the domain of instructional leadership. The importance of leadership to accomplishing all elements of the PDI design became increasingly evident as the Initiative progressed. Given the considerable early adjustments in schedules, logistics, and mindsets asked of leaders by PDI, there was consensus among center directors that an intensive period of orientation and PD for center leaders prior to engaging teacher teams would have advanced the implementation of PDI with teachers, particularly in Year 1.

2. ***Prepare and Execute the Re-development of Reflective Supervision Among Direct Supervisors Earlier in the PDI Process.*** The sustainability of the PDI job-embedded PD cycles for teachers depended on a well scaffolded "hand off" of facilitative functions from the coach to direct supervisors, with sufficient time for those supervisors to gain confidence in JEPD practices. This transition did occur at all sites in the PDI pilot project, but was delayed both by the difficulty of exposing direct supervisors consistently to key practices, and to a lack of clear guidelines for coaches around how to scaffold and pace the transition. We recommend that clearer protocols for coaches and direct supervisors be developed to support an earlier and more sure-footed transition in future implementations.

3. ***Distinguish the content and functions of learning labs and reflective practice groups (RPGs) for leaders.*** The distinct formats and functions of learning labs and RPGs for teachers were distinguished clearly at an early point in the project. In the case of leaders, however, both learning labs and RPGs remained strongly focused on transmitting vital information to leaders, often using PowerPoint presentations, combined with large and small group discussion formats. Only in the last year of the project did leaders assume a more active role in setting RPG agendas and leading discussions around evidence sources linked directly to leader practice such as video. We recommend that leader RPGs shift more quickly into more active, reflective, and leader-initiated patterns in future implementations in order to elevate the distinct and intended impacts of RPGs within the PDI design.

4. ***Don't underestimate the challenges of equipping coaches to facilitate comprehensive JEPD***. The Ounce designers anticipated several of the transformations in behavior and mindset that the PDI would require of coaches. In response they facilitated the regular convening of coaches in professional learning formats to involve them as active collaborators in developing training content and to reflect on problems

of practice in the field. Coaches generally affirmed the value of their professional learning community sessions. That said, and even with training in skill sets like Motivational Interviewing, considerable time was required to equip coaches with the lexicon and concepts of the 5 Essential Supports and (for some coaches) the CLASS. Coaches were also more accustomed to "supportive" than "challenging" modes of discourse with teachers, and were generally uncomfortable with coaching center directors. Similar to leaders, we recommend that reflective practice sessions for coaches develop clearer protocols to guide coach discussion of difficult problems of practice, making greater use of rich and direct evidence sources such as audio and video. When these evidence sources were used in coaching conversations during the PDI pilot they evinced considerable promise for shifting coach mindsets and skill sets.

5. ***Don't underestimate the experience of "overwhelm" in the first phase of comprehensive JEPD***. The evaluation produced encouraging findings indicating that community-based ECE teachers and leaders in Head Start settings have both the capacity and willingness to grapple with complex developmental concepts, and will translate these concepts into improved practice when scaffolded skillfully. This willingness did not prevent leaders and teachers from experiencing significant stress and fatigue early in the project as the intensity of the PDI curriculum and the frequent presence of coaches as observers became evident. While this "overwhelm" should be addressed wherever possible through design adjustments as recommended here, we believe that some level of early stress is endemic to the PDI's ambitious transformational agenda. Because the evaluation provides evidence that the phase of stress does give way to professional growth and confidence, we recommend that leaders and teachers be more effectively oriented to what to expect from the change process at the outset of this approach to JEPD.

6. ***Permit greater flexibility in the scheduling of coaching sessions to moderate the physical presence of coaches and maximize the impact of coach observations***. The evaluation documented the development of generally warm and professionally productive relationships between coaches and teachers at all four intervention centers. Teachers grew attached to their coaches in productive ways and looked forward to PD sessions. However, teachers also were critical when coaching schedules separated the days for varied functions such as lesson planning, observation sessions, and reflective feedback. This approach to scheduling created the feeling for many teachers that the coaches were a ubiquitous presence, while reducing the benefits of rapid feedback to on-site observations. We therefore recommend that coaching schedules be aligned to teacher schedules in ways that link varied coaching functions as closely as possible in time, both to maximize coaching benefits and reduce the press on teachers associated with the presence of coaches.

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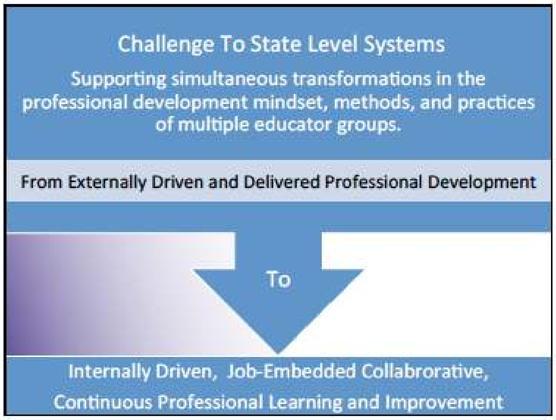
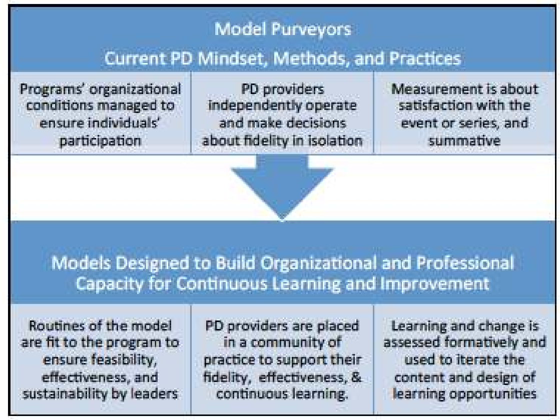
Appendix 1A Selected Data Collection Protocols and Instruments (See Companion Volume)

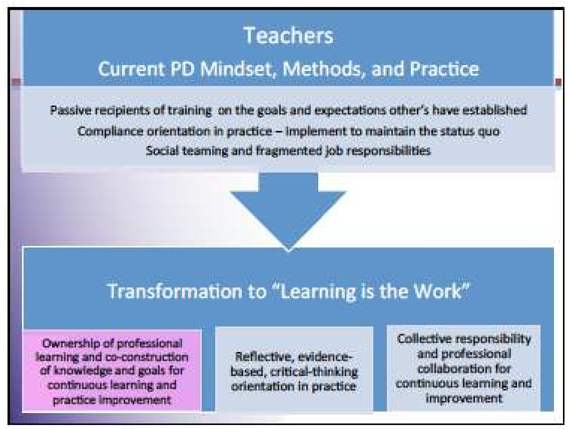
Appendix 2A: Ounce of Prevention Fund – Investing in Innovation Professional Development Initiative - Teacher and Leader Learning Objectives

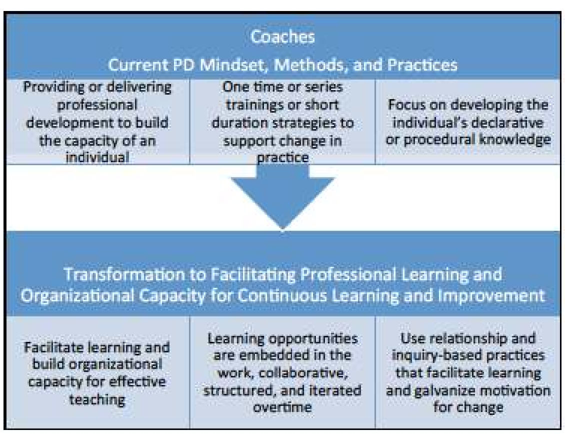
Ounce of Prevention Fund – Investing in Innovation Professional Development Initiative - Teacher and Leader Learning Objectives	
Knowledge, Skills, & Dispositions *Teachers will*:	Knowledge, Skills, & Dispositions *Leaders will:*
1) Understand the *developmental trajectories and learning concepts* in the Illinois Early Learning and Development standards (IELD)/GOLD objectives, how they develop in children, and how to use the trajectories to identify goals for children's learning.	1) Understand *the Five Essentials Supports Framework* and how instructional leadership and strong organizational conditions are essential to promoting professional capacity, teaching effectiveness, continuous improvement, and children's learning, development, and kindergarten readiness.
2) Use *formative assessment* tools and process (GOLD Online) to observe children's learning and development, make sense of children's learning and development progress towards the standards, and identify individualized learning and development needs and goals.	2) Use *Inclusive Leadership* practices to cultivate a shared vision of excellent practice and quality improvement; build relational trust and collective responsibility for teaching effectiveness and children's learning; structure teachers' opportunities to influence policies and guidance systems impacting their daily work; and facilitate job-embedded routines for teachers' professional collaboration, learning, and planning for improvement.
3) Understand and be able to identify *high-impact teaching practices* that provide children with emotionally supportive, organized, and instructionally meaningful interactions (CLASS) that promote children's development and learning toward the standards (IELD's/GOLD) and kindergarten readiness.	3) Demonstrate increased skill implementing systems and practices aligned to the *Five Essentials Framework* to support teaching effectiveness, with emphasis on building a coherent instructional guidance and support system that includes direct supervisor facilitation of job-embedded professional development routines (i.e., weekly lesson planning, monthly observation and feedback, and monthly reflective practice groups with teachers).
4) Use the *Focused Teaching Cycle* lesson planning protocol and weekly discussion guide to reflect, think critically, and intentionally plan ambitious interactions and instruction for children that is, standards-aligned, parent- and data-informed, and identifies the specific high-impact teaching practices the team will implement to facilitate children's learning.	4) Demonstrate increased skill using the *Inclusive Inquiry Exploration and Decision-Making Cycle* to think critically and collaboratively with staff to problem-solve economic, philosophical, pedagogical, and logistical barriers that arise persistently and that impacting practice effectiveness.
5) Use the *Observe-Reflect-Respond* pattern to support deliberate and consistent implementation of high-impact emotionally supportive, organized and instructionally meaningful interactions (CLASS) throughout each day that promote children's engagement and progress towards the standards (IELD's/GOLD) and kindergarten readiness.	5) Report a greater sense of confidence and coherent "mental models" of the *Five Essentials Framework, the Inclusive Inquiry and Decision-Making Cycle, and job-embedded professional learning approaches* to make informed decisions about program policies and systems of continuous improvement.
6) Report a greater sense of confidence and coherent "mental models" of the *Focused Teaching Cycle and Observe-Reflect-Respond* pattern for critical thinking and decision-making during instructional planning, teacher-child interactions and instruction, and collaborative learning opportunities with peers.	
As a Result of Improved Organizational Conditions and Effective Leading and Teaching, Children Will: Demonstrate improved learning, development, and kindergarten readiness.	

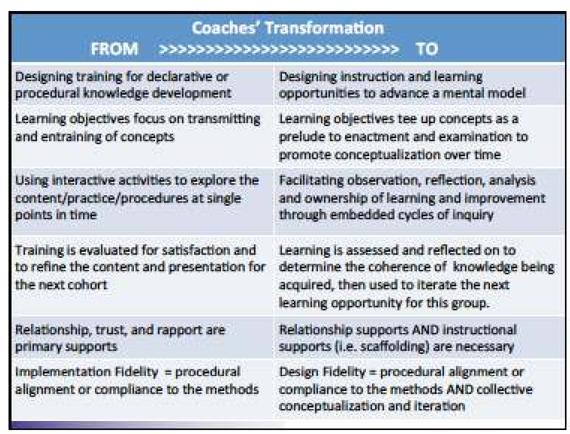
Appendix 2B: PDI Theories of Participant Transformations



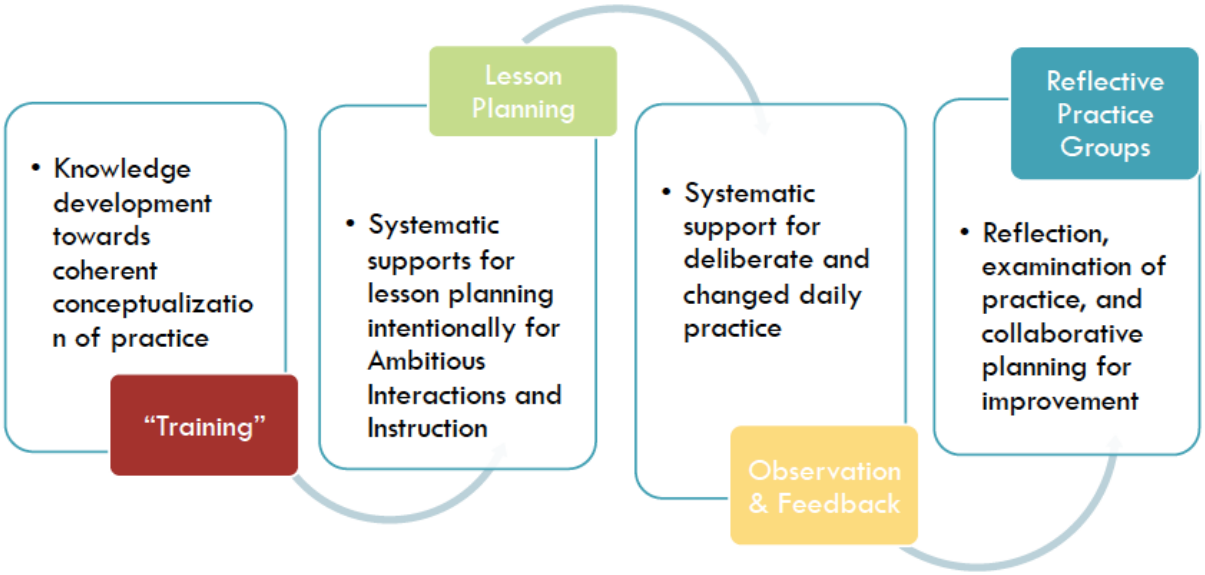








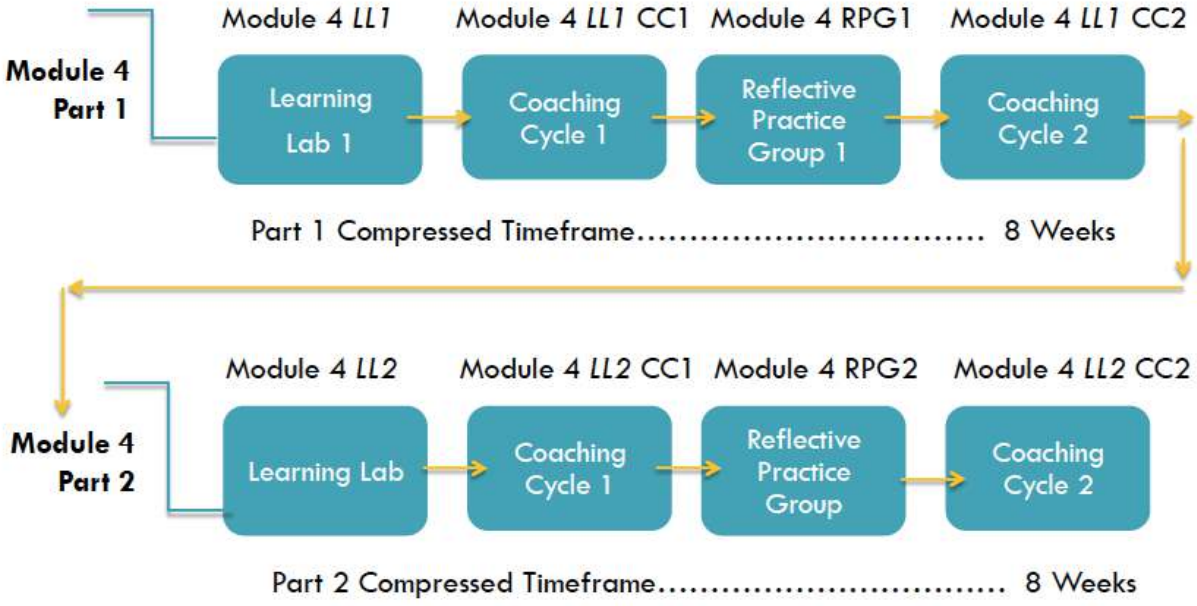
Appendix 2C: Full Implementation of the Teacher Learning Cycle Following Initial Adaptation



Professional Development Initiative (PDI) Contexts for Learning by Module

One Module consists of Two Parts in a Compressed Timeframe..... 16 Weeks

The content of the Learning Lab (LL) is linked to its corresponding part in the Module.
For example, the content of LL1 is put into practice and reflected on through all of part 1 and the content of LL2 is put into practice and reflected on through all of part 2.



Appendix 3A: Pools of Comparison Centers Matched to Each of Five PDI Sites Based Upon Spring 2012 Demographic and Organizational Characteristics: Center1, Center2 & Center3

PDI Center	Enrolled	% Black	% Latino	% Asian	% White	% Female	% IFSP	% IEP	% FRL	% ELL
Center1	**296.0**	**98.3**	**1.7**	**0.0**	**0.0**	**48.6**	**0.0**	**11.8**	**99.3**	**0.3**
Center1 Comps	**207.8**	**94.3**	**3.3**	**0.2**	**0.4**	**49.0**	**1.7**	**6.0**	**72.6**	**3.6**
Center1.1	232.0	99.6	0.0	0.0	0.0	49.1	3.9	3.0	72.4	0.0
Center1.2	127.0	98.4	0.0	0.0	1.6	57.5	3.1	3.1	55.1	2.4
Center1.3	362.0	75.4	11.6	2.2	1.7	52.2	3.6	8.0	51.4	24.9
Center1.4	340.0	80.6	14.7	0.0	0.3	49.4	1.2	4.7	99.1	8.8
Center1.5	247.0	97.2	0.8	0.0	0.8	45.7	0.0	6.1	74.5	0.0
Center1.6	155.0	99.4	0.0	0.0	0.0	48.4	1.9	5.8	77.4	0.0
Center1.7	224.0	95.5	2.2	0.0	0.0	46.4	0.0	4.9	17.4	0.0
Center1.8	136.0	100.0	0.0	0.0	0.0	46.3	1.5	10.3	90.4	0.0
Center1.9	133.0	100.0	0.0	0.0	0.0	50.4	1.5	9.8	98.5	0.0
Center1.10	122.0	96.7	3.3	0.0	0.0	44.3	0.0	4.1	90.2	0.0
Center2	**367.0**	**43.9**	**53.1**	**1.4**	**0.8**	**51.5**	**2.7**	**2.7**	**86.4**	**59.7**
Center2 Comps	**113.0**	**55.6**	**33.0**	**1.2**	**3.5**	**49.9**	**0.0**	**3.8**	**79.2**	**24.4**
Center2.1	85.0	45.9	42.4	1.2	1.2	49.4	0.0	7.1	90.6	42.4
Center2.2	139.0	47.5	28.8	0.0	11.5	46.0	0.0	2.9	56.8	5.0
Center2.3	105.0	29.5	52.4	4.8	3.8	55.2	0.0	2.9	81.9	46.7
Center2.4	117.0	75.2	24.8	0.0	0.0	46.2	0.0	5.1	74.4	20.5
Center2.5	119.0	79.8	16.8	0.0	0.8	52.9	0.0	0.8	92.4	7.6
Center3	**294.0**	**87.4**	**0.0**	**2.7**	**4.1**	**55.1**	**0.0**	**0.7**	**15.0**	**13.9**
Center3 Comps	**114.2**	**87.6**	**2.1**	**0.1**	**0.4**	**51.7**	**1.3**	**5.2**	**70.3**	**1.9**
Center3.1	90.0	91.1	6.7	0.0	1.1	55.6	2.2	2.2	96.7	5.6
Center3.2	54.0	100.0	0.0	0.0	0.0	42.6	0.0	3.7	61.1	0.0
Center3.3	86.0	10.0	0.0	0.0	0.0	50.0	9.3	5.8	69.8	0.0
Center3.4	408.0	98.0	0.0	0.0	0.0	47.8	1.2	3.9	34.8	1.2
Center3.5	87.0	95.4	1.1	0.0	0.0	59.8	0.0	2.3	16.1	0.0
Center3.6	42.0	97.6	0.0	0.0	2.4	47.6	0.0	9.5	59.5	0.0
Center3.7	27.0	100.0	0.0	0.0	0.0	59.3	0.0	7.4	100.0	0.0
Center3.8	152.0	85.5	13.2	0.7	0.0	49.3	0.0	6.6	86.8	12.5
Center3.9	98.0	98.0	0.0	0.0	0.0	48.0	0.0	3.1	85.7	0.0
Center3.10	98.0	100.0	0.0	0.0	0.0	57.1	0.0	7.1	92.9	0.0

APPENDIX 3B: Pools of Comparison Centers Matched to Each of Five PDI Sites Based Upon Spring 2012 Demographic and Organizational Characteristics: Center4A & Center4B

PDI Center	Enrolled	% Black	% Latino	% Asian	% White	% Female	% IFSP	% IEP	% FRL	% ELL
Center4A	**111.0**	**88.3**	**4.5**	**0.0**	**0.0**	**39.6**	**0.0**	**2.7**	**94.6**	**3.6**
Center4A Comps	**133.8**	**82.4**	**12.6**	**0.4**	**0.7**	**49.4**	**0.9**	**3.1**	**41.6**	**6.1**
Center4A.1	109.0	86.2	11.0	0.9	0.9	48.6	3.7	0.9	30.3	5.5
Center4A.2	113.0	73.5	22.1	0.0	0.0	47.8	0.0	3.5	0.9	5.3
Center4A.3	133.0	97.0	2.3	0.0	0.0	51.9	0.0	2.3	79.7	0.8
Center4A.4	180.0	72.8	15.0	0.6	1.7	49.4	0.0	5.6	55.6	12.8
Center4B	**105.0**	**30.5**	**65.7**	**0.0**	**0.0**	**40.0**	**1.0**	**8.6**	**94.3**	**33.3**
Center4B Comps	**94.6**	**18.3**	**68.1**	**0.0**	**7.3**	**51.9**	**1.5**	**3.1**	**42.7**	**29.1**
Center4B.1	112.0	15.2	82.1	0.0	1.8	50.0	0.0	3.6	23.2	31.3
Center4B.2	65.0	12.3	75.4	0.0	10.8	52.3	6.2	0.0	32.3	3.1
Center4B.3	89.0	11.2	60.7	0.0	13.5	56.2	1.1	3.4	42.7	29.2
Center4B.4	142.0	28.2	57.7	0.0	5.6	50.0	0.0	5.6	61.3	23.2
Center4B.5	65.0	24.6	64.6	0.0	4.6	50.8	0.0	3.1	53.8	58.5

APPENDIX 4A: Selected Characteristics of the Four Host Chicago Neighborhoods for the PDI Intervention Sites, Compared with City of Chicago.

PDI Intervention Center	**Center1**	**Center2**	**Center3**	**Center4**	**City of**
Chicago Host Community >>>	**West Englewood**	**Rogers Park**	**Near South Side**	**Ashburn**	**Chicago**
[1]Demographics (Total Population>>>)	34,632	57,165	21,042	42,821	2,706,101
% White	1.0	39.0	49.3	15.9	32.2
% Hispanic	2.8	24.8	6.0	34.3	28.7
% African American	94.8	27.0	24.1	48.9	31.9
% Other Race	1.3	9.1	20.6	0.9	5.7
% Population Change	-27.5	-15.4	55.5	3.6	-6.9
Median Age	32.4	32.7	35.0	35.2	33.3
[1]Housing and Amenities					
Average Household Size	3.4	2.3	1.7	3.3	2.6
% Renter Occupied Units	54.2	71.9	51.4	13.8	54.7
% Vacant Housing Units	24.4	13.4	15.2	4.3	13.8
% Single Family Units	52.8	7.9	13.13	89.3	29.1
% Built 2000 or Later	3.0	4.3	63.6	1.7	8.6
Median Number of Rooms	6.2	4.5	3.8	6.5	4.8
Park Acreage Per 1000 Residents	1.8	1.1	34.8	6.5	3.9
[1]Education and Employment					
% High School Diploma or Higher	74.0	82.5	93.1	82.7	81.1
% Bachelor's Degree or Higher	6.9	40.8	69.8	19.8	34.2
Median Income	$26,436	$39,440	$73,763	$67,286	$47,270
% In Labor Force, Employed	62.9	90.0	94.7	87.4	86.4
% Not in Labor Force	45.8	29.8	18.7	34.2	33.7
% Driving Alone to Work	48.4	38.9	47.4	75.0	52.6
% Using Public Transit to Work	35.8	42.2	30.8	11.6	27.9
Avg. Annual Vehicle Miles Per Household	9,811	8,041	9,031	17,792	10,530
[2]Chicago Hardship Index	89/100	39/100	7/100	37/100	

1. Source: MetroSource Community Data Snapshot based on 2013 American Community Snapshot

2. Source: City of Chicago Data Portal: https://data.cityofchicago.org/Health-Human-Services/hardship-index/792q-4jtu

APPENDIX 4B: Selected Neighborhood Indicators for Census Tracts Surrounding the Four PDI Intervention Centers at PDI Baseline (2012). Primary Source: American Community Survey, 2008-2012.

	Center1	Center2	Center3	Center4	Chicago	U.S.
Chicago Neighborhood	**West Englewood**	**Rogers Park**	**Near South Loop**	**Ashburn**		
US Census Tract	6712	107.02	3301	7004.01		
Total Population 2012	1,189	5,789	15,740	6,256	2.702M	309.1 M
Social/Demographic Indicators						
% White (Alone, Not Hispanic)	0.8%	22.0%	47.0%	15.3%	32.0%	63.7%
% African American (Alone, Not Hispanic)	96.9%	21.4%	24.5%	54.8%	32.5%	12.2%
% Other (Not Hispanic Self-Identified)	4.5%	5.3%	24.6%	1.5%	8.3%	9.7%
% Hispanic/Latino (w all Race Combinations)	0.0%	52.7%	6.7%	29.1%	28.4%	16.4%
Median Age	31.2	29.9	35.0	33.9	33.1	37.2
% Children 5 Years and Under	7.9%	10.2%	5.8%	6.4%	6.9%	6.5%
% Married, Other than Separated	32.8%	36.6%	34.2%	41.7%	35.0%	49.2%
% Speaking Language Other than English	0.8%	62.6%	29.9%	24.7%	35.8%	20.5%
Economic & Housing Indicators						
Median Annual Income	$11,449	$20,542	$53,995	$30,842	$25,921	$26,564
Median Monthly Housing Cost	$1,107	$953	$1,903	$1,590	$1,121	$1,015
% Employed (16 Years and Older)	33.0%	70.9%	76.1%	63.1%	57.8%	58.2%
% Housing Units Renter Occupied	67.9%	64.3%	53.3%	10.7%	50.8%	32.7%
% In Workforce Using Primarily Public Transit	47.5%	27.1%	31.5%	10.5%	26.7%	5.0%
% With Daily Commute Exceeding 45 minutes	32.0%	29.3%	18.1%	33.1%	28.9%	15.6%
Poverty Indicators						
% Families w Children < 18 Below Poverty Line	25.3%	34.1%	15.5%	7.1%	26.8%	17.2%
% Families Using Food Stamps/SNAP	73.7%	53.4%	17.6%	57.4%	53.3%	56.1%
% Without Health Insurance	28.3%	35.9%	6.9%	14.1%	19.6%	14.9%

APPENDIX 4B: Selected Neighborhood Indicators for Census Tracts Surrounding the Four PDI Intervention Centers at PDI Baseline (2012). Primary Source: American Community Survey, 2008-2012.

	Center1	Center2	Center3	Center4	Chicago	U.S.
Chicago Neighborhood	**West Englewood**	**Rogers Park**	**Near South Loop**	**Ashburn**		
Education Indicators						
% Children Who are in Nursery/PreSchool	16.4%	5.3%	8.1%	4.7%	6.8%	6.1%
% Residents: High School Graduates or Higher	79.0%	66.4%	92.7%	88.1%	80.5%	85.7%
% Residents: Bachelor's Degrees or Higher	8.6%	33.6%	68.0%	22.6%	33.6%	28.5%

APPENDIX 4C: Selected Demographic and Educational Designations of Students Attending the Four PDI Intervention Centers at Baseline (Spring 2012), Compared with Chicago Head Start Levels (AY 2012)

	Center2 Rogers Park	Center3 Near South Loop	Center4A Ashburn	Center4B Ashburn	CDFSS Head Start Centers
Social/Demographic Indicators					
% Female	41.1%	65.0%	34.8%	35.7%	47.3%
% White	0.9%	5.0%	0.0%	0.0%	1.8%
% African American	36.6%	81.7%	78.3%	26.2%	50.6%
% Hispanic	57.1%	0.0%	13.0%	69.0%	41.5%
% Asian	0.0%	10.0%	0.0%	0.0%	2.5%
% Other/Unknown	5.4%	3.3%	8.7%	4.8%	3.5%
% English Primary Language	40.2%	96.7%	91.3%	45.2%	67.5%
% Spanish Primary Language	50.0%	0.0%	8.7%	52.4%	28.5%
Parental Status					
Two Parent Household	11.6%	5.0%	0.0%	7.1%	17.5%
Single Parent Household	87.5%	95.0%	91.3%	90.5%	78.4%
Dual Custody/Active Male Involved	0.0%	0.0%	0.0%	4.8%	0.9%
Grandparent is Primary Custodian	0.0%	0.0%	0.0%	0.0%	0.3%
Non-Related Guardian	0.0%	0.0%	4.2%	0.0%	1.2%
Foster Care or Group Home	0.0%	0.0%	0.0%	2.4%	0.9%
Family Characteristics					
Parent is Homeless	0.0%	0.0%	0.0%	0.0%	2.4%
Parent is Disabled	0.0%	0.0%	0.0%	0.0%	0.3%
Teen Parent	0.0%	0.0%	0.0%	0.0%	1.6%
Migrant Parent	0.0%	0.0%	0.0%	0.0%	0.1%
% Families with SSI	0.0%	0.0%	0.0%	0.0%	0.4%
% Families with TANF	0.0%	0.0%	0.0%	0.0%	0.2%
Educational Designations					
% Students with IEP	5.4%	0.0%	13.0%	16.7%	6.6%
% Students with IFSP	0.0%	0.0%	0.0%	0.0%	0.6%
% Students Identified as Homeless	0.0%	0.0%	0.0%	0.0%	2.4%
2012 Head Start Income Eligibility					
% Families Over-Income	1.8%	1.7%	21.7%	9.5%	7.9%.
% Families Under-Income 0% - 50%	71.4%	21.7%	43.5%	57.1%	42.5%
% Families Under-Income 51% +	26.8%	76.7%	34.8%	33.3%	49.6%

Source: Chicago Department of Family and Support Services, Child and Program Databases. Excludes CPS School-Based ECE and FSSH Home-Based Child Care. Total N = 19,292 Children.

APPENDIX 4D: Organizational Characteristics of 4 PDI Intervention Centers at Baseline (Spring 2012)

	Center1	**Center2**	**Center3**	**Center 4 (A,B)**
Type of Agency	**Not For Profit**	**For Profit**	**For Profit**	**For Profit**
Funding Sources				
Child Care Assistance	Y	Y	Y	Y
Head Start	Y	Y	Y	Y
Early Head Start	Y	N	N	N
PreSchool for All	Y	Y	Y	Y
Prevention Initiative	Y	Y	Y	Y
Private Pay/Tuition	N	Y	Y	Y
Center Characteristics: Overall				
Total Child Enrollment	196	151	128	105
Age Range Served	0-5	15ms-5	0-5	0-5
Total Classrooms	15	10	11	8
Total Staff	63	29	31	25
Total Supervising Staff	5	3	2	4
Total Staff Assigned to PDI	22 (35%)	13 (45%)	16 (52%)	20 (80%)
% Families Qualifying for FRL	100%	100%	95%	96%
Program Characteristics: Ages 0-3				
Number of Children Served	64	31	67	50
Total Number of Classrooms	8	4	7	5
Classrooms Assigned to PDI	3	3	2	5
Number of Teachers	21	8	16	10
Teachers Assigned to PDI	9	6	4	10
Number of Supervisors	2	1	1	2
Supervisors Assigned to PDI	2	1	1	2
Number of Family Specialists (FSS)	2	1	2	2
FSS Assigned to PDI	2	1	2	2
Program Characteristics: Ages 3-5				
Number of Children Served	132	120	47	55
Total Number of Classrooms	7	6	3	3
Classrooms Assigned to PDI	2	2	2	2
Number of Teachers	16	12	8	6
Teachers Assigned to PDI	5	4	5	4
Number of Supervisors	1	1	1	2
Supervisors Assigned to PDI	1	1	1	1
Number of Family Specialists (FSS)	4	0	0	0
FSS Assigned to PDI	2	0	0	0
Accreditation and Quality Ratings				
Time in Yrs as Head Start Grantee	37	1.5	8	6
Time in Yrs as Early HS Grantee	16	0	0	0
CPS Prevention Initiative Level	2 (out of 3)	3 (out of 3)	3 (out of 3)	2 (out of 3)
IL Quality Rating (QRS) Level	3 (out of 4)	4 (out of 4)	3 (out of 4)	1 (out of 4)
Path to IL QRS Rating	QRS	QRS	NAECY	QRS
NAECY Accreditation (Y/N)	Y	Y	Y	N
Prior Experience with PD Coaching	Y	Y	Y	Y

APPENDIX 4E: Comparing PDI Lead Teachers (N = 37) with National FACES 2013 Lead Teacher Sample: Selected Demographic and Educational indicators

Teacher Background	Percent of Lead Teachers	
Gender	PDI 2013	FACES 2013
Female	94.4	99.4
Male	4.8	0.6
Age		
18—29	19.0	19.7
30—39	31.7	29.9
40—49	21.4	25.1
50—59	16.7	19.6
60 or Older	9.5	5.7
Race/Ethnicity		
White, Non-Hispanic	7.9	44.8
African American, Non-Hispanic	73.0	31.5
Hispanic/Latino	7.9	18.8
American Indian or Alaska Native, Non-Hispanic	0.0	2.1
Asian or Pacific Islander, Non-Hispanic	0.8	1.4
Multi-Racial/Bi-Racial, Non-Hispanic	0.8	0.6
Other, Non-Hispanic	9.5	0.8
Years Teaching		
0 – 2 Years	55.2	20.0
3 – 4 Years	8.0	16.0
5 – 9 Years	19.2	25.5
10+ Years	17.6	38.5
Highest Level of Education		
High School Diploma or Equivalent or Less	2.4	7.1
Voc/tech diploma after high school	0.8	NA
Some College	15.9	12.0
Associate's Degree (AA)	34.9	34.7
Bachelor's Degree (BA)	20.6	34.9
Graduate or Professional Degree	25.4	11.3
Field of Study Includes Early Childhood Education	48.4	52.6
Enrolled in 6+ Early Childhood Education	88.9	87.8
Has a Teaching Certificate or License	61.2	39.4

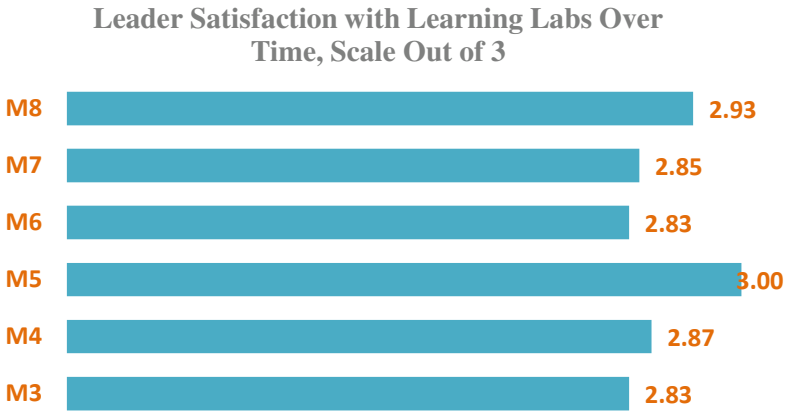
Source link: http://www.icpsr.umich.edu/icpsrweb/ICPSR/studies/284

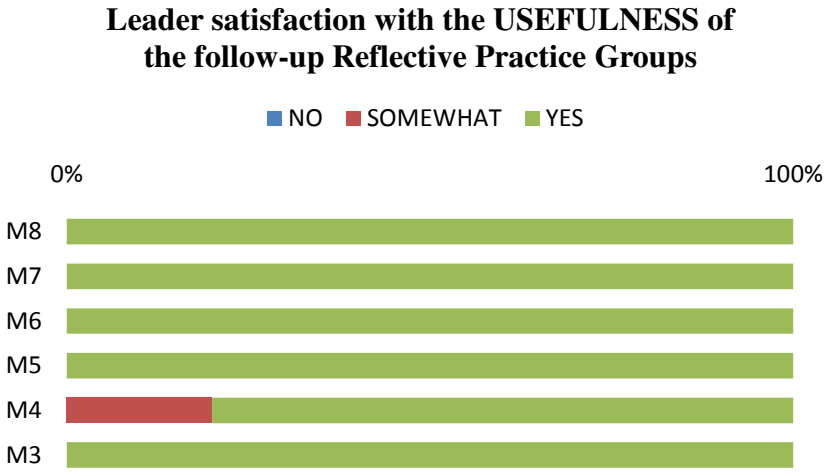
APPENDIX 5A: Description of Key Components and Indicators

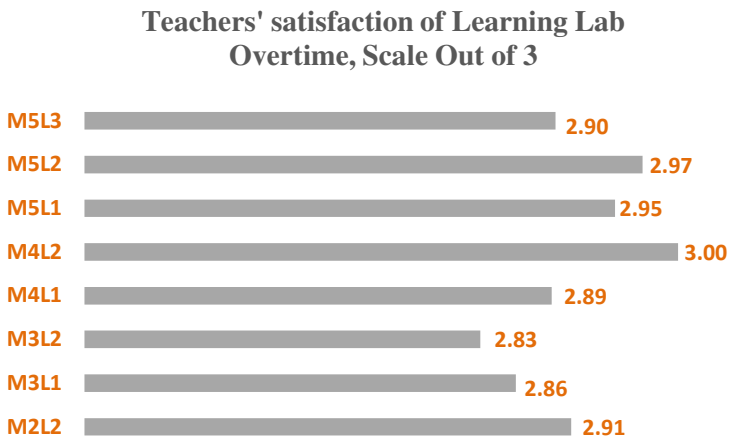
Planned Intervention Activity	List of Key Indicators For Each Key Component
Component 1: Coach Induction and Coach Community of Practice Implemented by the Sponsor Organization	**1. Coach Induction:** 119 hours of induction contexts for learning for coaches facilitated by the sponsor organization in the first six months of a coach's initiation in year 1 **2. Coach community of practice:** 181 hours of coach community of practice facilitated by the sponsor organization in years 2 and 3
Component 2: Professional Development Initiative Implementation	1. **PDI Implementation of the learning contexts for teachers annually**: 67.5 hours of embedded PDI contexts for learning for teaching teams are implemented by coaches per year. 2. **PDI Implementation of the learning contexts for teachers in a compressed timeframe**: 1 module consisting of 10 PDI contexts for learning for teaching teams are implemented by coaches every eight weeks. 3. **PDI Implementation of the learning contexts for Direct Supervisors annually**: 20 hours of embedded consultation contexts for direct supervisors are implemented by coaches per year 4. **PDI Implementation of the learning contexts for Direct Supervisors in a compressed timeframe**: 2 embedded consultation contexts for direct supervisors are implemented each month 5. **PDI Implementation of the learning contexts for Direct Supervisors and Center Leaders annually**: 22.5 hours of PDI contexts for learning for Direct Supervisors and Center Leaders are implemented by the sponsor organization per year 6. **PDI Implementation of the learning contexts for Direct Supervisors and Center Leaders in a compressed timeframe:** 1 module consisting of 2 PDI contexts for learning for center leaders and direct supervisors are implemented by the sponsor organization every eight weeks. 7. **PDI Implementation of the consultation contexts for learning for Center Leaders annually**: 10 hours of embedded consultation contexts for Center Leaders are implemented by PDI coaches per year 8. **PDI Implementation of the consultation contexts for learning for Center Leaders in a compressed timeframe**: 1 embedded consultation context for center leaders are implemented by coaches each month
Component 3: Coach Professional Development	1. **Coach attendance to the induction contexts for learning for coaches**: Coaches attend 119 hours of induction contexts for learning facilitated by the sponsor organization in the first six months of coach initiation. 2. **Coach attendance to the community of practice for coaches**: Coaches attend 181 hours of community of practice contexts for learning facilitated by the sponsor organization in years 2 and 3.
Component 4: Teacher Professional Development	1. **Teacher Attendance to the PDI contexts for learning per year**: Age-level classroom teachers attend 67.5 hours of embedded PDI contexts for learning facilitated by the coaches per year 2. **Teacher Advancement of Knowledge**: Age-level classroom teachers complete at least four of six sections of the formative assessment

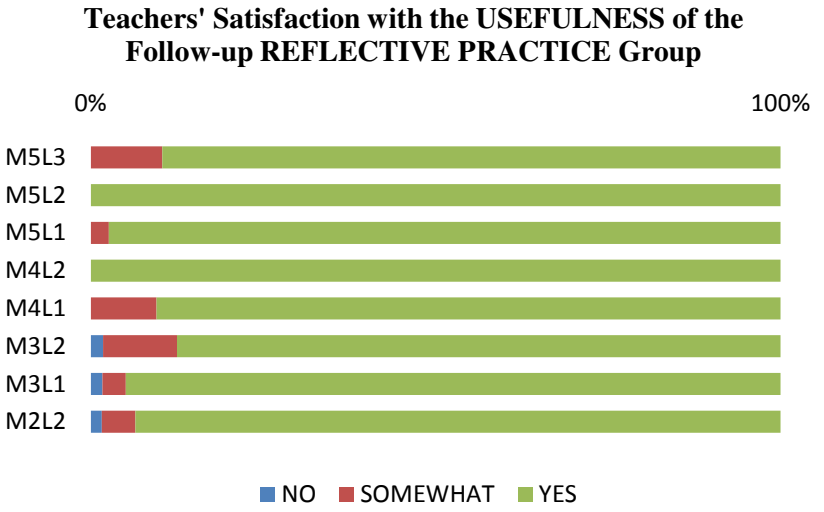
Planned Intervention Activity	List of Key Indicators For Each Key Component
Component 5: **Direct Supervisor Professional Development**	1. **Direct Supervisor Attendance to the PDI contexts for learning for Center Leaders per year**: Direct Supervisors attend 22.5 hours of PDI contexts for learning facilitated by the Sponsor Organization per year 2. **Direct Supervisor Attendance to embedded PDI contexts for learning for teachers Per Year**: Site Direct Supervisors attend 6 embedded PDI contexts for learning for teachers per eight-week cycle; DS must attend a complete coaching cycle for one teaching team 3. **Direct Supervisor Attendance to the consultation contexts for learning for Direct Supervisors**: Direct Supervisors attend 20 hours of embedded PDI consultation contexts for learning for Direct Supervisors facilitated by the coaches per year 4. **Direct Supervisor Advancement of Knowledge**: Direct Supervisors complete at least four of six sections of the formative assessment
Component 6: **Center Leader Professional Development**	1. **Leader Attendance to PDI Contexts for Learning for Center Leaders per Year**: Center Leaders attend 22.5 hours of PDI contexts for learning facilitated by the Sponsor Organization per year 2. **Leader Attendance to the consultation contexts for learning for Center Leaders**: Center Leaders attend 10 hours of embedded consultation contexts for Leaders facilitated by the coaches per year 3. **Center Leaders Advancement of Knowledge**: Center Leaders complete at least four of six sections of the formative assessment

APPENDIX 5B: Leader and Teacher Satisfaction with Learning Labs and Reflective Practice Groups

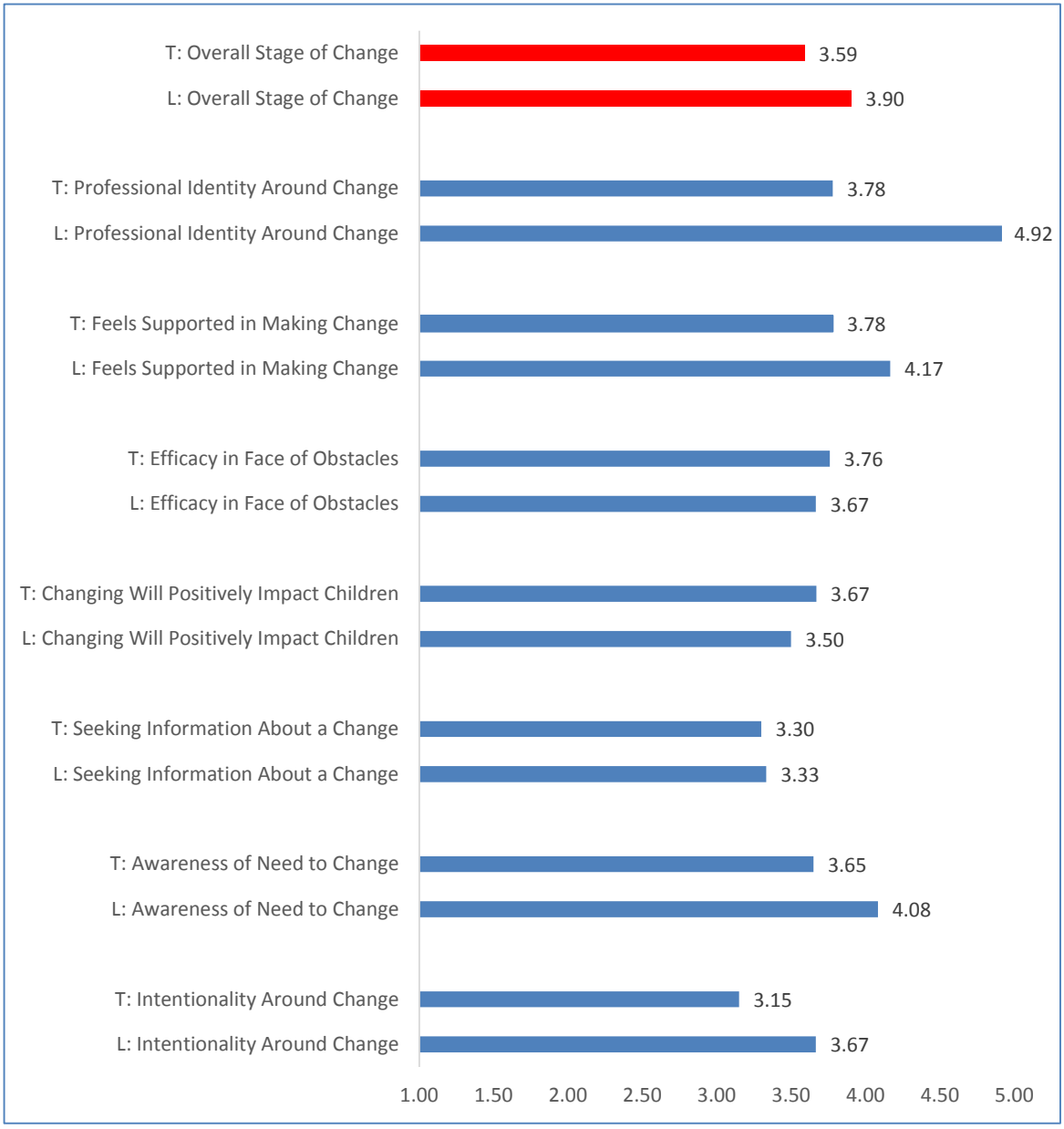




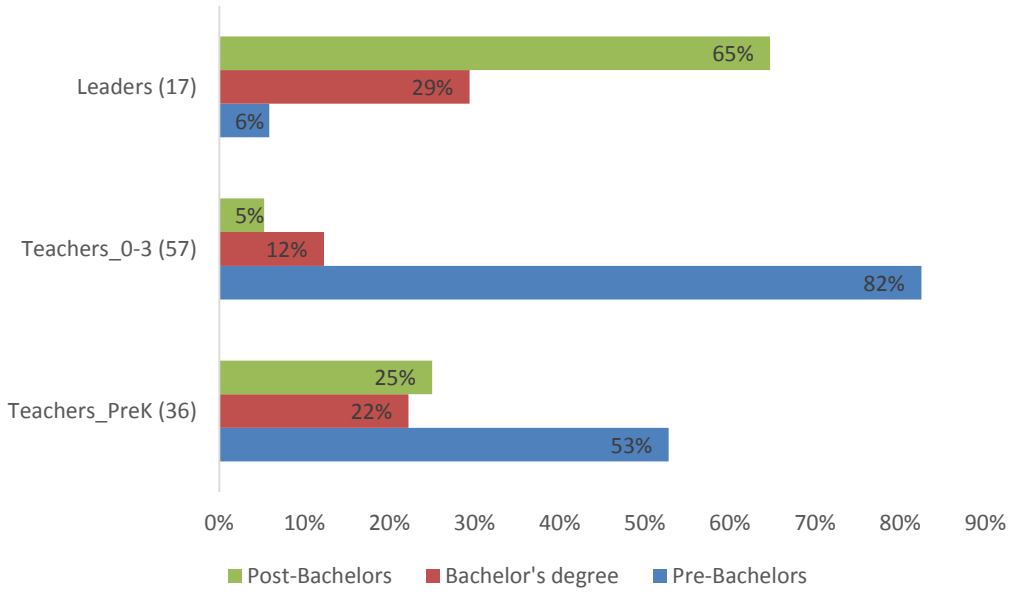




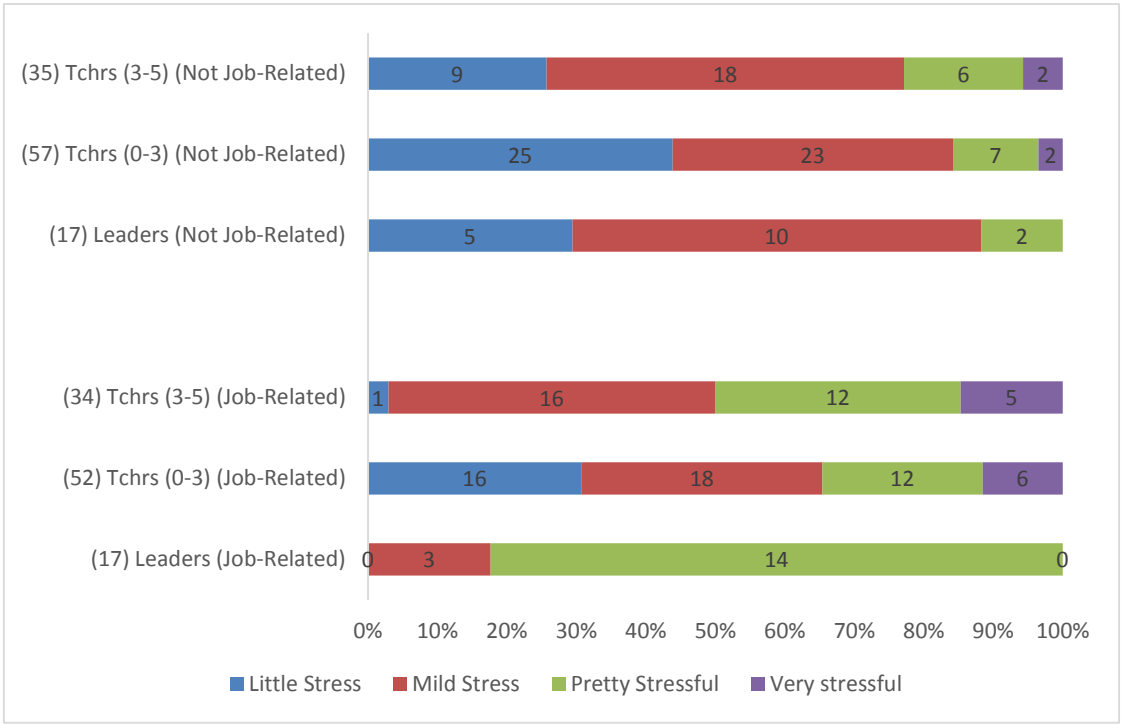
APPENDIX 6A: Mean Ratings on "Stages of Change" Metrics in Fall 2012 among 12 Leaders and 46 Teachers From Four PDI Centers



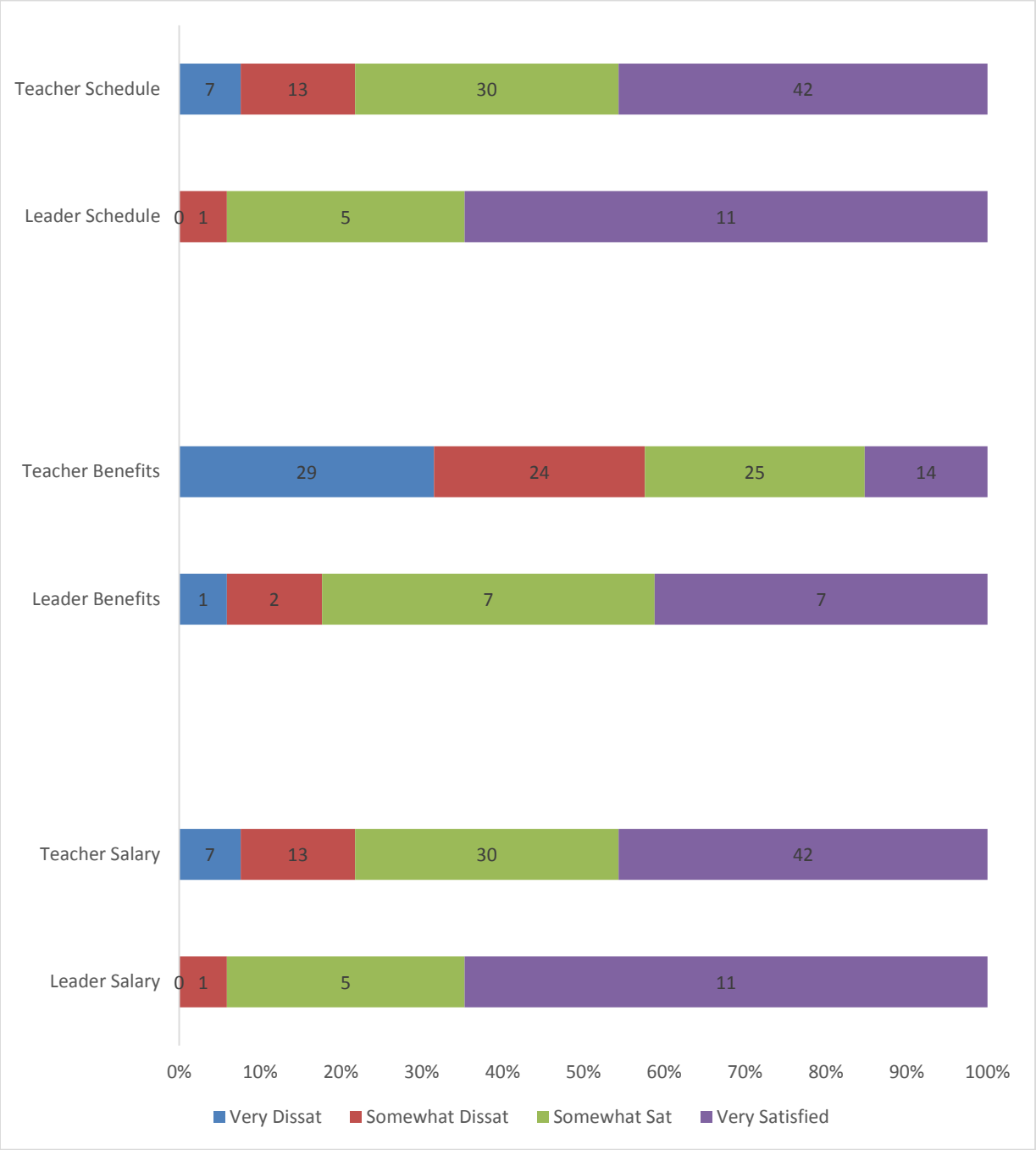
APPENDIX 6B: Educational Asymmetry: Comparing Percentages with Different Education Levels Among Teachers (Birth-3 and Pre-K) and Center Leaders/Administrators in 4 PDI Centers



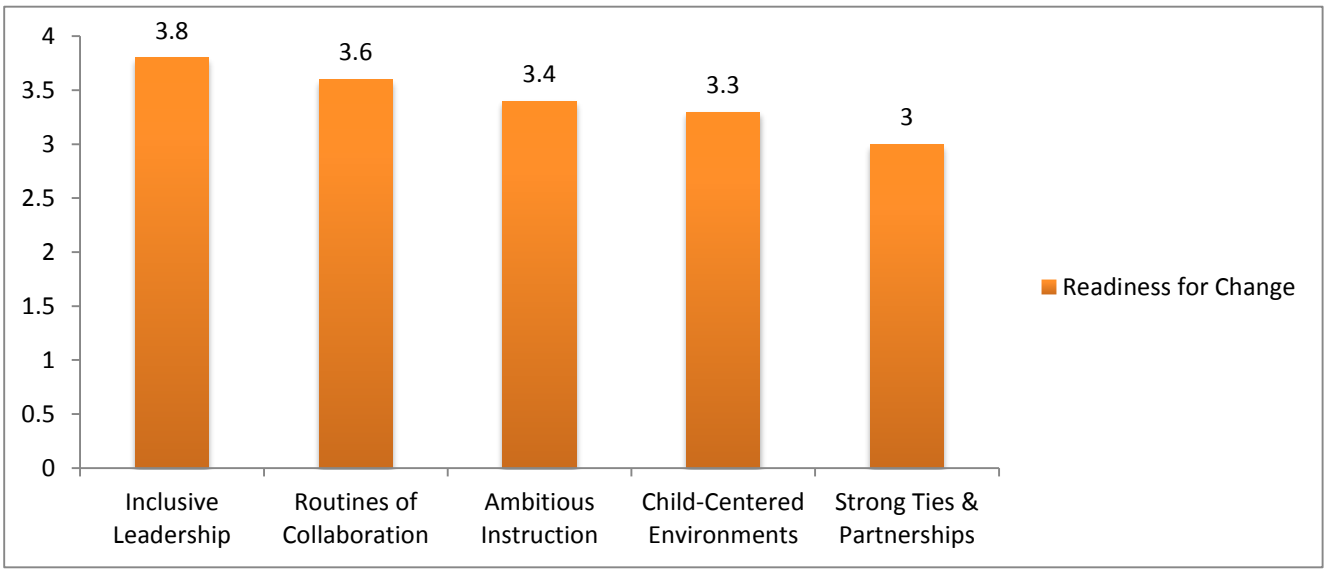
APPENDIX 6C: Comparing Perceived Stress (Job-Related and Non-Job-Related) Among PDI Center Teachers and Leaders



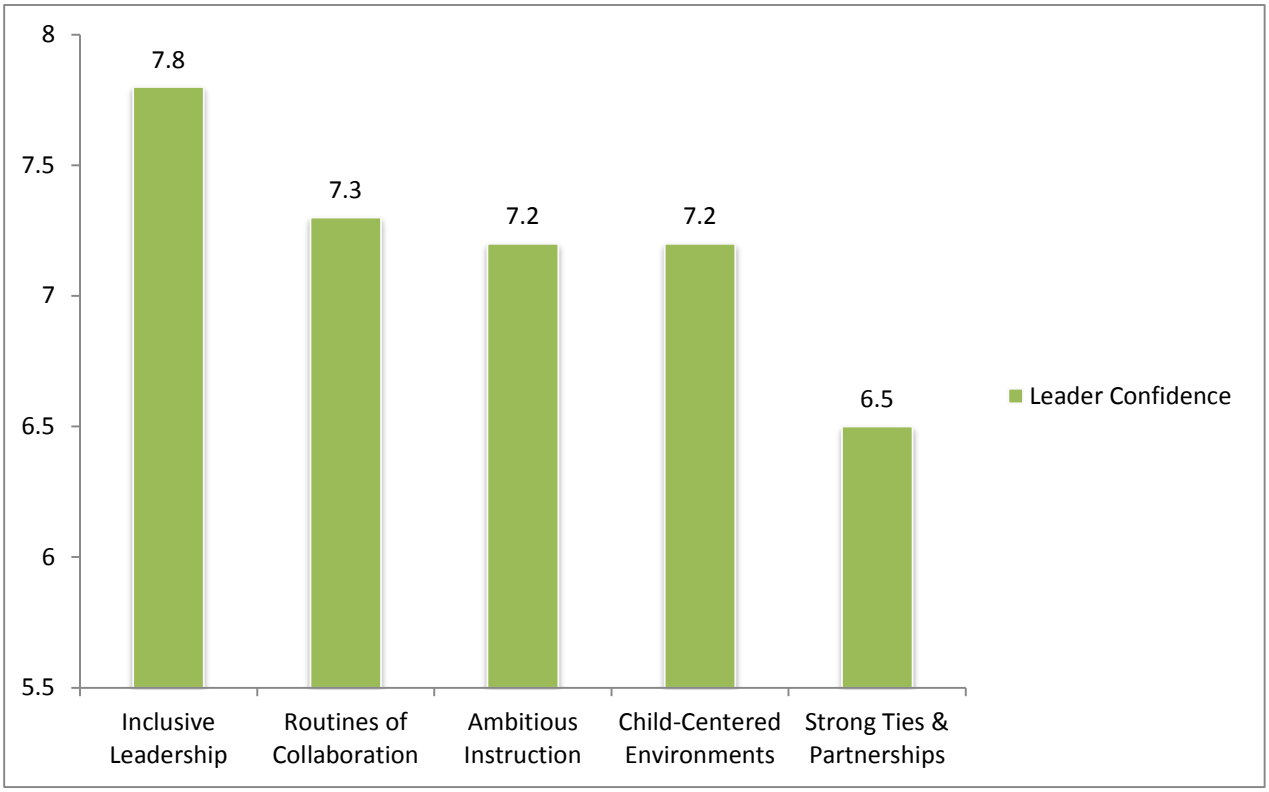
APPENDIX 6D: Levels of Satisfaction with Salary, Benefits, and Work Schedules of PDI Center Teachers (92) and Leaders (17) in Fall 2013



APPENDIX 6E: Leaders' Readiness to Make Changes to Strengthen the Five Essentials



APPENDIX 6F: Leaders' Confidence in Making and Sustaining Organizational and Leadership Changes to Strengthen the Five Essentials



APPENDIX 6G. Leader Formative Self-Assessment Data Leader Learning and Change towards the Five Essentials Framework

As Year 3 Progressed: Leader Growth Related to their Role and Systems in Supporting Ambitious Instruction
Focus 1 – Growing Confidence with Inclusive Leadership • "…it really helped me with my practice of being a supervisor and it took me from always giving directives and instructions, and do this and do that, or do it this way, do it that way, to changing my routine into begin asking them what do they think and including them in the decision making and coming up with strategies to improve certain things, on issues or concerns or even things that were not issue things like if we were planning events or things like that to ask them more so. So it's really bringing the staff's perspectives into play." {Center3, Direct Supervisor} • "I think I've learned to be more inclusive in that and not just have myself doing a lot of the program goals and all of that, but be more inclusive about having staff, the front liners who are actually in the classroom doing the work every day, be a part of those meetings. And the site managers and ed coordinators but before I think it was just more, oh, me trying to do a lot of things myself. I think because that's how I was trained in previous employment, that is what a leader does, they take charge and do everything….So I definitely have come you know to be flexible in my style of leadership and looking at the data really is a self-reflection on myself to say have I been a good leader and have my leader support me to help me be a good leader when we sometimes struggle with the same thing which is time management. It is so, there is just not enough time to be able to support the ground work, and now we know that it starts from the ground in order to get things to make sure it is happening." {Center1, Education Director} • "One of our coaches, she would ask... maybe in one of our meetings, 'well what do you think?' I think I developed a lot more of that. Well what do you think? Why ... instead of just saying what I thought…Yeah, it really is hard for someone who has always had a decision to kind of know where to head with the question. So just stop and say, ok let me have them handle that. It's better. It is much less stressful for me and that it is a unified effort and not just an individual decision." {Center3, Center Director}
Focus 2 – "Work in Progress" – using the Lens and Language of the CLASS for supervisory dialogue and feedback • "That's still a work in progress… looking at the CLASS and how I can apply it to how I relate to staff, ourselves ... how can we use that tool. So for me the positive climate, that was important for me to start with that one because after I made my transition to site manager I was not always so available. So looking at that positive climate, you know you have to have close proximity, right, so you know I decided that I'm going to leave the office, I have to go downstairs to the classrooms, upstairs to the classrooms to make sure I keep making those connections with teachers, cause that's the only way I'm going to build trust. First I got to do the relationship and then, you know, hopefully trust will come out of that, right. So, that's what I've been doing, I mean I still got a lot of work to do but I think that's more important to make sure that I keep those connections with staff and make sure that I concentrate on building relationships." • "I'm still in the beginning stages of using the CLASS language to supervise the teachers. I still have to step back, sometimes at the moment I have to do a 'me check' and walk away and then come back and approach it. But I think that is another thing of instead of being teacher sensitivity, it is still teacher sensitivity but from the directors point of view, of 'ok, don't say what I'm really thinking at this time because it might come out wrong. Let me come back and reflect and then maybe address the situation with the teachers.'"
Focus 3 – Embracing the need to build a System that Provides Teacher with Coherent Instructional Guidance and Supports through Embedded Routines for Collaboration • "I am fascinated with systems and how agencies utilize systems to have their center build professional capacity through routines of collaboration; the whole idea of protected time and the embedded time is something that we've come to value and we have really been working on." • "I see us providing supports by making sure they have planning time, like really protecting that for them and by us too being focused on the outcomes in an aggregate, but then also breaking it down by classrooms and helping them to be able to analyze it, and to use it into their planning." • "We were talking about teachers' professional development and theory of experience and so what that got me thinking about was, what type of experience are teachers getting at our center? I really began to

As Year 3 Progressed: Leader Growth Related to their Role and Systems in Supporting Ambitious Instruction
understand that it is our responsibility that teachers are learning and growing and that we have to lead that, we have to provide the structure for that in order for that to happen."
Focus 4 – Striving for Ambitious Instruction – breaking down silos and using protocols • **"**Most teachers are just putting themselves in an age range. I'm only a 15-month year old teacher, so I only know about 15 months. But really to get them thinking 0-5 approach, or 0-3 and 3-5, really looking at that holistic approach and so that's where we are trying to get on the next level just move the needle toward and really be an exemplary for ambitious instruction." • "Protocols are helping us strive toward ambitious instruction. All of our lesson planning meetings are in different classrooms with different topics, the thing that stays the same is the protocol, which amplified how important it is to plan for ambitious instruction."
Focus 5 – Shifting mindsets about PD • **"**I have always supported staff development, you know thinking about staff who wanted to go to conferences, or they want to go to a training. I had really even said to people sometimes going to these conferences is a waste of money because I don't see anything when they come back. And we've put, and in the past we've done things ... we've required people to come back and give a report, to do a presentation – this is what I learned, this is how I'm going to use it, all of those kind of things and it just kind of all ... just kind of goes away... but really understanding that to make it stick, it has got to be these embedded routines." • **"**We have to make sure that they have the right training for whatever their areas of growth are and just as they do individualize planning for the children, we have to do individualized planning for staff. Professional development I should say, is now individualized professional development within embedded routines."

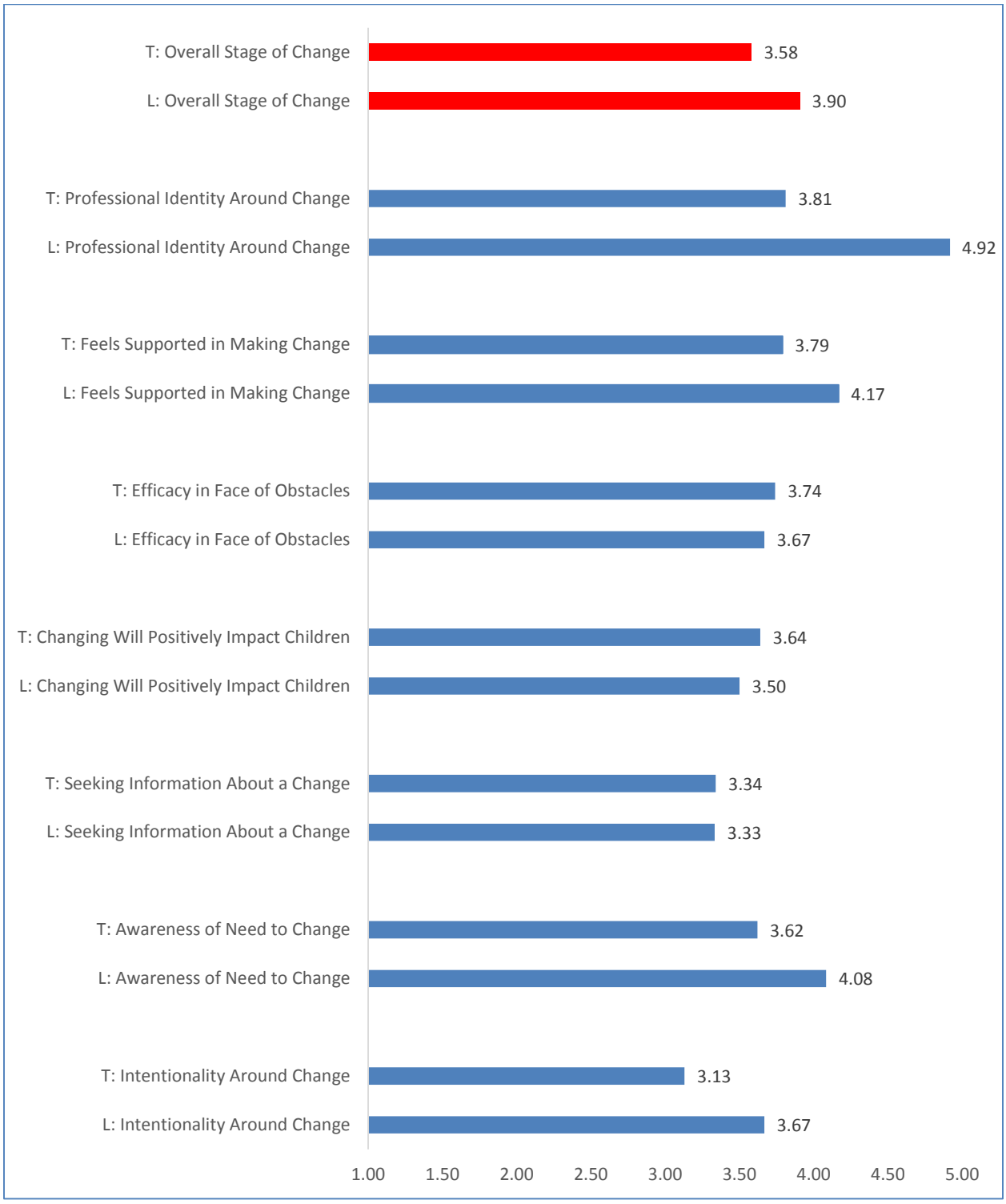
Appendix 6H: Comparing the Self-Assessments of 12 PDI Leaders (Directors and Supervisors) with Corresponding Independent Assessments by their Assigned PDI Coach Teams (4, 1-per-Center)

	Leaders 2014 Self-Assessments	Coaches Assess Leaders 2014	Difference: Coach v. Leaders
Center1 Mean	**4.1**	**4.3**	**0.2**
Director	4.6	4.0	-0.6
Director	4.6	4.9	0.3
Supervisor	4.1	4.7	0.6
Supervisor	3.1	3.7	0.6
Center2 Mean	**4.3**	**3.9**	**-0.4**
Director	4.3	3.7	-0.6
Supervisor	4.4	4.0	-0.4
Supervisor	4.1	3.9	-0.3
Center3 Mean	**4.4**	**4.4**	**-0.1**
Supervisor	4.3	4.6	0.3
Supervisor	4.6	4.1	-0.4
Center4 Mean	**4.1**	**3.6**	**-0.5**
Director	4.1	3.7	-0.4
Supervisor	4.3	3.4	-0.9
Supervisor	3.9	3.6	-0.3
Grand Means	**4.2**	**4.0**	**-0.2**

Stages of Change (SOC) Assessment: Correspondence of Stage of Change Levels with Average Score Ranges:	
1.0 – 1.4	1: Pre-contemplation
1.5 – 2.4	2: Contemplation
2.5 – 3.4	3: Preparation
3.5 – 4.4	4: Action
4.5 – 5.0	5: Maintenance

Source: Peterson, S. M., Baker, A., & Weber, M. (March, 2010). Stage of Change Scale for Early Education and Care 2.0 Professional Manual. Rochester, NY: Children's Institute Inc.

APPENDIX 6I: Mean Ratings on "Stages of Change" Metrics in Fall 2012 among 12 Leaders and 46 Teachers From Four PDI Centers



Appendix 7A: Comparison of Lead Teacher Characteristics by PDI and FACES

Teacher Background	PDI	FACES
GENDER		
Female	95%	99.4%
Male	5%	.6%
AGE		
18-29	19%	20%
30-39	32%	30%
40-49	21%	25%
50-59	18%	20%
60 or older	10%	5%
RACE/ETHNICITY		
White, Non-Hispanic	8%	45%
African American, Non-Hispanic	73%	32%
Hispanic/Latino	8%	19%
American Indian or Alaska Native, Non-Hispanic	0%	2%
Asian or Pacific Islander, Non-Hispanic	.8%	1.4%
Multi-Racial/Bi-Racial, Non-Hispanic	.8%	.6%
Other, Non-Hispanic	9.5%	.8%
YEARS TEACHING		
Less than 2 Years	55%	20%
3 – 4 Years	8%	16%
5 – 9 Years	19%	26%
More than 10 Years	18%	39%
HIGHEST LEVEL OF EDUCATION		
High School Diploma or Equivalent or Less	2%	7%
Voc/tech diploma after high school	.8%	n/a
Some College	16%	12%
Associate's Degree (AA)	35%	35%
Bachelor's Degree (BA)	21%	35%
Graduate or Professional Degree	25%	11%
FIELD OF STUDY		
Early Childhood Education	48%	53%
Enrolled in 6+ Hours of Early Childhood Education Courses	89%	88%
CERTIFICATION		
Has a Teaching Certificate or License	61%	39%

Appendix 7B: Representative Quotations of Reconstructing Teachers' Use of Standards and Child Progress Data for Individualization in Lesson Planning

Infant & Toddler Baseline	Infant & Toddler Time 2	Infant & Toddler Time 3
"Sometimes I do use standards and goals, sometimes I don't. I first do, like, activities that go along with the theme and then I make up the objectives. It's like the mail carrier, I didn't know what else to put on for the objectives. So I said well, they're using their fingers, it's fine motor." **"We are not required to do individualization so I leave it all blank."**	"Like now we think about "what is your goal, what are you trying to do?" The Objectives. We never used to fill that out. We were like well, were making like fun art, like making Santa Claus, making snowmen, making snowflakes. Now we look at the objectives. -like cognitive, physical, language, etc. Our coach showed us it is so much more than say just scribbling on a piece of paper. They are actually doing this objective and its cognitive development. They are thinking this way, they are doing this. Everybody was like, wow. It's actually really important to know what our goals are and how to see it in the children." "Well, our coach will question us concerning the children who we have concerns about and in our meetings with her we have the opportunity to reflect and think about things that we hadn't thought about that child prior to that day. So in doing that we come up with a plan on how to plan for this particular child. Once we have a week to follow through on a particular plan, we see if what we planned helped and actually it has."	"We talk about the children's interest and what we had observed in the individualization part of the previous plan, -- so since we're working on transitions and routines, we gathered resources from the IELS and went through them and then we went to Gold to find where it fell in the objectives. First, it was 12-B, which is remembers the sequence of personal routines and experiences with teacher support so that was how we got that objective. Then we talked about how we've been doing a lot of regulation, because we still have children that are fairly new to us due to transitions. So we've been focusing on regulation in addition to the transitions and the routines. Oh and, we also looked to the IELS to get more ideas about regulation."

Preschool Baseline	Preschool Time 2	Preschool Time 3
"I really like to work on what the kids know or what they are learning and kind of base that for the week. I've set up kind of like an idea that we're going to be talking about with harvest time coming up, so we have general ideas, and then what we'll focus on -- like I'll pick out certain letters to focus on that week." **"It's not always written down, but we discuss a lot of individualizing using information from families."**	"Now we think of the goals first and then the children. So it was like flipping the way we would do a lesson plan. Now, it's what do I want the kids to get out of it? What concepts am I trying to teach them? How can I break it down to the different levels that are in the classroom in order for them to grasp what I'm trying to teach them?" "And so the PDI does really drive and force you to look at that individual child, because you are asked these questions on the lesson planning protocol. Those questions are to bring you to answers about the individual child."	**"**When planning for a group of children, we follow TS Creative Curriculum in our planning, because some of the objectives are preselected based on the activities. But, when we plan for an individual child, we look at where they are developmentally to plan for that child. We pull out the observations to discuss the level. Sometimes the families share something that they're working on at home or something that might be a concern and we'll try to build on what the family knows or asks. We also know to follow the child's lead, because even though you may have an activity planned if the child takes you to a different level of thinking you just go and you get more involved in their thinking and take it from there and build on that moment."

Appendix 7C: Evidence of the PDI Advancing Teacher Collaboration

Theme #1: Increased investment with use of classroom video

RPG Sample Quotation Time 1	*RPG Sample Quotation Time 2*
"I believe that the design of the entire RPG was successful. In regards to the video, the teachers enjoyed watching the video and some were able to point out elements of the teacher interactions that were related to teacher sensitivity, positive climate and regard for child perspective. However, I felt that they were somewhat struggling with connecting the video to the CLASS dimensions."	"Using the protocol to analyze the video was very successful. It was successful for several reasons. The teachers and supervisors took their time in analyzing the video observation data, discussing the appropriate preliminary marking, debating their decisions, discussing how much information is required to make an assessment, and exploring the value of collaborating to understand children."
"I do not think the teachers were very engaged during the video. I would like to try to find some that may display some diversity."	"The teachers were very excited and engaged with their own videos. They followed the norms during the discussion. The teachers who presented were very proud of themselves, noted through their smiling and wanting to explain the plan behind the activity. One teacher actually said how meaningful it was to have watched their videos rather than those that were brought in. It will be interesting to see how the teachers respond to offering their videos for the next time."

Theme #2: Shift from sharing to collaboration to critique

RPG Sample Quotation Time 1	*RPG Sample Quotation Time 2*
"One participant said her goal was to become more connected with her team. Another participant commented that he wanted to build his teaching strategies to advance the children's learning."	"After viewing one video, feedback shared from one participant included that she felt the teacher should have interacted more and created opportunities for more learning. Honestly, this feedback made me nervous because I am particularly challenged in my work with the teacher that the feedback was directed to. However, after a few moment of silence, the teacher said "You're right I could have talked more to her."
"A few of the teachers were open and willing to share successful and unsuccessful experiences they had in their attempts at being more present in their classrooms. This open vulnerable sharing seemed to allow others to be more engaged."	"This did not happen during the RPG, but the next day during the lesson planning meeting, one teacher said that he realized that the child really likes tactile experiences and we discussed some ways to use that information-maybe giving him something he can hold and squeeze to help him attend during circle. There had been discussion of the child's favored activities during the RPG. Things they wondered about: Why the child has such difficulty playing? If the child was making friends at school and some discussion about what indicates friendship."

Theme #3: The Significance of Collaboration

RPG Sample Quotation Time 1	*RPG Sample Quotation Time 2*
"We were having the discussion about their work during the cycle, and their beliefs about how being present had impacted their relationships with children and families, and also how relationships impact learning. The teachers were sharing lots of examples from the cycle activities. I decided to ask if they were curious about what each other had focused on during their cycle. This led to a very rich, 10-minute sharing. I asked how they felt about hearing this from one another. One teacher asked, "can we do this all the time?" I asked for her to say more and she said, "I don't know, it's just good to hear about what each other is doing." All nodded in agreement and some said, "yes" or "I agree". This felt like a very important step toward building this learning community."	"Using the protocol to analyze the video was very successful. It was successful for several reasons. The teachers and supervisors took their time in analyzing the video observation data, discussing the appropriate preliminary marking, debating their decisions, discussing how much information is required to make an assessment, and exploring the value of collaborating to understand children."
"The theme of reflecting on the past two months was very powerful. The questions gave the participants the opportunity to reflect and share with each other. There were a number of examples of teachers sharing their successes with each other. For the first time, they were asking each other questions as they really wanted to learn more from each other. The icebreaker focusing on their values was a perfect way to start the meeting. It was also interesting to observe how much thought and time they put into writing their responses on post-its."	"One teacher added to the norms and suggested that it's okay to agree to disagree, but do it with respect. Another teacher asked for each classroom to have a copy of the norms. …[Another teacher commented on] the benefit of looking at the videos with her colleagues to gain other perspectives… The teachers are beginning to realize during the Focused Teaching Cycle that it's better to collaborate with their team rather than by themselves. Another teacher wrote that she would like to explore different way of reflecting with the RPG."

Appendix 7D: Testing for Increases in Readiness to Change of PDI Teachers from 2012 to 2014 Using Paired Sample T-Test Procedure

SOC Parameter (n 31)	Mean (Std. Dev.)	Mean Difference (Std. Dev.)	t-value	p-value
Intention 2012	3.0(1.1)	+0.8(1.32)	-3.5	.001
Intention 2014	3.8(1.1)			
Awareness 2012	3.6(1.2)	+1.0(1.39)	-4.0	.000
Awareness 2014	4.6(.72)			
Seeking Information 2012	3.4(.85)	+0.1(.20)	-0.5	.639
Seeking Information 2014	3.5(.81)			
Effect on Children 2012	3.6(1.2)	+0.3(1.43)	-1.4	.176
Effect on Children 2014	3.9(.96)			
Overcoming Obstacles 2012	3.9(.81)	+0.1(1.1)	-0.3	.745
Overcoming Obstacles 2014	4.0(.97)			
Social Support 2012	3.6(.70)	+0.2(1.0)	-0.9	.393
Social Support 2014	3.8(.69)			
Professional Identity 2012	3.9(1.3)	+0.6(1.3)	-2.7	.001
Professional Identity 2014	4.5(.81)			
SOC Overall Score 2012	3.6(.52)	+0.4(0.5)	-4.8	.000
SOC Overall Score 2014	4.0(.41)			

Appendix 7E: CLASS PreK Impact Models

$ES15_j = \beta_0 + \beta_1*(TREAT) + \beta_2*(ESBL_2) + \beta_3*(CFPOV_3) + \beta_4*(CFWORK_4) + \beta_5*(CFEDU_5) + \beta_6*(CEHS12_6) + \beta_7*(CPFA12_7) + e_j$

$CO15_j = \beta_0 + \beta_1*(TREAT) + \beta_2*(COBL_2) + \beta_3*(CFPOV_3) + \beta_4*(CFWORK_4) + \beta_5*(CFEDU_5) + \beta_6*(CEHS12_6) + \beta_7*(CPFA12_7) + e_j$

$IS15_j = \beta_0 + \beta_1*(TREAT) + \beta_2*(ISBL_2) + \beta_3*(CFPOV_3) + \beta_4*(CFWORK_4) + \beta_5*(CFEDU_5) + \beta_6*(CEHS12_6) + \beta_7*(CPFA12_7) + e_j$

Variables
ES15 = CLASS Emotional Support post-intervention measure 2015
CO15 = CLASS Classroom Organization post-intervention measure 2015
IS15 = CLASS Instructional Support post-intervention measure 2015
ESBL = CLASS Emotional Support baseline measure
COBL = CLASS Classroom Organization baseline measure
ISBL = CLASS Instructional Support baseline measure
TREAT = Intervention center versus comparison center
CFPOV = 2012 Percent families below the poverty line with related children under 18
CFWORK = 2012 Percent unemployed 2012
CFEDU = 2012 Percent with Bachelor's degree or higher
CEHS12 = 2012 EHS Center-based
CPHA12 = 2012 State PreK Preschool for All Funding
e_j = error term

Appendix 7F. Results of Repeated Measures ANOVA for Toddler and PreK CLASS Outcomes

A. Toddler CLASS Domain and Dimension Score Means and Standard Deviations, 2013 – 2015

Domain Score: Emotional and Behavioral Supports (EBS)

	Mean	Std. Deviation	N
2013	4.850	.7321	6
2014	6.125	.6571	6
2015	6.217	.5307	6

EBS Dimension: Positive Climate

	Mean	Std. Deviation	N
2013	4.967	.4967	6
2014	6.600	.4733	6
2015	6.400	.6419	6

EBS Dimension: (Lack of) Negative Climate)

	Mean	Std. Deviation	N
2013	6.100	.9099	6
2014	6.9667	.08165	6
2015	7.000	0.0000	6

EBS Dimension: Teacher Sensitivity

	Mean	Std. Deviation	N
2013	4.533	.7866	6
2014	5.850	.9894	6
2015	6.067	.8116	6

EBS Dimension: Regard for Child Perspectives

	Mean	Std. Deviation	N
2013	4.767	.5715	6
2014	5.850	.7609	6
2015	5.900	1.0159	6

EBS Dimension: Behavioral Guidance

	Mean	Std. Deviation	N
2013	3.933	1.1978	6
2014	5.383	1.4006	6
2015	5.833	.7230	6

Domain Score: Engaged Support for Learning (ESL)

	Mean	Std. Deviation	N
2013	2.912	.8901	6
2014	4.008	1.2612	6
2015	3.388	.2344	6

ESL Dimension: Facilitation of Learning and Development

	Mean	Std. Deviation	N
2013	3.100	1.0100	6
2014	5.150	1.0330	6
2015	4.450	.3146	6

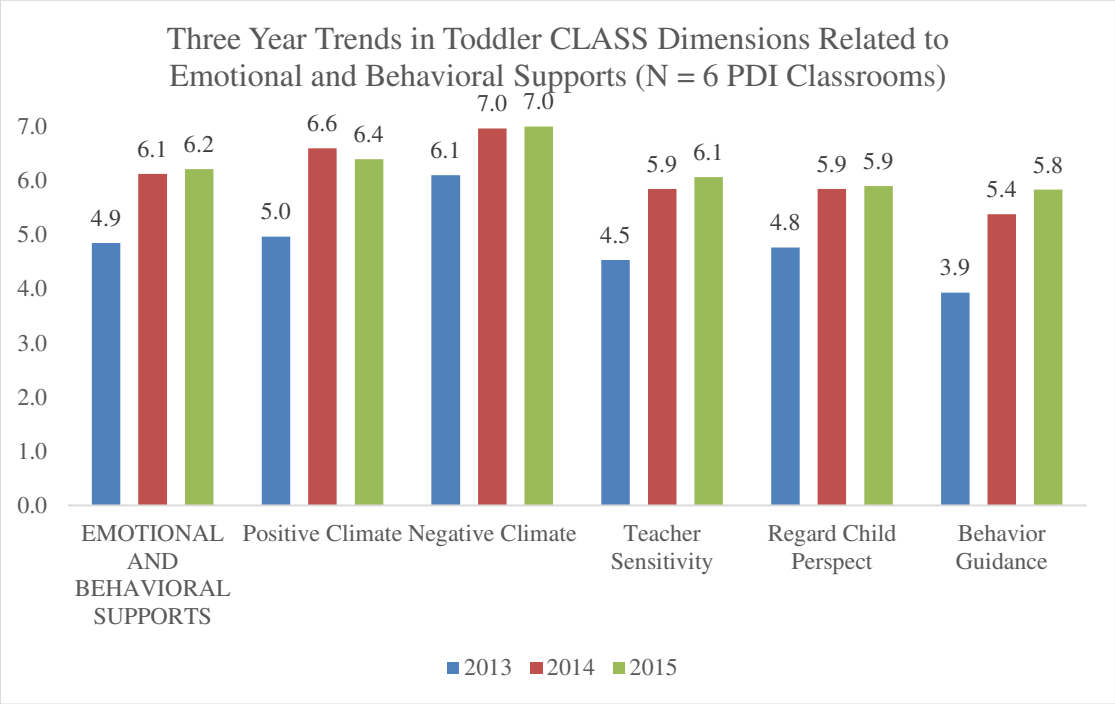
ESL Dimension: Quality of Feedback

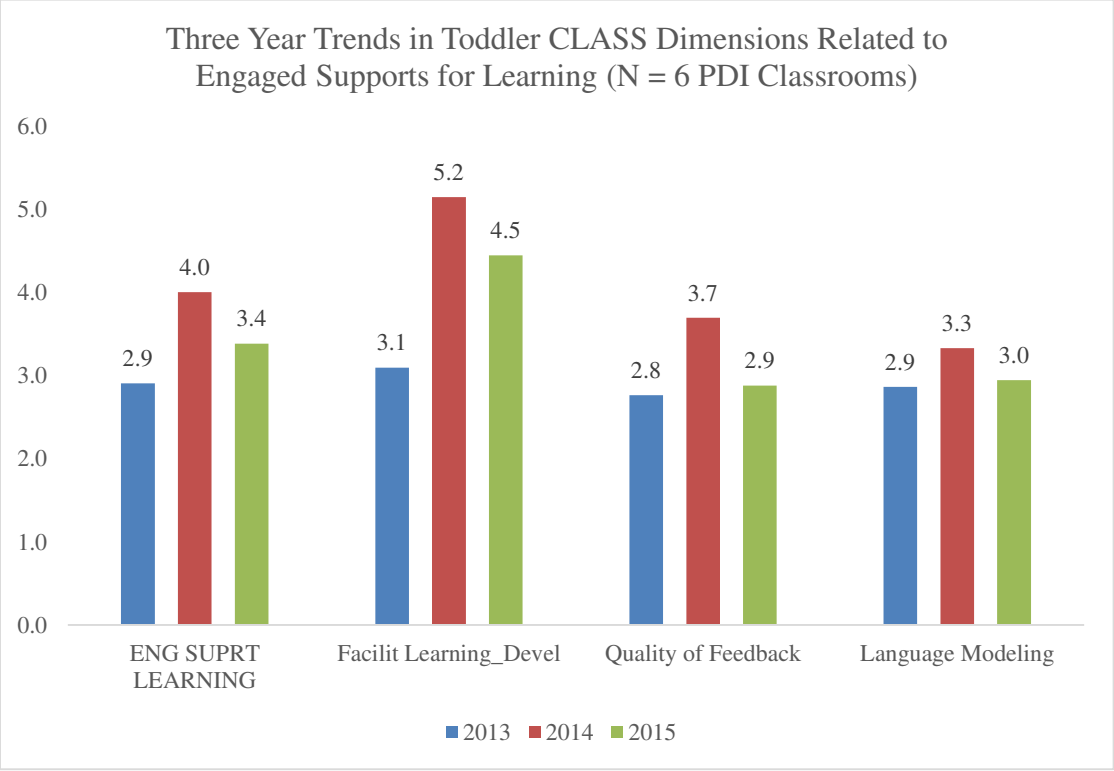
	Mean	Std. Deviation	N
2013	2.767	.6121	6
2014	3.700	1.5633	6
2015	2.883	.3764	6

ESL Dimension: Language Modeling

	Mean	Std. Deviation	N
2013	2.867	1.1501	6
2014	3.333	1.4445	6
2015	2.950	.3728	6

Appendix 7G: Comparing Extent of Change within Toddler CLASS Dimensions within Domain





Appendix 7H: PreK CLASS Domain and Dimension Score Means and Standard Deviations, 2013 – 2015

PreK Domain: Emotional Supports (ES)

	Mean	Std. Deviation	N
2013	5.714	.3010	7
2014	6.071	.8528	7
2015	6.250	.3434	7

ES Dimension: Positive Climate

	Mean	Std. Deviation	N
2013	5.571	.6448	7
2014	6.343	.8561	7
2015	6.343	.4995	7

ES Dimension: (Lack of) Negative Climate

	Mean	Std. Deviation	N
2013	7.000	0.0000	7
2014	7.000	0.0000	7
2015	7.000	0.0000	7

ES Dimension: Teacher Sensitivity

	Mean	Std. Deviation	N
2013	5.300	.4282	7
2014	5.686	1.0527	7
2015	5.943	.6268	7

ES Dimension: Regard for Student Perspective

	Mean	Std. Deviation	N
2013	4.914	.4598	7
2014	5.600	.9781	7
2015	5.743	.6705	7

PreK Domain: Classroom Organization (CO)

	Mean	Std. Deviation	N
2013	4.657	.5315	7
2014	5.619	.8769	7
2015	6.060	.3167	7

CO Dimension: Behavioral Management

	Mean	Std. Deviation	N
2013	4.900	.4796	7
2014	5.986	1.1305	7
2015	6.043	.2149	7

CO Dimension: Productivity

	Mean	Std. Deviation	N
2013	4.771	.9123	7
2014	5.743	.7635	7
2015	6.371	.4680	7

CO Dimension: Instructional Learning Formats

	Mean	Std. Deviation	N
2013	4.329	.5619	7
2014	5.200	.9165	7
2015	5.771	.3988	7

Appendix 7H: PreK CLASS Domain and Dimension Score Means and Standard Deviations, 2013 – 2015 (Continued)

PreK Domain: Instructional Supports (IS)

	Mean	Std. Deviation	N
2013	3.220	.9336	7
2014	3.389	1.1825	7
2015	2.703	1.7394	7

IS Dimension: Concept Development

	Mean	Std. Deviation	N
2013	3.071	1.0531	7
2014	3.200	1.3748	7
2015	2.586	1.6446	7

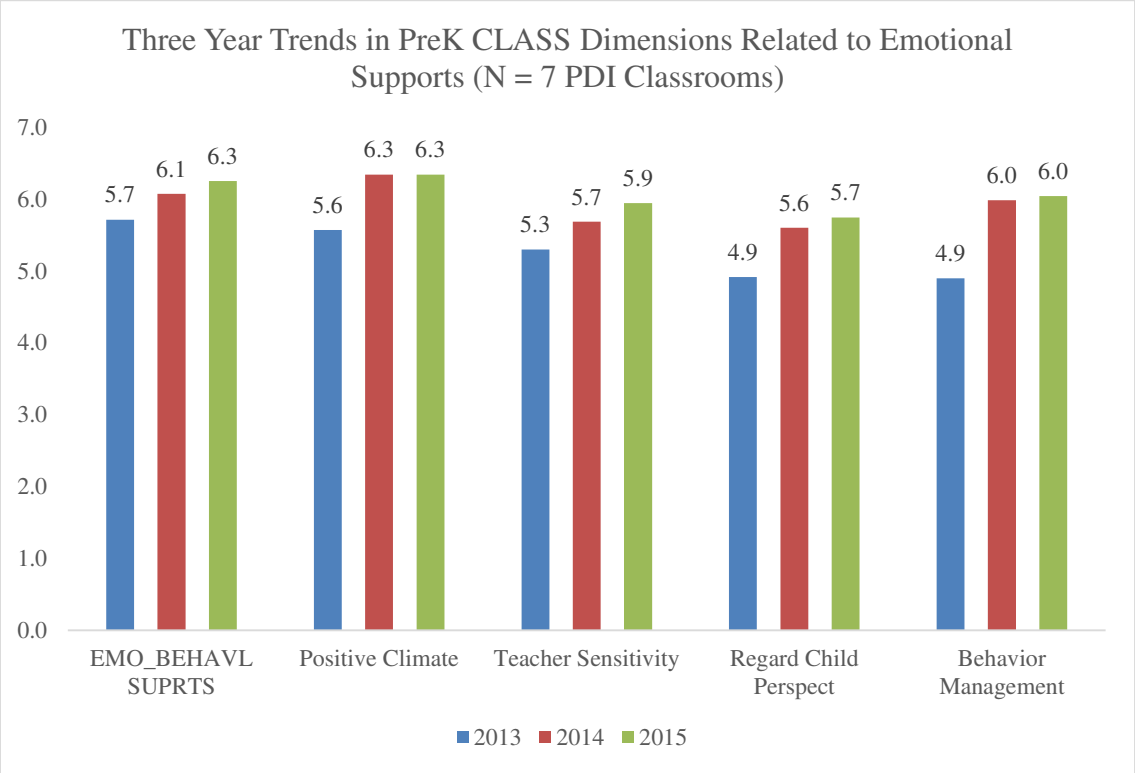
IS Dimension: Quality of Feedback

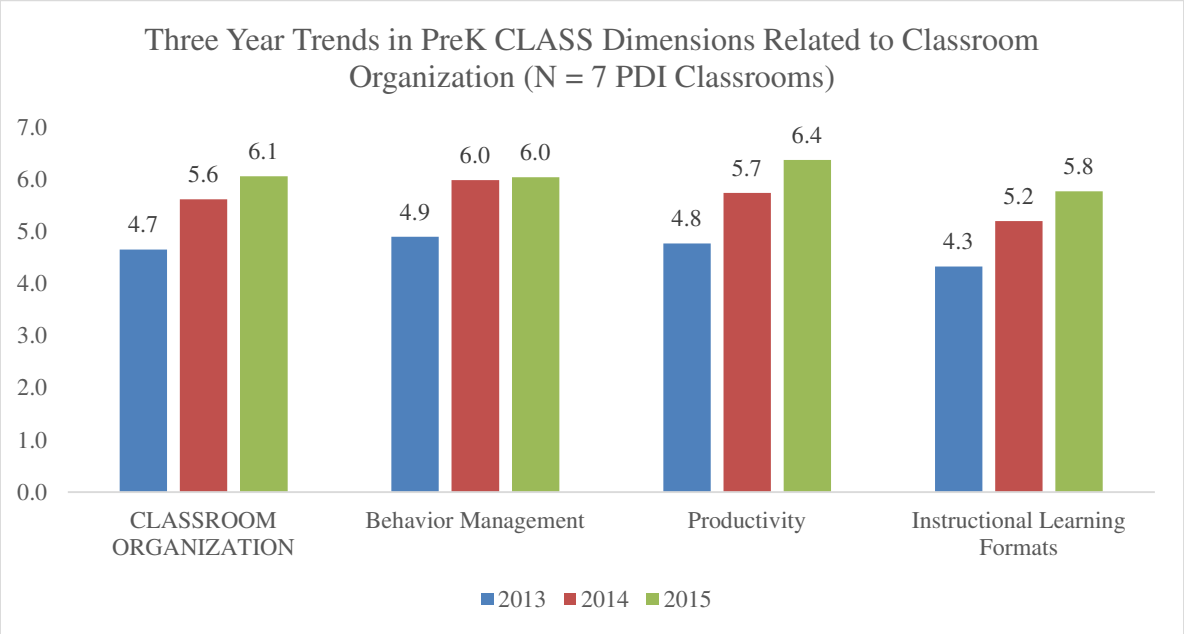
	Mean	Std. Deviation	N
2013	3.400	.9000	7
2014	3.557	1.3100	7
2015	2.814	1.7257	7

IS Dimension: Language Modeling

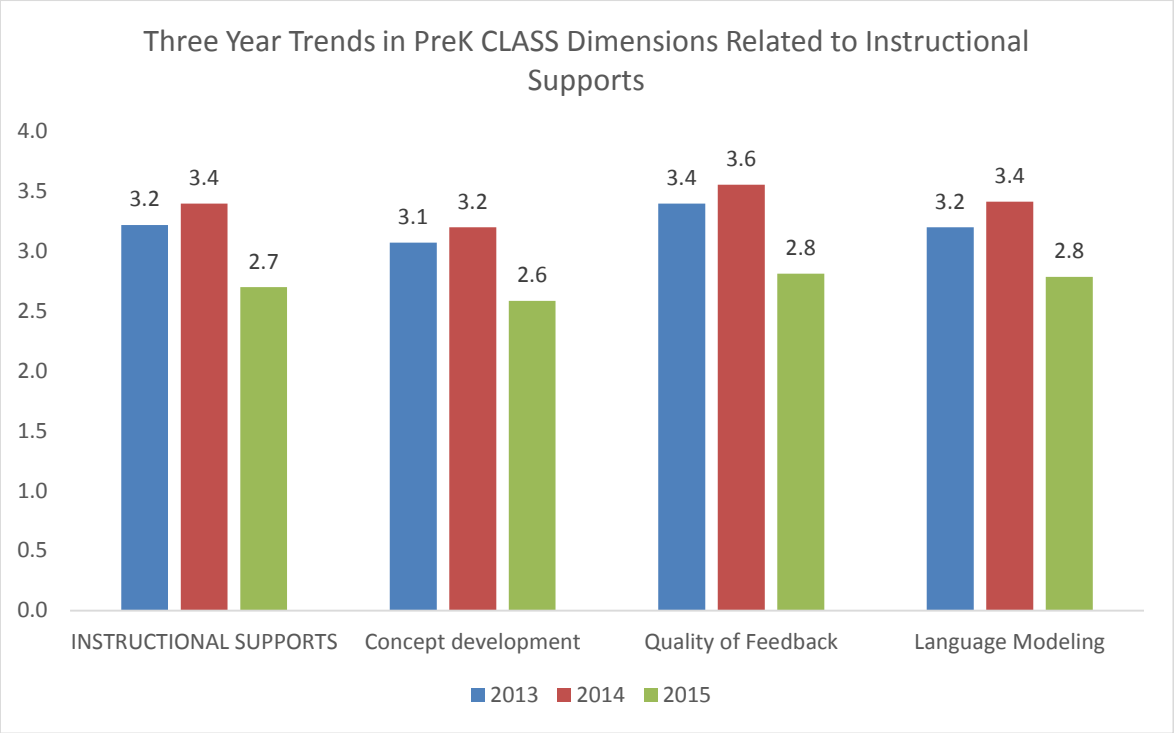
	Mean	Std. Deviation	N
2013	3.200	.9574	7
2014	3.414	1.1596	7
2015	2.786	1.9030	7

Appendix 7I: Comparing Extent of Change within PreK CLASS Dimensions within Domain





Appendix 7I: Extent of Change within PreK CLASS Dimensions within Domain (continued)



Appendix 7J: Results of Repeated Measures ANOVA of Toddler CLASS Domains and Dimensions: Summary of Within-Subjects Differences (N = 6 Classrooms) (i.e. Among Timepoints 2013, 2014 & 2015).

Measures	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Observed Power
EMOTIONAL & BEHAVIORAL SUPPORTS	1.11	2.00	0.56	1.11	0.39	0.27	0.17
Positive Climate*	1.74	1.61	1.08	2.55	0.18	0.46	0.28
Negative Climate	1.02	2.00	0.51	1.51	0.30	0.33	0.21
Teacher Sensitivity*	0.81	1.01	0.80	0.39	0.58	0.12	0.07
Regard for Child Perspectives	0.80	2.00	0.40	0.52	0.62	0.15	0.10
Behavior Guidance	3.26	2.00	1.63	1.24	0.35	0.29	0.18
ENGAGED SUPPORT FOR LEARNING	0.94	2.00	0.47	0.36	0.71	0.11	0.09
Facilitation of Learning & Development	1.41	2.00	0.71	0.55	0.60	0.15	0.11
Quality of Feedback	2.17	2.00	1.08	0.80	0.49	0.21	0.13
Language Modeling	0.33	2.00	0.16	0.09	0.92	0.03	0.06

* Indicates that a measure did not satisfy the criteria of sphericity. The Greenhouse-Geisser correction is applied.

Appendix 7K: Results of Repeated Measures ANOVA of PreK CLASS Domains and Dimensions: Summary of Within-Subjects Differences (N = 7 Classrooms) (i.e. Among Timepoints 2013, 2014 & 2015).

Measures	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Observed Power
EMOTIONAL SUPPORTS	0.27	2.00	0.14	0.28	0.76	0.07	0.08
Positive Climate	0.42	2.00	0.21	0.39	0.69	0.09	0.09
Teacher Sensitivity	1.46	2.00	0.73	0.79	0.48	0.17	0.14
Regard for Child Perspectives	0.37	2.00	0.19	0.27	0.77	0.06	0.08
CLASSROOM ORGANIZATION	0.09	2.00	0.04	0.07	0.94	0.02	0.06
Behavior Management	0.11	2.00	0.05	0.07	0.93	0.02	0.06
Productivity	0.42	2.00	0.21	0.24	0.79	0.06	0.08
Instructional Learning Formats	0.02	2.00	0.01	0.02	0.98	0.00	0.05
INSTRUCTIONAL SUPPORTS	4.48	2.00	2.24	2.36	0.16	0.37	0.35
Concept development	2.34	2.00	1.17	0.97	0.42	0.20	0.16
Quality of Feedback	5.60	2.00	2.80	2.22	0.17	0.36	0.33
Language Modeling	6.00	2.00	3.00	3.84	0.07	0.49	0.52

Note: All PreK Measures satisfy criteria of sphericity at $p<.05$ level. No correction is applied.

APPENDIX 8A: GOLD English Language Acquisition Composite Measure Development

The GOLD English Language Acquisition subscale contains item objectives 37, and 38 which assess expressive and receptive language of students on a 9-point scale representing students' developmental levels (beginning, progressing, increasing, and advancing development). The total number of students in the sample was N = 122. The ELA raw scale scores were converted to Rasch measures using a stacked data approach without anchoring due to the small number of items being used to equate the baseline and post-intervention item objectives. The items were equated by calibrating both the pre-intervention and post-intervention items together (N = 244). Rasch fit statistics indicated these items fit the Rasch model with an Infit MNSQ = .97, and Outfit MNSQ = -.02. The category threshold measures indicate that the rating scales representing children's developmental levels were functioning as intended, with child level scores that reflect lower and higher levels of ELA development. The item separation index shows the difficulty level of the items sufficiently captures the range of abilities of the students taking the assessment. The person reliability was .76, showing children were well differentiated. The item reliability was acceptable within NEi3 standards ($\alpha = .85 > .80$). Thus the child measures used for the impact study were based on a reliable composite of the two items. These measures were then rescaled to the 9-level scale for ease of interpretation of results.

GOLD English Language Acquisition Rasch Item Calibration Results

ELA Objective Item	Score	Count	Logit Measure	Standard Error	Infit MNSQ	Outfit MNSQ	Correlation
Objective 37 Pre- and Post- Intervention	1247	244	-0.41	0.16	0.97	-0.2	0.98
Objective 38 Pre- and Post- Intervention	1216	244	0.41	0.16	0.97	-0.2	0.97
MEAN	1231.5	244	0	0.16	0.97	-0.2	
S.D.	15.5		0.41				
Item Separation Reliability: .84		Person Separation Reliability: .76					

GOLD English Language Acquisition Rasch Item Threshold Statistics

	Category Number	Developmental Level	Level Count	Level %	Mean Measure	SE	Outfit MNSQ	Infit MNSQ
Objective 37 (Pre- and Post Intervention)	1	Level 1	9	4	-25.1	0.26	0.6	-0.4
	2	Level 2 (Beginning)	25	10	-18.75	0.7	0.8	-0.52
	3	Level 3	15	6	-10.73	0.36	0.2	-0.23
	4	Level 4 (Progressing)	45	18	-6.25	0.25	0.7	-0.25
	5	Level 5	41	17	-0.05	0.36	0.9	0
	6	Level 6 (Increasing)	44	18	4.7	0.3	0.9	0.18
	7	Level 7	33	14	9.59	0.32	0.7	0.31
	8	Level 8 (Advancing)	25	10	17.35	0.9	2.2	0.48
	9	Level 9	7	3	27.66	0.33	0.1	0.39
Objective 38 (Pre- and Post Intervention)	1	Level 1	6	2	-25.3	0.38	0.3	-0.33
	2	Level 2 (Beginning)	27	11	-19.44	0.77	1.2	-0.56
	3	Level 3	27	11	-9.93	0.45	1	-0.29
	4	Level 4 (Progressing)	46	19	-4.73	0.34	1.5	-0.19
	5	Level 5	37	15	1.29	0.27	0.6	0.04
	6	Level 6 (Increasing)	41	17	5.26	0.3	0.7	0.19
	7	Level 7	26	11	9.61	0.26	0.4	0.27
	8	Level 8 (Advancing)	28	11	17.63	0.79	1.1	0.52
	9	Level 9	6	2	27.87	0.3	0.2	0.36

APPENDIX 8B: GOLD Social Emotional, GOLD Language, GOLD Cognitive, GOLD Literacy, GOLD Mathematics, and GOLD English Language Acquisition, and BRSA Baseline Models

$Y_{ij} = \gamma_{00} + \gamma_{01}*TREAT_j + u_{0j} + r_{ij}$

where,

Y_{ij} = the age-standardized GOLD subscale development outcome for child i in early childhood center j at baseline
γ_{00} = the average GOLD subscale development score (intercept) across centers
γ_{01} = the slope coefficient for the intervention center covariate
u_{0j} = the random effect for the center level intercept, normally distributed with a mean of 0 and homogenous variance $u_{0j} \sim N(0,T)$
r_{ij} = the random effect for the student level , normally distributed with a mean of 0 and homogenous variance $rij \sim N(0,\sigma 2)$

APPENDIX 8C: GOLD Social Emotional, GOLD Language, GOLD Cognitive, GOLD Literacy, GOLD Mathematics, and GOLD English Language Acquisition, and BRSA Impact Models

GOLD Social Emotional, GOLD Language, GOLD Cognitive, GOLD Literacy, and GOLD Mathematics Impact Models

$Y_{ij} = \gamma_{00} + \gamma_{01}*TREAT_j + \gamma_{02}*Site\ 2\ Group_j + \gamma_{03}*Site\ 3\ Group_j + \gamma_{04}*Site\ 4\ Group_j + \gamma_{05}*Site\ 5\ Group_j + \gamma_{06}*CFPOV_j + \gamma_{07}*CFWORK_j + \gamma_{08}*CFEDU_j + \gamma_{09}*EHS12C_j + \gamma_{010}*PFA12_j + \gamma_{10}*BLZ + \gamma_{20}*S14AGE_{ij} + \gamma_{30}*SIEP_{ij} + \gamma_{40}*D2YEAR_{ij} + \gamma_{41}*TREAT_j*D2YEAR_{ij} + u_{0j} + u_{4j}*D2YEAR_{ij} + r_{ij}$

Y_{ij} = the GOLD development outcome for child i in early childhood center j.
γ_{00} = the average GOLD development score (intercept) across centers
γ_{01} = the slope coefficient for the intervention center covariate
γ_{02} = the slope coefficient for the matched comparison centers to the Site 2 intervention center, Site 1 intervention center as reference
γ_{03} = the slope coefficient for the matched comparison centers to the Site 3 intervention center, Site 1 intervention center as reference
γ_{04} = the slope coefficient for the matched comparison centers to the Site 4 intervention center, Site 1 intervention center as reference
γ_{05} = the slope coefficient for the matched comparison centers to the Site 5 intervention center, Site 1 intervention center as reference
γ_{06} = the slope coefficient for the center level concentration of poverty
γ_{07} = the slope coefficient for the center level concentration of families affected by unemployment
γ_{08} = the slope coefficient for the center level concentration of families with guardians with a Bachelor's degree or higher
γ_{09} = the slope coefficient centers receiving Early Head Start funding
γ_{010} = the slope coefficient centers receiving Pre-school for All funding
γ_{10} = the slope coefficient for the GOLD age standardized baseline outcome measure
γ_{20} = the slope coefficient for children's age in months at the time of the impact measure
γ_{30} = the slope coefficient for child level IEP
γ_{40} = the slope coefficient for children enrolled in intervention centers for two years, children enrolled in intervention centers for one year as reference group
γ_{41} = the slope coefficient for the 2-year enrollment *intervention interaction effect
u_{0j} = the random effect for the center level intercept, normally distributed with a mean of 0 and homogenous variance $u_{0j} \sim N(0,T)$
u_{4j} = the random effect for the 2 -year enrollment*intervention interaction, normally distributed with a mean of 0 and homogenous variance $u_{0j} \sim N(0,T)$
r_{ij} = the random effect for the student level, normally distributed with a mean of 0 and homogenous variance $r_{ij} \sim N(0,\sigma 2)$

GOLD English Language Acquisition Impact Model

$Y_{ij} = \gamma_{00} + \gamma_{01}*TREAT_j + \gamma_{02}*Site\ 2\ Group_j + \gamma_{03}*Site\ 3\ Group_j + \gamma_{04}*Site\ 4\ Group_j + \gamma_{05}*Site\ 5\ Group_j + \gamma_{06}*CFPOV_j + \gamma_{07}*CWORK_j + \gamma_{08}*CEDU_j + \gamma_{09}*EHS12C_j + \gamma_{010}*PFA12_j + \gamma_{10}*ELABLZ_{ij} + \gamma_{20}*S14AGE_{ij} + \gamma_{30}*D2YEAR_{ij} + \gamma_{31}*TREAT_j*D2YEAR_{ij} + u_{0j} + u_{3j}*D2YEAR_{ij} + r_{ij}$

Y_{ij} = the GOLD ELA development outcome for child i in early childhood center j.
γ_{00} = the average GOLD ELA development score (intercept) across centers
γ_{01} = the slope coefficient for the intervention center covariate
γ_{02} = the slope coefficient for the matched comparison centers to the Site 2 intervention center, Site 1 intervention center as reference
γ_{03} = the slope coefficient for the matched comparison centers to the Site 3 intervention center, Site 1 intervention center as reference
γ_{04} = the slope coefficient for the matched comparison centers to the Site 4 intervention center, Site 1 intervention center as reference
γ_{05} = the slope coefficient for the matched comparison centers to the Site 5 intervention center, Site 1 intervention center as reference
γ_{06} = the slope coefficient for the center level concentration of poverty
γ_{07} = the slope coefficient for the center level concentration of families affected by unemployment
γ_{08} = the slope coefficient for the center level concentration of families with guardians with a Bachelor's degree or higher
γ_{09} = the slope coefficient centers receiving Early Head Start funding
γ_{010} = the slope coefficient centers receiving Pre-school for All funding
γ_{10} = the slope coefficient for the age standardized baseline GOLD ELA measure
γ_{20} = the slope coefficient for children's age in months at the time of the impact measure
γ_{30} = the slope coefficient for children enrolled in intervention centers for two years, children enrolled in intervention centers for one year as reference group
γ_{31} = the slope coefficient for the 2-year*intervention interaction effect
u_{0j} = the random effect for the center level intercept, normally distributed with a mean of 0 and homogenous variance $u_{0j} \sim N(0,T)$
u_{3j} = the random effect for the 2 -year enrollment*intervention interaction, normally distributed with a mean of 0 and homogenous variance $u_{0j} \sim N(0,T)$
r_{ij} = the random effect for the student level, normally distributed with a mean of 0 and homogenous variance $r_{ij} \sim N(0,\sigma 2)$

Bracken School Readiness Assessment Impact Model

$Y_{ij} = \gamma_{00} + \gamma_{01}*TREAT_j + \gamma_{02}*Site\ 2\ Group_j + \gamma_{03}*Site\ 3\ Group_j + \gamma_{04}*Site\ 4\ Group_j + \gamma_{05}*Site\ 5\ Group_j + \gamma_{10}*BSRABLZ_{ij} + u_{0j} + r_{ij}$

Y_{ij} = the BSRA development outcome for child i in early childhood center j.
γ_{00} = the average BSRA development score (intercept) across centers
γ_{01} = the slope coefficient for the intervention center covariate
γ_{02} = the slope coefficient for the matched comparison centers to the Site 2 intervention center, Site 1 intervention center as reference
γ_{03} = the slope coefficient for the matched comparison centers to the Site 3 intervention center, Site 1 intervention center as reference
γ_{04} = the slope coefficient for the matched comparison centers to the Site 4 intervention center, Site 1 intervention center as reference
γ_{05} = the slope coefficient for the matched comparison centers to the Site 5 intervention center, Site 1 intervention center as reference
γ_{06} = the slope coefficient for the center level concentration of poverty
γ_{07} = the slope coefficient for the center level concentration of families affected by unemployment
γ_{08} = the slope coefficient for the center level concentration of families with guardians with a Bachelor's degree or higher
γ_{09} = the slope coefficient centers receiving Early Head Start funding
γ_{010} = the slope coefficient centers receiving Pre-school for All funding
γ_{10} = the slope coefficient for the age-standardized baseline BSRA measure
u_{0j} = the random effect for the center level intercept, normally distributed with a mean of 0 and homogenous variance $u_{0j} \sim N(0,T)$
r_{ij} = the random effect for the student level, normally distributed with a mean of 0 and homogenous variance $r_{ij} \sim N(0,\sigma 2)$

APPENDIX 8D: GOLD Longitudinal Measures Fall 2012 Through Spring 2014

Measure	N Intervention	Intervention Unadjusted Mean	N Comparison	Comparison Unadjusted Mean	Pooled SD
Social Emotional Fall 2012	55	463.38	291	486.95	0.00
Social Emotional Winter 2013	54	498.02	296	522.48	87.82
Social Emotional Spring 2013	53	529.66	295	549.66	85.32
Social Emotional Fall 2013	53	563.53	295	577.54	79.27
Social Emotional Winter 2014	55	590.51	299	594.57	74.96
Social Emotional Spring 2014	55	613.13	301	616.19	77.45
Language Fall 2012	54	450.74	294	487.35	0.00
Language Winter 2013	55	486.73	296	515.72	83.41
Language Spring 2013	52	522.00	293	545.00	85.46
Language Fall 2013	53	555.19	291	573.02	84.10
Language Winter 2014	55	585.67	298	594.84	83.61
Language Spring 2014	55	611.67	301	620.83	87.76
Cognitive Fall 2012	52	455.38	289	488.73	0.00
Cognitive Winter 2013	55	488.22	297	520.95	84.14
Cognitive Spring 2013	53	525.57	295	550.92	89.48
Cognitive Fall 2013	54	559.02	294	581.82	90.98
Cognitive Winter 2014	55	587.18	300	606.08	90.98
Cognitive Spring 2014	55	626.44	299	632.53	95.42
Literacy Fall 2012	51	490.18	280	505.65	0.00
Literacy Winter 2013	53	515.13	287	534.02	79.13
Literacy Spring 2013	50	547.88	289	552.83	82.80
Literacy Fall 2013	50	568.12	283	587.10	78.72
Literacy Winter 2014	53	599.45	294	604.60	82.68
Literacy Spring 2014	55	619.69	295	630.75	82.05
Mathematics Fall 2012	49	489.61	282	509.84	0.00
Mathematics Winter 2013	53	519.45	285	540.41	81.15
Mathematics Spring 2013	51	544.88	289	561.27	86.00
Mathematics Fall 2013	50	568.34	283	596.51	76.76
Mathematics Winter 2014	53	597.96	296	612.02	78.83
Mathematics Spring 2014	54	628.13	299	632.27	79.50

APPENDIX 8E: Three-Level Linear Growth Model

Level 1 Model

$Y_{tij} = \pi_{0ij} + \pi_{1ij}*(TIME_{tij}) + e_{tij}$

Y_{tij} = GOLD domain outcome variable at time point t for student i in center j
π_{0ij} = mean initial status of student i in center j
π_{1ij} = the developmental growth rate for student i in center j between fall 2012 and spring 2014
e_{tij} = the within person residual term

Level 2 Model

$\pi_{0ij} = \beta_{00j} + \beta_{01j}*(F12I_{ij}) + \beta_{02j}*(F12T_{ij}) + \beta_{03j}*(W13I_{ij}) + \beta_{04j}*(W13T_{ij}) + \beta_{05j}*(S13I_{ij}) + \beta_{06j}*(S13T_{ij}) + \beta_{07j}*(SU13I_{ij}) + \beta_{08j}*(SU13T_{ij}) + \beta_{09j}*(F13T_{ij}) + \beta_{010j}*(W14T_{ij}) + \beta_{011j}*(S14T_{ij}) + r_{0ij}$

$\pi_{1ij} = \beta_{10j} + \beta_{11j}*(F12I_{ij}) + \beta_{12j}*(F12T_{ij}) + \beta_{13j}*(W13I_{ij}) + \beta_{14j}*(W13T_{ij}) + \beta_{15j}*(S13I_{ij}) + \beta_{16j}*(S13T_{ij}) + \beta_{17j}*(SU13I_{ij}) + \beta_{18j}*(SU13T_{ij}) + \beta_{19j}*(F13T_{ij}) + \beta_{110j}*(W14T_{ij}) + \beta_{111j}*(S14T_{ij})$

π_{0ij} = the initial status of student i in center j as a function of β_{pq}*(student age group)
π_{1ij} = the developmental growth rate for student i in center j as a function of β_{pq}*(student age group)
The β_{pij}'s represent the student level effects for the age categories included in the level 2 model for each checkpoint period
r_{0ij} = level 2 random effect

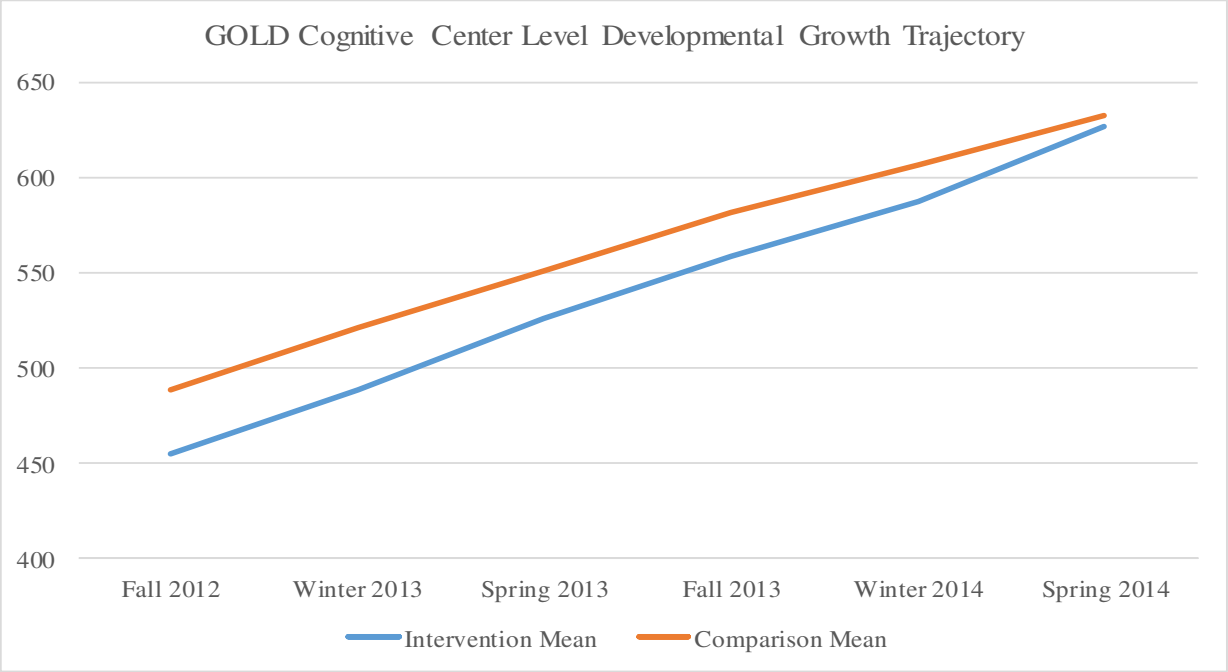
Level 3 Model

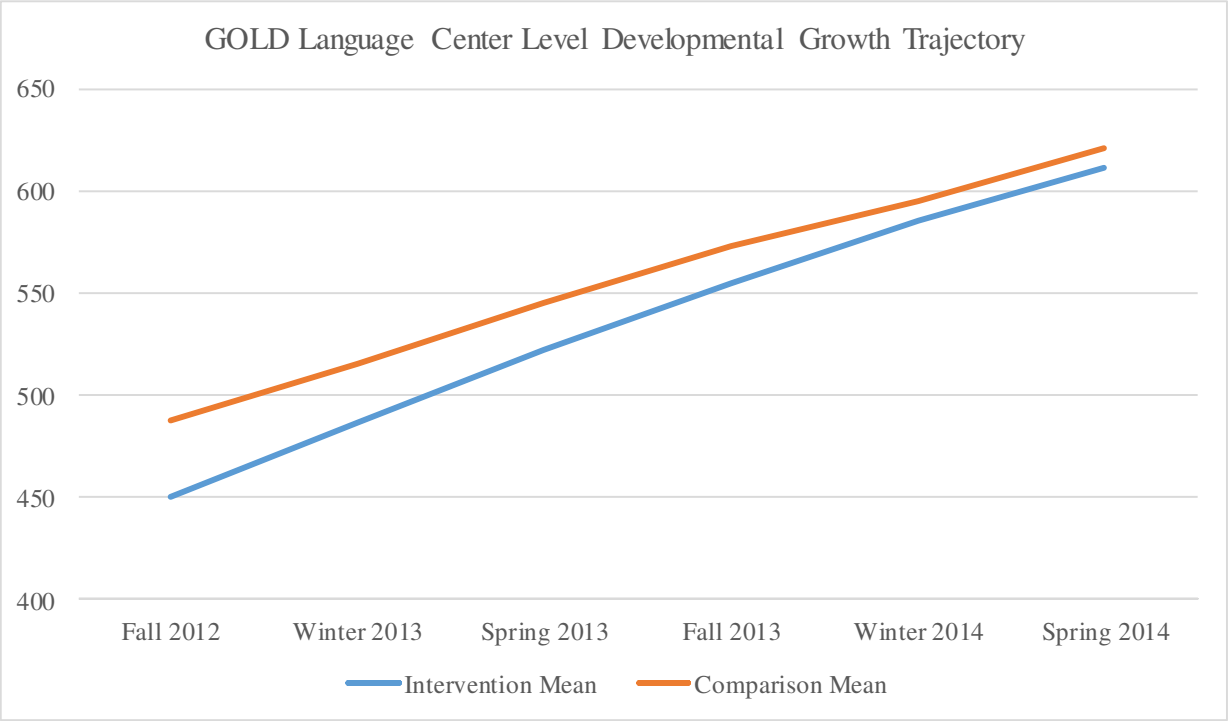
$\beta_{00j} = \gamma_{000} + \gamma_{001}(TREAT_j) + \gamma_{002}(Site\ 2\ Group_j) + \gamma_{003}(Site\ 3\ Group_j) + \gamma_{004}(Site\ 4\ Group_j) + \gamma_{005}(Site\ 5\ Group_j) + u_{00j}$
$\beta_{01j} = \gamma_{010}$
$\beta_{02j} = \gamma_{020}$
$\beta_{03j} = \gamma_{030}$
$\beta_{04j} = \gamma_{040}$
$\beta_{05j} = \gamma_{050}$
$\beta_{06j} = \gamma_{060}$
$\beta_{07j} = \gamma_{070}$
$\beta_{08j} = \gamma_{080}$
$\beta_{09j} = \gamma_{090}$
$\beta_{010j} = \gamma_{0100}$
$\beta_{011j} = \gamma_{0110}$
$\beta_{10j} = \gamma_{100} + \gamma_{101}(TREAT_j) + \gamma_{102}(Site\ 1\ Group_j) + \gamma_{103}(Site\ 2\ Group_j) + \gamma_{104}(Site\ 3\ Group_j) + \gamma_{105}(Site\ 4\ Group_j)$
$\beta_{11j} = \gamma_{110}$
$\beta_{12j} = \gamma_{120}$
$\beta_{13j} = \gamma_{130}$
$\beta_{14j} = \gamma_{140}$

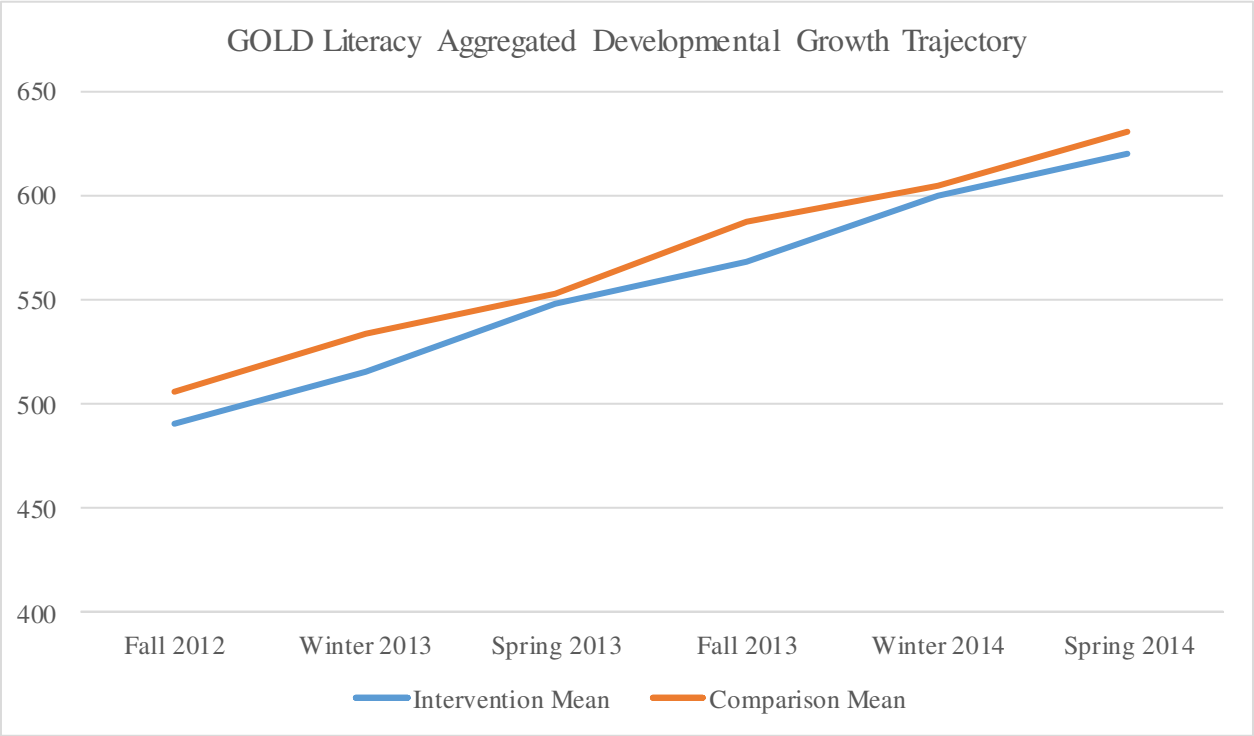
$\beta_{15j} = \gamma_{150}$
$\beta_{16j} = \gamma_{160}$
$\beta_{17j} = \gamma_{170}$
$\beta_{18j} = \gamma_{180}$
$\beta_{19j} = \gamma_{190}$
$\beta_{110j} = \gamma_{1100}$
$\beta_{111j} = \gamma_{1110}$

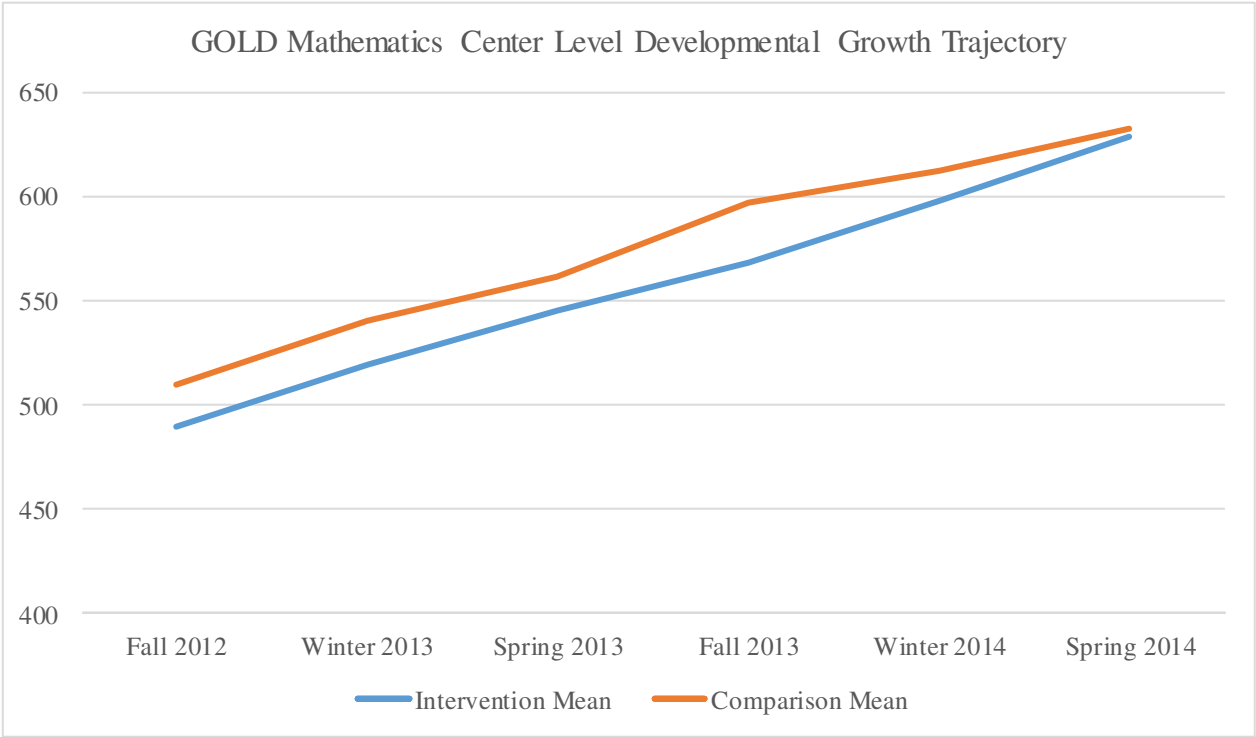
γ_{000} = the mean for the initial status across centers
γ_{001} = the intervention center effect on the mean initial status across centers
γ_{100} = the average student developmental growth trajectory (TIME) across centers
γ_{101} = the intervention center effect on the grand mean on TIME
β_{00j} = the initial status of center j
β_{10j} = the average growth rate within centers for the 6 time points (TIME)
β_{pqj} = the fixed effects for student age categories
u_{00j} = level 3 random effect

APPENDIX 8F: GOLD Center Level Developmental Growth Trajectories






GOLD Literacy Aggregated Developmental Growth Trajectory
650
600
550
500
450
400
Fall 2012
Winter 2013
Spring 2013
Fall 2013
Winter 2014
Spring 2014
Intervention Mean
Comparison Mean


GOLD Mathematics Center Level Developmental Growth Trajectory
650
600
550
500
450
400
Fall 2012
Winter 2013
Spring 2013
Fall 2013
Winter 2014
Spring 2014
Intervention Mean
Comparison Mean