TSR

Texas School Ready!

2016

annual report

Texas State Center for Early Childhood Development

CHILDREN'S LEARNING INSTITUTE™

UTHealth™
The University of Texas
Health Science Center at Houston

Pursuant to Section 29.160, subsection (e) of the Texas Education Code, and House Bill 1, General Appropriations Act, Article III, Texas Education Agency Rider No. 45, and Article VII, Texas Workforce Commission Rider No. 27 of the 84th Legislative Session.

Dear Gov. Abbott, Lt. Gov. Patrick, Speaker Straus, Chairman Taylor, Chairman Aycock, Commissioner Williams, Members of the Legislative Budget Board, and Members of the Texas Legislature:

Since our inception as the Center for Improving the Readiness of Children for Learning and Education (CIRCLE), the Children's Learning Institute (CLI) at The University of Texas Health Science Center at Houston has developed and implemented the Texas School Ready! (TSR) Project and served nearly 600,000 at-risk children.

The Children's Learning Institute is unique in the range of research and programs represented and its philosophical commitment to ensuring real and lasting change for young children and families. Since 2005, CLI has received competitive research grants to study and implement various approaches to child development and played a critical role in reforming how early childhood educational practice supports school readiness. None of this would have been possible without the support and leadership of the Texas Executive and Legislative branches.

It is with great pleasure that I share with you some exciting results pertaining to the Texas School Ready project for FY 2016. The Texas School Ready project is the result of thirteen years of grant-funded work from the Institute of Education Sciences (IES), National Institutes of Health (NIH), United States Department of Education (USDOE), the Texas Education Agency (TEA), and the Texas Workforce Commission (TWC) to improve "school readiness" for at-risk children in Texas. Pursuant to Texas Education Code, Subchapter E, Section 29.160 (e) of Senate Bill 76 of the 78th Legislative Session, and House Bill 1, General Appropriations Act, Article III, Education, Texas Education Agency Rider No. 45 and Article VII, Business and Economic Development, Texas Workforce Commission Rider No. 27 of the 84thd Legislative Session, the Children's Learning Institute at The University of Texas Health Science Center at Houston is pleased to present the following report.

Should you have any questions about the details contained in this report, please contact the Director of CLI State Initiatives, Dr. April Crawford at 713.500.3740 or April.Crawford@uth.tmc.edu. Additionally, please do not hesitate to contact me.

Sincerely,

Susan H. Landry, Ph.D
Executive Director
Michael Matthew Knight Memorial Professor
Albert and Margaret Alkek Distinguished Chair in Early Childhood

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8. An experimental study evaluating professional development activities within a state funded pre-kindergarten program. Research paper published in *Reading and Writing: An Interdisciplinary Journal*, 24(8). September, 2011.
9. Effects of a brief tiered language intervention for prekindergarteners at risk. Research article published in *Early Education & Development*, 24:3, 2013.
10. Initial validation of the prekindergarten classroom observation tool and goal setting system for data-based coaching. Research paper published in *School Psychology Quarterly*, September 2013.
11. Scaling up data-based mentoring in pre-kindergarten classrooms. Chapter published in *Mentoring Practices, Potential Challenges and Benefits*, 2013.

introduction

Texas School Ready (TSR) is administered by the State Center for Early Childhood Development at the Children's Learning Institute at UTHealth.

The Texas School Ready project is the result of more than thirteen years of research, implementation, and innovation of targeted interventions that prioritize "school readiness" for at-risk children in Texas. The program realizes this goal through a focus on research-based curriculum, classroom resources, technology-driven child progress monitoring, teacher/staff professional development with one-on-one coaching, and ongoing program evaluation. Originally known as the Texas Early Education Model (TEEM), TSR has been made possible with combined grant funds from the Institute of Education Sciences (IES), National Institutes of Health (NIH), United States Department of Education (USDE), the Texas Education Agency (TEA), and the Texas Workforce Commission (TWC). Texas School Ready serves children across diverse settings including public school programs, federal Head Start programs, and community-based childcare (including for-profit, non-profit, faith-based, and federally subsidized settings). Our mission is to positively impact the early learning experiences and environments of our most academically at-risk children.

TSR's design is driven by the following research-based concerns:

- Early childhood is a critical period for building school readiness skills in language; literacy; mathematics; and social, emotional, and cognitive development.
- Children who come from families in poverty and disadvantaged backgrounds are less likely to receive quality early learning experiences at home and at school.
- Cognitive readiness can be achieved in ways that support the whole child.
- Research-based, comprehensive curricula are essential classroom tools.
- Responsive teaching that attunes to children's signals promotes social and cognitive development.
- Progress monitoring that informs adjustments to instruction better assures school readiness.
- Effective professional development, with ongoing coaching, assures goals are achieved.

Addressing these concerns through the implementation and sustainability of quality programs, the Texas School Ready project strives to ensure that at-risk children arrive at kindergarten well prepared and ready to succeed.

statewide impact

Through both sophisticated technology and a network of state and local partnerships, Texas School Ready is reaching more children than ever before.

2,343
participating schools

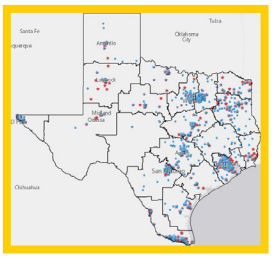
8,349
registered teachers

438
communities
356 districts and 12 charters
20 Head Start agencies
50 community organizations

8,016
PD certificates

38,874
hours of training

116,676
children supported through progress monitoring



Interested in TSR's participation by region? Check out our interactive heatmap, available at **go.uth.tmc/mapTSR**

CLI Engage

TOOLS HOUSED ON CLI ENGAGE

CIRCLE Progress Monitoring

CIRCLE Activity Collections

eCIRCLE Professional Development Courses

CIRCLE Classroom Observation Tools

CIRCLE Collaborative Tools

COMING IN 2017

Infant & Toddler Caregiver Courses

CIRCLE CDA Training Program

Texas Kindergarten Entry Assessment (TX-KEA)

Between 2003 and 2014, the Children's Learning Institute (CLI) researched and implemented large-scale interventions in early education, continually experimenting with ways to increase the number of teachers and children served. While this number steadily increased, technology limitations, personnel costs, and Texas' sheer geographic expanse presented barriers to a delivery scale that was truly reflective of statewide need. In 2014, in partnership with the Texas Education Agency, CLI began conceptualizing a cost-effective, digital delivery system that could disseminate early childhood program improvement tools across the state. This innovative e-learning and data utilization platform became known as CLI Engage.

In conceptualizing CLI Engage, we believed three primary goals could be achieved by transitioning to a platform that was TEA and CLI owned and managed: (1) our team of researchers, developers, and innovators would have more flexibility to enhance existing tools and develop new resources that could meet the state's needs; (2) the platform would emphasize data and an integration of tools, so that resources would complement and inform one another; and (3) a web-based platform would provide programs across the state with sustainable access to high quality tools, in turn serving an incredible capacity of children and families in Texas.

After a one-year pilot with three major school districts, CLI Engage officially launched to the state in fall 2015 with 6,834 teachers registered by December 31. Through significant outreach efforts, that number increased to 11,823 at the beginning of the 2016-2017 school year.

Moving forward, CLI Engage now serves as the technological base from which TSR is conceptualized and delivered (discussed further in the following pages). Moreover, the platform has the capacity to serve as a major vehicle for sustained statewide access to innovative professional development, supplemental curriculum, and assessment resources that local communities can tailor to fit their needs.

delivery models

Texas School Ready recognizes that one size does not fit all programs. In collaboration with the Texas Education Agency, TSR developed three delivery models — known as TSR Comprehensive, TSR Online, and TSR Online+ — to deliver services across the state. These cost-effective models range in intensity of support, greatly increasing TSR's ability to affect positive change in early childhood classrooms by matching the most intensive services to those teachers and students with the greatest need.

MODELS BY SERVICE DELIVERY SETTING

SERVICE SETTING	TSR ONLINE	TSR ONLINE+	TSR COMPREHENSIVE
Public school preK and open enrollment charters	Open enrollment	Eligible	Eligible if partnered with childcare or Head Start
Head Start centers	Open enrollment	----	Eligible
Texas Rising Star certified childcare providers	Open enrollment	----	Eligible
Non-Texas Rising Star childcare providers	Open enrollment for Past TSR participants	----	Eligible programs serve 50% at-risk children
INTENSITY	●●●●●●●●●●	●●●●●●●●●●	●●●●●●●●●●●●●●●●●●●●●●●●●●●●

TSR COMPREHENSIVE

TSR Comprehensive is the research validated, three-year professional development program that provides high-intensity support to early education teachers in communities that are most in need of quality resources and individualized technical assistance. TSR Comprehensive is made possible by collaboration and partnership at state, regional, and local levels.

Programs are eligible to participate in TSR Comprehensive if they meet certain requirements: all childcare programs must be in good standing with Texas Department of Family and Protective Services. Programs must be serving at least 50% at-risk children meeting eligibility requirements for state-funded prekindergarten and/or at least 50% children eligible to receive Child Care Management System (CCMS) funding. All Head Start programs are eligible, and public school preK programs if they are partnered with a child care or Head Start program. Additionally, home-based child care providers who are in good standing with Texas DFPS are eligible to join TSR communities and receive access to the Beginning Education: Early Childcare at Home (BEECH) professional development modules, as well as the BEECH materials kit and activity guide.

Every two years, community-based organizations can apply to become TSR Comprehensive "lead agents," serving as the hub for TSR in their local community. These lead agents recruit eligible Head Start, child care programs, and public schools to participate in TSR for three years and coordinate the delivery of services to TSR participants. In April 2015, a request for applications (RFA) launched for 2015-17 TSR Comprehensive Lead Agents. After a thorough review process, twenty-six lead agents were selected for the 2015-17 grant term (see image on the following page).

Through calls, emails, webinars, in-person trainings, and site visits, CLI provides implementation support to lead agents that enhances the program's performance and ensures fidelity to the model.

PROJECT DIRECTION

Faculty researchers, project managers, and technology developers shape and innovate TSR at the Children's Learning Institute at UTHealth

PROGRAM MANAGEMENT

Regional program managers provide quality assurance and coordinate local implementation among multiple lead agencies (see next paragraph). Program managers are employed by UTHealth but reside in the communities they serve.

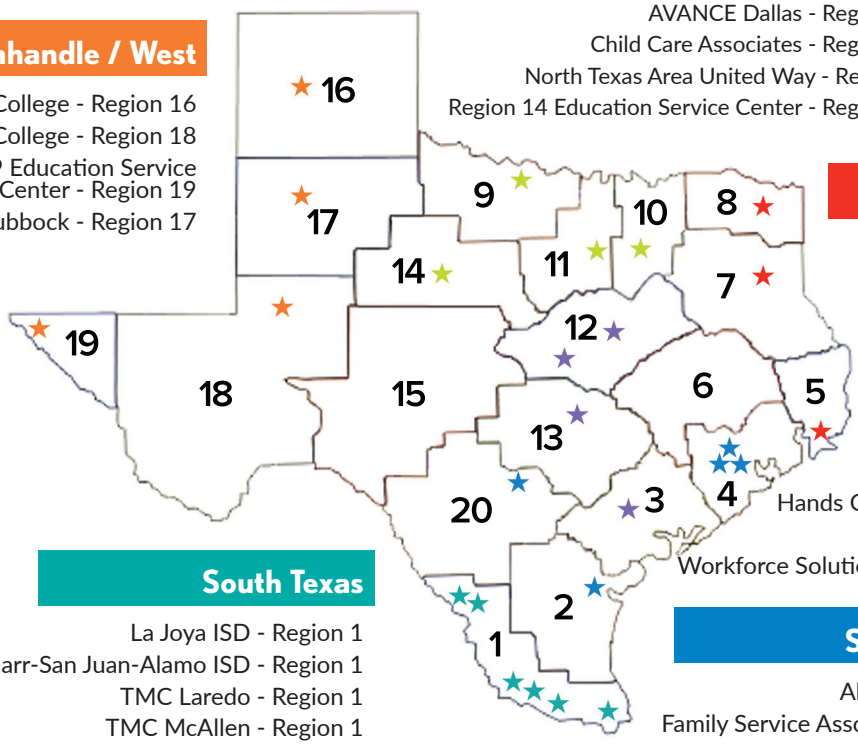
PROGRAM IMPLEMENTATION

TSR partners with local organizations, including school districts, education service centers, and workforce development boards, who serve as lead agencies for TSR in their communities, providing direct services. TSR coaches are employed by the lead agency but are in regular contact with program management. A list of the 2015-2016 lead agents can be found in Appendix 1.

TSR COMPREHENSIVE ELIGIBLE PROGRAMS

- **Childcare centers that serve at least 50% at-risk children**
- **Head Start centers**
- **Public preK if partnered with one of the above**

TSR 2015-2017 LEAD AGENCIES



North Texas

AVANCE Dallas - Region 10
Child Care Associates - Region 11
North Texas Area United Way - Region 9
Region 14 Education Service Center - Region 14

Panhandle / West

Amarillo College - Region 16
Midland College - Region 18
Region 19 Education Service Center - Region 19
YWCA Lubbock - Region 17

Northeast Texas

Kilgore College - Region 7
Region 5 Education Service Center - Region 5
Region 8 Education Service Center - Region 8

Central Texas

EOAC Waco - Region 12
Hands On Learning, Inc. - Region 12
TMC Victoria - Region 3
Workforce Solutions Capital Area - Region 13

South Texas

La Joya ISD - Region 1
Pharr-San Juan-Alamo ISD - Region 1
TMC Laredo - Region 1
TMC McAllen - Region 1
Workforce Solutions Cameron - Region 1
Workforce Solutions South Texas - Region 1

Southeast Texas

Aldine ISD - Region 4
Family Service Association - Region 20
Houston ISD - Region 4
Region 2 Education Service Center - Region 2
Rhodes School - Region 4

Teachers who participate in TSR Comprehensive receive three years of professional development, including individualized coaching through one of two coaching models: face-to-face or remote (web-based). TSR coaches demonstrate new instructional strategies, work one-on-one with teachers to help refine their practices in-the-moment, help with room arrangement to support classroom management and learning opportunities, and are available to help teachers create lesson plans. Face-to-face coaches provide this support in the classroom, while remote coaches communicate with their teachers through phone calls and use video editing software to provide annotated feedback on a teacher's instructional videos. Feedback is aligned with the CIRCLE Classroom Observation Tool, ensuring teachers in both face-to-face and remote coaching are working toward the same quality improvement goals.

In addition to individualized coaching, all TSR Comprehensive teachers receive the CIRCLE Preschool Foundations Training (two-day introduction to early learning concepts) and monthly facilitated eCIRCLE sessions (video-based courses that delve deeper into school readiness concepts).

TSR Comprehensive enrollment for the 2015-2016 school year is described to the right. CLI maintains a waiting list of approximately 400 programs that would like to participate.

TSR COMPREHENSIVE 2015-2016 PARTICIPATION

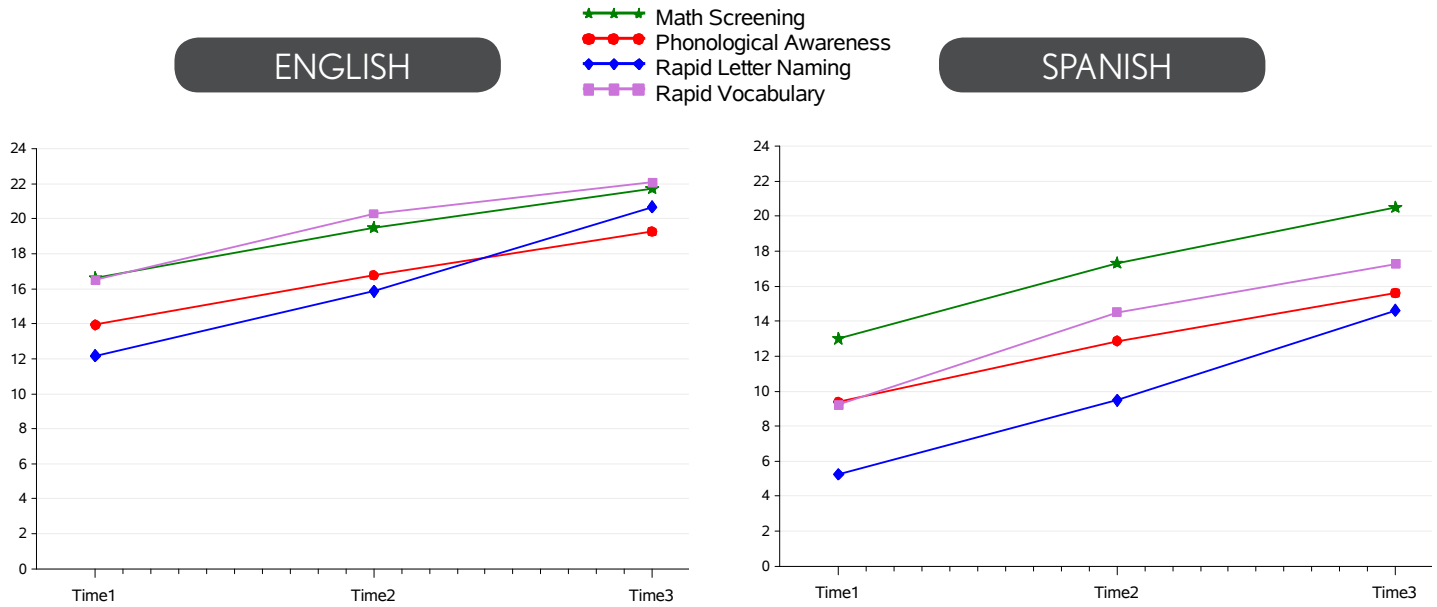
Setting	Schools	Teachers	Students
Childcare	702	1,457	13,947
Head Start	201	477	7,612
District	36	76	1,126
Totals	**939**	**1,989***	**22,636**

***395 of these teachers participated in TSR Comprehensive through the Beginning Education: Early Childcare at Home (BEECH) program.**

Student Gains

The design and intensity of TSR Comprehensive allows us to continue to evaluate the effectiveness of our professional development efforts and monitor student progress toward school readiness. Progress monitoring of children's learning is a key feature of the Texas School Ready model. The more that young learners have an early mastery of letters, words, sounds, and math, the better they tend to do in school as they progress into the upper elementary grades and beyond.

These two graphs depict progress monitoring results for TSR Comprehensive students across three distinct time periods during FY2016. The scores include Letter Knowledge, Phonological Awareness, Vocabulary, and Mathematics. All scores are further broken down for tests given in English and Spanish. These four scores are important indicators that correlate highly with a child's success upon kindergarten entry and longer term academic success.



Teacher Gains

TSR measures teacher gains in instructional behaviors known to advance child outcomes using a standardized assessment tool known as the CIRCLE Classroom Observation and Goal-Setting Tool (see page 20). PreK teachers in TSR Comprehensive have shown meaningful changes after just a few months of participation in the project. In the graph to the left, BOY refers to beginning of year observations; MOY, middle of year. Change from BOY to MOY represents the average increase in instructional strategies observed during a 2-hour classroom observation. The graph illustrates improvements across all content areas related to key early childhood indicators.

Participant Testimonials

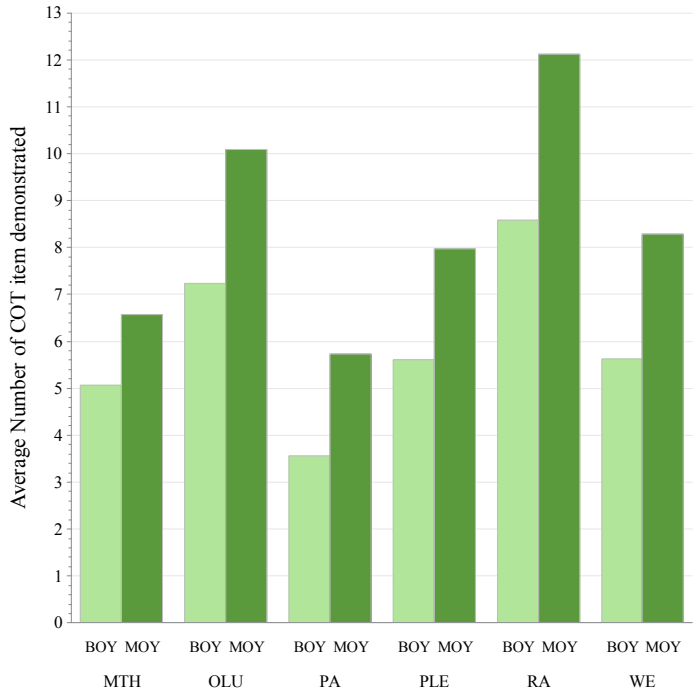
"I have had the privilege to be a TSR teacher for the past three years. I am humbled by the opportunity and extremely grateful that I was selected to be in this wonderful life-changing program. I am a better teacher for it. Your program has helped me in so many ways and I know that it will for years to come. You have made a difference in my teaching and in the way I approach things, but most of all the gratitude I feel is immense. I only wish that this were my first year. I will miss all of the deadlines, the online tests, the mentoring, and the lessons that I planned with my coach, but in all honesty I will miss it all!"

—TSR Comprehensive teacher

"TSR is a great program, it reaches all areas of development and the teachers who are in TSR has more instructional strategies and more practical materials and activities to work with the children. The teacher in my center has improved in language support and concept development and getting it across to the students."

—TSR Comprehensive administrator

USE OF INSTRUCTIONAL STRATEGIES : BOY vs MOY



MTH: Math, OLU: Oral Language, PA: Phonological Awareness, PLE: Print/Letter & Early Reading, RA: Read Alouds, WE: Written Expression

TSR COMPREHENSIVE 2016 TEACHER SURVEY (409 responses)	
91%	felt eCIRCLE facilitation classes were important in improving their classroom instruction
90%	felt CIRCLE 2-day training to be important
75%	said they refer to the CIRCLE Activity Collection at least 2-3 times per week
74%	said they regularly use child progress monitoring reports to plan instruction
93%	felt very satisfied with the coaching support received
96%	felt that coach's recommendations helped improve their classroom instruction
95%	reported that with coaching support they met their short-term instructional goals most or all of the time

TSR ONLINE

TSR Online is the package of digital resources that are now housed on CLI Engage: CIRCLE Progress Monitoring, eCIRCLE Professional Development, CIRCLE Activity Collection, and the classroom observation and collaborative tools. Eligible programs (left sidebar) can access these tools at no cost and are encouraged to tailor the suite of resources to fit their local needs. This allows districts to implement or exclude tools such as assessments or professional development courses based on the current priorities of the program. TSR also provides resources for districts to build local training capability; for example, district staff can use TSR's web-based training and facilitation guides to lead eCIRCLE professional development in group sessions with their teachers.

TSR ONLINE ELIGIBLE PROGRAMS

- **Public school districts and charter schools**
- **Head Start and Early Head Start programs**
- **Texas Rising Star Certified Providers (child care)**
- **Past and current Texas School Ready participants**

Because the CLI Engage platform was conceptualized with TEA to meet the needs of public school districts, enrollment in TSR Online at the district level is highly encouraged. Districts can appoint "community administrators" who coordinate roster uploads and manage data and reporting at the highest level. Each subsequent level (e.g. principals, school specialists, teachers) are given specific user roles that pre-determine their level of access. For instance, a principal may pull an aggregate progress monitoring report for all students enrolled in one school, but a teacher will only see data for his or her class. This hierarchical structure makes district-level adoption seamless and encourages wider participation.

During the 2014-2015 school year, three major independent school districts participated in a pilot of CLI Engage (2,400 teachers and nearly 50,000 students). This "Texas-sized" pilot provided invaluable feedback on the usability of the platform and even recommendations for further resource development. All three districts re-enrolled for the platform's statewide launch in fall 2015.

Prior to and during the 2015-2016 school year, the TSR communications team conducted a statewide outreach campaign that included press releases, webinars and newsletters, conference presentations and tradeshow booths, a TSR Online track at TSR's annual statewide conference, and 13 local community events in partnership with education service centers.

Through regional partnerships, TSR Online is expanding its reach beyond enrollment in the platform; 18 out of the 20 education

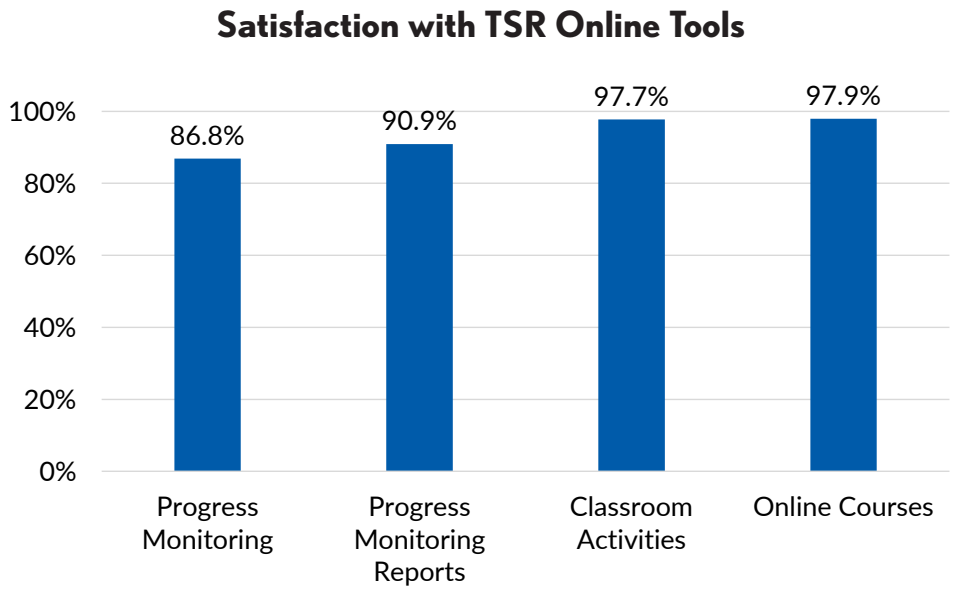
TSR ONLINE
2015-2016 PARTICIPATION

Setting	Schools	Teachers	Students
Childcare	173	495	2,964
Head Start	174	483	6,271
District	1,281	5,679	85,970
Totals	**1,631**	**6,657**	**95,205**

service centers are active on CLI Engage and have adopted or developed trainings that support TSR Online implementation. These include ESC delivery of progress monitoring training, eCIRCLE professional development sessions, and the CIRCLE Preschool Foundations Training. Additionally, all 20 ESCs have signed up to host outreach events in Spring 2017.

As TSR's service expanded with the launch of CLI Engage, TSR staff developed protocols for measuring the ongoing performance of the platform and its tools. This requires careful monitoring of the platform's help ticket system, which categorizes the support issues submitted by users and tracks responses from CLI's team of six Client Support Analysts. Ticket submissions seek support for common issues such as help establishing accounts, uploading data, finding solutions to technical issues, navigating the platform, and becoming comfortable with the individual tools. In FY2016, the technology team streamlined this process to successfully close 5,609 help tickets, with 80% of those tickets resolved within 72 hours of submission.

During 2016, CLI also launched multiple surveys to gain feedback from users on numerous performance indicators. Over 80% of respondents reported being likely or very likely to recommend CLI Engage to peers by the end of the school year. The graph below indicates user satisfaction level with the most commonly used tools.



TSR ONLINE+

TSR ONLINE+ ELIGIBLE PROGRAMS

School districts and charter schools eligible through competitive application process

TSR Online+ provides an opportunity for Texas public school districts and charter schools to apply for enhanced TSR services beyond what is already available to them through TSR Online. These services—foundations training, *Developing Talkers* training, and individualized coaching sessions, specifically—are ingredients that have been used in the research-validated model of TSR, now known as TSR Comprehensive. These services are provided to school districts and charter schools at no cost through TSR funding from the Texas Education Agency.

CIRCLE Preschool Foundations Training: a two-day, face-to-face introduction to the foundational concepts underpinning Texas School Ready and its tools. This training demonstrates the need to incorporate more playful and purposeful activities that move beyond traditional, rote instruction. All established early learning domains are addressed in addition to best practices and classroom management. Attendees also explore lessons from the CIRCLE Activity Collection in the context of quality instructional practices such as responsiveness and scaffolding. This training is often delivered through partnerships with regional education service centers.

TSR ONLINE+ 2015-2016 PARTICIPATION

	Districts	Teachers
CIRCLE Training		
Delivered	39	434
Remote Coaching		
Delivered	**28**	**136**
Developing Talkers Kits		
Delivered	31	596

Five Sessions of Personalized Remote Coaching: specially trained TSR remote coaches use positive coaching strategies to provide individualized professional development to teachers. District and school leaders work with TSR coaches to prioritize instructional areas for improvement. Coaches begin with a call to set goals, provide resources, and help with instructional planning. The teacher is then assigned an activity and specific instructional practices to target; the assignment is filmed and uploaded through CLI Engage's collaborative tools. The coach uses editing software to annotate the video, focusing feedback on the specific strategies laid out in the CIRCLE observation tools. Teacher and coach use a followup call to discuss the feedback and set goals for the next assignment.

REMOTE COACHING

Teacher films instruction:

Coach provides feedback through annotated video and coaching calls:

Developing Talkers / Hablemos Juntos Materials and Training: a web-based training on the Pre-Kindergarten Response to Intervention (P-RTI) instructional framework and supplemental curriculum targeting listening comprehension and vocabulary skills (more details can be found in the next section).

The TSR communications team conducted outreach to Texas school districts and charter schools in Spring 2016 to encourage them to apply for TSR Online+. The application for TSR Online+ opened in April 2016, and TSR Online+ grantees were notified of their awards in June 2016. TSR partnered

with ESCs whenever possible to host the CIRCLE Preschool Foundations Training for the TSR Online+ grantees in their regions; these trainings began in early FY2016. A TSR Online+ application for the 2017-18 school year will open in Spring 2017.

"This program has helped me improve my teaching style tremendously. By the time I completed my final video, I was no longer nervous. I was rather eager to discuss how I was growing and learning so much from my coaching sessions. I am a better teacher and I am beyond grateful that I had this amazing opportunity to grow."

—TSR Online+ teacher

TSR ONLINE+ 2016 TEACHER SURVEY (42 responses)	
93%	felt their coach provided them with deeper content knowledge and clear instructional strategies to support children's learning
95%	would recommend remote coaching to other teachers

our approach

Research conducted by the Children's Learning Institute, as well as innumerable studies in the field, strongly suggests that a successful approach to improving early learning environments combines the following key components:

- Curriculum and classroom materials that are developmentally appropriate and support skills known to predict school readiness.
- Ongoing professional development for teachers that incorporates effective adult learning strategies, provides authentic context, and supports teachers in moving toward more sophisticated instruction.
- Progress monitoring that is research-validated and briefly administered and whose primary purpose is to inform instruction.
- Observation tools that measure teacher practice and provide a concrete basis for setting goals for improvement.

These components, as implemented in the Texas School Ready project, are discussed in depth in the following pages. Many of these resources are now more widely available through the CLI Engage online platform. While many of TSR's resources are available across delivery models, some components are targeted to programs most in need of additional supports. Delivery of tools and trainings discussed in the following pages can be matched to TSR model using the key below:

● TSR Comprehensive; ● TSR Online;
● TSR Online+

curriculum & materials

Research supports TSR's approach that teachers need the right tools to do their jobs effectively. All programs that participate in TSR serve at-risk children, yet many of them lack the resources to purchase high quality curriculum and materials. TSR provides a unique combination of curriculum and state standards, instructional materials, and access to technology.

Curriculum & State Standards

	Model		
Resource	C	O	O+
Activity Collection	●	●	●
Developing Talkers kit	●		
Learning guidelines	●		
Curriculum	●		

The *CIRCLE Activity Collection* refers to a variety of hands-on activities that teachers can implement during large group, small group, centers, and one-on-one instruction. Language, literacy, social emotional skills, mathematics, and science are the core concepts covered in CIRCLE activities. Now in digital format, the collection includes new and expanded activities, videos of select activities performed in real classrooms, and direct links to activities from the *CIRCLE Progress Monitoring System*.

Developing Talkers / Hablemos Juntos Supplemental Curriculum kits are provided to TSR Comprehensive teachers who have progressed beyond the foundational concepts of instruction (after year 1). Developing Talkers targets listening comprehension and vocabulary skills by providing lessons, materials, and instructional templates. Each of the four units provides 80 Tier-1 and 64 Tier-2 lesson plans for 16 weeks of instruction, vocabulary and picture cards for each week of instruction, and two books per week (32 books total).

Printed copies of the *Texas Infant, Toddler, and Three-Year-Old Early Learning Guidelines* and *Texas Prekindergarten Guidelines* are given to all TSR Comprehensive teachers. The CIRCLE Activity Collection is aligned to these state standards, as well as the *Head Start Early Learning Outcomes Framework*. These alignments support teachers in planning for instruction across learning domains and targeting end-of-year outcomes.

Many TSR childcare centers located in high risk communities lack the foundational instructional materials necessary to help children build school readiness skills. If a center does not own any high quality state-approved curricula, TSR Comprehensive will purchase one for its participating preschool classrooms. TSR coaches then train teachers to implement the curriculum in conjunction with quality teaching strategies.

Instructional Materials

Resource	C	O	O+
Startup kit	●		
Readiness kit	●		

All TSR Comprehensive classrooms are provided the *Classroom Startup Kit*, which includes pre-printed posters, sentence strips, charts, letter walls, labels, and other materials that aid in classroom management.

All TSR Comprehensive classrooms are also provided with *School Readiness Kits* that contain manipulatives, books, and activity cards for instruction across six content areas—math, science, written expression, letter knowledge, oral language, and phonological awareness. This kit is used in combination with the CIRCLE Activity Collection to ensure teachers have the materials necessary to deliver hands-on learning experiences.

Access to Technology

Resource	C	O	O+
Laptop	●		
Camera	●		●

Many centers participating in TSR do not have computers in individual classrooms. TSR provides laptops to teachers to effectively administer CIRCLE Progress Monitoring and access the online professional development resources.

TSR teachers participating in the remote model of coaching (through both Comprehensive and Online+ delivery models) are given cameras to record instructional assignments for their coaches.

professional development

During the 2015-2016 school year, TSR participants received professional development through a variety of face-to-face and web-based mediums, including:

CIRCLE 2-day Training

- Comprehensive;
- Subset of Online+

CIRCLE Preschool Foundations Training (also referred to as CIRCLE 2-day) is a face-to-face introduction to the foundational concepts underpinning Texas School Ready and its tools. The goal of the training is to provide a strong knowledge base of early childhood development and quality instructional strategies that support it.

Progress Monitoring Training

- Comprehensive

Each teacher participating in TSR Comprehensive attends an eight-hour training on the CIRCLE Progress Monitoring System that features the goals of tracking child progress, how to conduct the assessments on our web-based tool, and pulling reports on child progress throughout the year.

ITELG Training

- Comprehensive

Texas Infant, Toddler, and Three-Year-Old Early Learning Guidelines Training is a face-to-face introduction to the ITELG domains, as well as information on how to effectively use the guidelines in the classroom.

Developing Talkers Training

- Comprehensive: 2nd and 3rd year teachers;
- Subset of Online+

Developing Talkers / Hablemos Juntos Training is a face-to-face and/or web-based training on the Pre-Kindergarten Response to Intervention (P-RTI) instructional framework and supplemental curriculum, *Developing Talkers / Hablemos Juntos*. Developing Talkers targets listening comprehension and vocabulary skills by providing lessons, materials, and instructional templates.

eCIRCLE Courses

● Comprehensive;
● Online; ● Online+

eCIRCLE Professional Development represents more than 100 hours of online courses featuring extensive video-based demonstrations of effective instructional practices, as well as application-based assignments and activities. The courses cover a broad range of topics aligned with the Texas PreK Guidelines and include research-based key predictors of language and literacy development. eCIRCLE can be delivered self-paced or in a facilitated group setting.

BEECH Courses

● Comprehensive;
● Online; ● Online+

Beginning Education: Early Childcare at Home (BEECH) is an online professional development system specifically designed for home-based child care providers. BEECH is used with home-based providers in the TSR Comprehensive program but is also available statewide at no cost to participants. Toddler teachers at participating center-based TSR schools are also using the BEECH courses to build their knowledge and skills.

Coaching

● Comprehensive;
● Subset of Online+

Personalized coaching is delivered on a biweekly basis either face-to-face or via video upload and phone call. TSR coaches are trained to use positive mentoring strategies aligned with the Classroom Observation Tool to set teacher goals and track progress. Project managers have multiple processes for ensuring the quality of our teacher coaching. Driven by the CLI Coaching Competency Framework, coaches receive intensive training that includes:

- a week-long coaching conference;
- a "lunch and learn" series, delivered via webinar—sessions are targeted to areas of need identified through a review of child progress monitoring reports and teacher-coach goal-setting practices; and
- monthly "collaborative coaching" phone conferences that use coach-recorded videos to encourage self/peer reflection and provide feedback to improve practice.

Summer Institute

● Comprehensive;
● Online; ● Online+

The Texas School Ready Summer Institute is a high-level research and training conference that registers 1,500 early childhood administrators, practitioners, and leaders across Head Start, childcare, and public school settings. While all participants receive free registration to the event, TSR provides approximately 375 scholarships to current TSR Comprehensive participants to offset hotel accommodation for those teachers with the greatest need. A hallmark of the institute is its unique combination of small, hands-on trainings with larger presentations from nationally recognized early childhood experts. 92% of survey participants rated the summer 2015 Institute as "excellent" or "very good."

Webinars & Other Outreach

● Comprehensive;
● Online; ● Online+

The TSR staff regularly delivers free webinars, newsletters, and other media to assist schools and centers with implementing quality instructional practices using TSR's tools. Past topics include "Creative Effective Classroom Setups," "Interactive Writing Techniques," and "Using Data in the Classroom."

data-driven tools

CIRCLE PROGRESS MONITORING

Available to ● Comprehensive; ● Online; ● Online+

TSR's assessment tool, the CIRCLE Progress Monitoring System (formerly known as C-PALLS+), is a user-friendly, technology-driven tool that enables teachers to quickly assess children's progress in multiple learning domains important for kindergarten readiness. This simple yet reliable data collection allows teachers to focus on lessons that target their students' least developed skill sets.

Along with a sophisticated reporting system, the tool uses benchmark status to automatically group children for skill-based small group instruction. This grouping feature links directly to lessons in the CIRCLE Activity Collection that support the targeted skill.

CIRCLE Progress Monitoring is based upon well-established prekindergarten guidelines and covers all domains in the *Head Start Early Learning Outcomes Framework*. It is a criterion-referenced measure that relates well to established standardized tests and is sensitive to growth in children's skills over time. The data used to support the reliability and validity of the CIRCLE Progress Monitoring System came from numerous research studies done by the Children' Learning Institute and continues to be evaluated with data from CLI Engage. Samples of CIRCLE Progress Monitoring direct assessments, observables, and reporting features can be found in the appendices.

CLASSROOM OBSERVATION TOOL (COT) and CLASSROOM ENVIRONMENT CHECKLIST (CEC)

Available to ● Comprehensive; ● Online; ● Online+

TSR coaches use the COT to capture evidence-based teaching behaviors that research has shown improve child outcomes. The tool provides a clear, unbiased system for tracking and monitoring teacher performance and progress. Item level indicators are highly targeted and address the breadth of learning domains important for school readiness. The system is well aligned with the Texas Prekindergarten Guidelines and can be used by teachers, school leaders, and intervention specialists to promote effective teaching. Samples of COT items and the teacher goal report can be found in the appendices.

The COT is accompanied by the Short-Term Goal Setting and Reporting System, which allows coaches and teachers to set achievable goals for incorporating specific instructional practices on the COT within a specified amount of time. For example, one goal report might target five strategies for a two-week period. These reports link directly to video clips, photographs, or other resources that provide an authentic snapshot of the strategy in action.

Similar to the COT, the Classroom Environment Checklist (CEC) is a quality evaluation tool designed to track improvement over time. The CEC's focus is the presence and quality level of instructional planning tools, meaningful literacy and print centers and materials, and the overall design and management of the classroom and individual centers.

additional 2016 innovations

ENHANCEMENTS TO CLI ENGAGE

During the pilot and first year of CLI Engage, CLI monitored feedback we received from users, staff, and our help ticket system. We used this feedback to improve the flexibility and functionality of the platform in the system enhancements that launched June 2016. These addressed a variety of improvements across CLI Engage's tools, including: updates to the collaborative tools that add consistency and clarity to the coaching process; a new template for creating assessments; clearer color coding for benchmark status on assessment reports; upgrades to data management tools; and new parent features.

TEXAS RISING STAR TRAINING AND SUPPORT

In partnership with the Texas Workforce Commission, CLI Engage houses the Texas Rising Star assessor's tool, as well as the online training for TRS assessors and mentors. In FY2016, CLI Engage's technology supported:

- 1,580 completed TRS site assessments
- 5,280 active classrooms (1,263 infant, 1705 toddler 1,876 preschool, and 841 school-age)

As a result of this activity, CLI staff provided approximately 1,200 instances of customized support (help tickets, phone calls, etc.) that helped improve consistency in data collection and scoring across the state.

CLI's TSR staff also planned and implemented the 2nd Annual Texas Rising Star Assessors and Mentors Training with 160 TRS staff in attendance. This weeklong training focused on best practices in assessment and mentoring protocols, as well as an in depth look at the 2016 updates to the Texas Rising Star guidelines.

INFANT AND TODDLER COURSE AND ACTIVITY COLLECTION

The Texas School Ready project is leveraging gifts from multiple foundations to expand resources for TSR participants who care for children ages birth to three. These resources will be hosted on CLI Engage and will include a full suite of professional development courses, classroom activities, teacher observation items, and child screening tools. In FY2016, CLI completed the first and largest course of the series, *Talk with Me: Promoting Early Language Development.* Samples of the course can be found in the appendix. (See the next section for 2017 development plans.)

ePATT

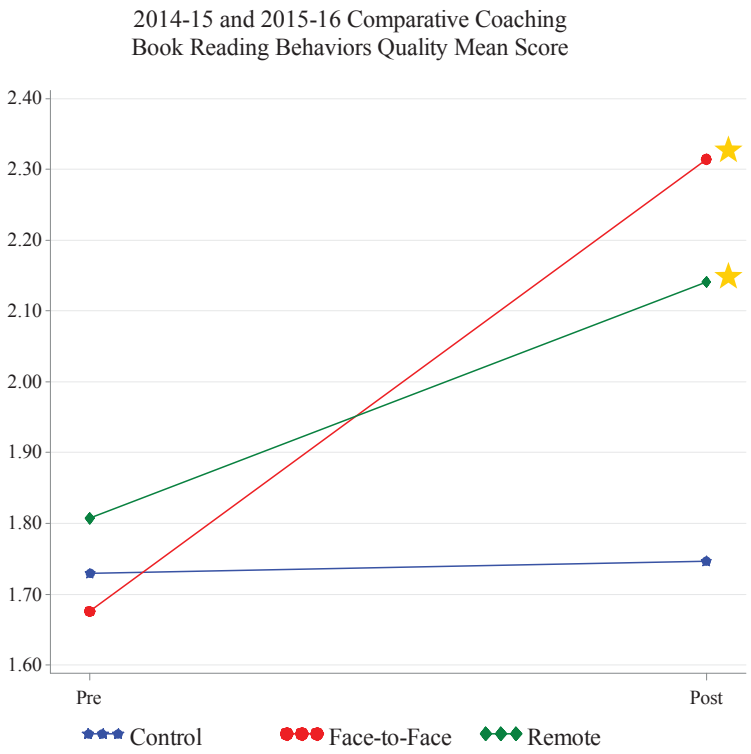
ePATT (an online implementation of Parents and Teachers Together) is advancing what we know about interventions in the two settings most often targeted by researchers and policymakers: home and school. The study, funded by the US Department of Education's Institute of Education Sciences, investigates the benefits for at-risk children of targeting teacher instructional practices in combination with parental use of responsive style in the home. Teachers from local Head Start programs participate in TSR's online professional development sessions, while parents of students in their classrooms receive online training and coaching in CLI's parent program, *Play and Learning Strategies* (PALS). The project will also analyze program cost-effectiveness and determine whether the intervention's effects on children's school readiness skills are sustained into kindergarten.

COMPARATIVE COACHING STUDY

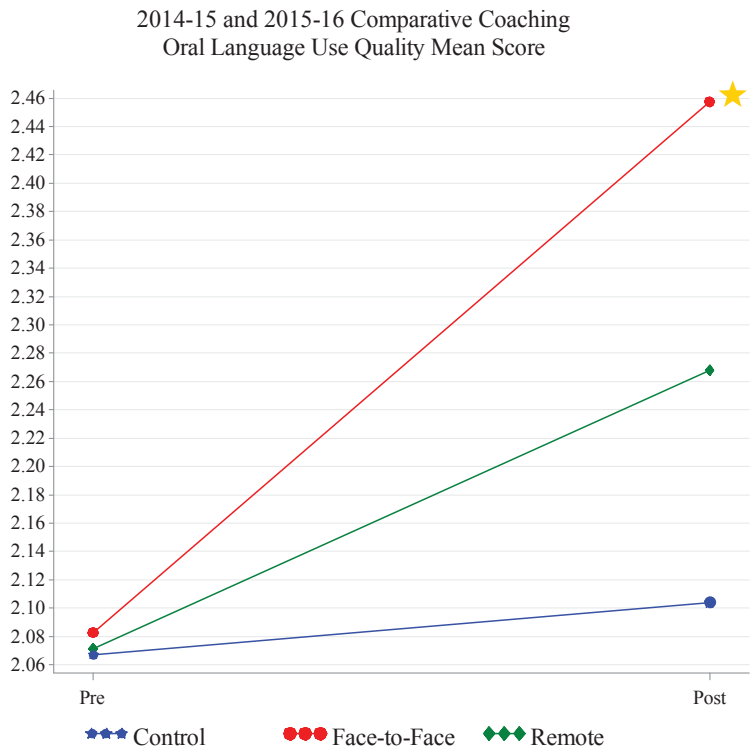
The comparative coaching study is a part of our ongoing effort to validate TSR's approach in new settings and delivery models. The study, funded by the US Department of Education's Institute of Education Sciences, brings together two widely used coaching approaches for supporting early childhood teachers, both used in TSR: face-to-face (in-class) and remote (video-based). This three-year study, the first of its kind, contrasts the two approaches in order to carefully examine the cost-effectiveness of using a technology-mediated coaching model. Remote coaching has the potential to save costs and increase access to professional development, especially for early care providers in rural communities. Through this study, an economic analysis will help us to identify the most effective and efficient methods for providing coaching that effectively advances teacher's instructional practices.

The graphs to the right and on the following page show teacher gains in quality instructional practices with face-to-face or remote coaching support relative to control teachers who received no coaching support. Teachers in this study come from childcare centers participating in the Texas School Ready project (n=156 randomly assigned to groups).

Teacher practice is measured with the Teacher Behavior Rating Scale, a pre- and post-intervention observational tool used to measure teacher instructional practices. "Quality" is measured on a 4-point scale; "quantity" is measured on a 3-point scale. Significant gains were found for



Post-test significance: Face-to-Face & Control: P <.001 Remote & Control: P <.01



Post-test significance: Face-to-Face & Control: P <.01

both face-to-face and remote coaching models in book reading quality, phonological awareness quality, and print and letter knowledge quantity. Significant gains in oral language quality were found for the face-to-face model. Sample indicators for each graph are found below.

Book Reading Quality

- Introduces the book
- Encourages discussion of book features
- Vocabulary words are combined with pictures or objects
- Reads with expression
- Extends book through activities and discussion

Oral Language Quality

- Models speaking in complete sentences
- Uses scaffolding language
- Uses thinking questions
- Makes links with previously learned words and concepts
- Engages children in conversations

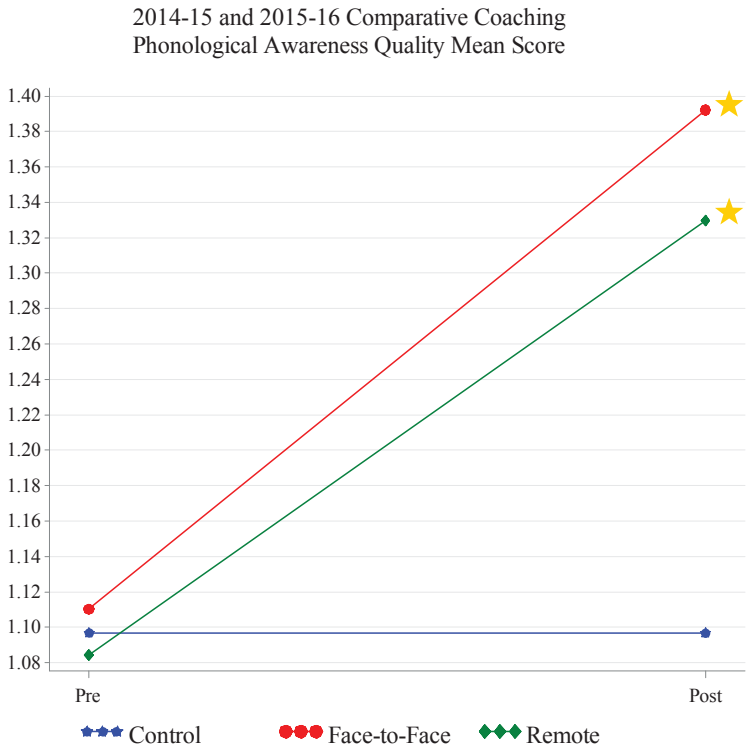
Phonological Awareness Quality

Integrates PA activities:

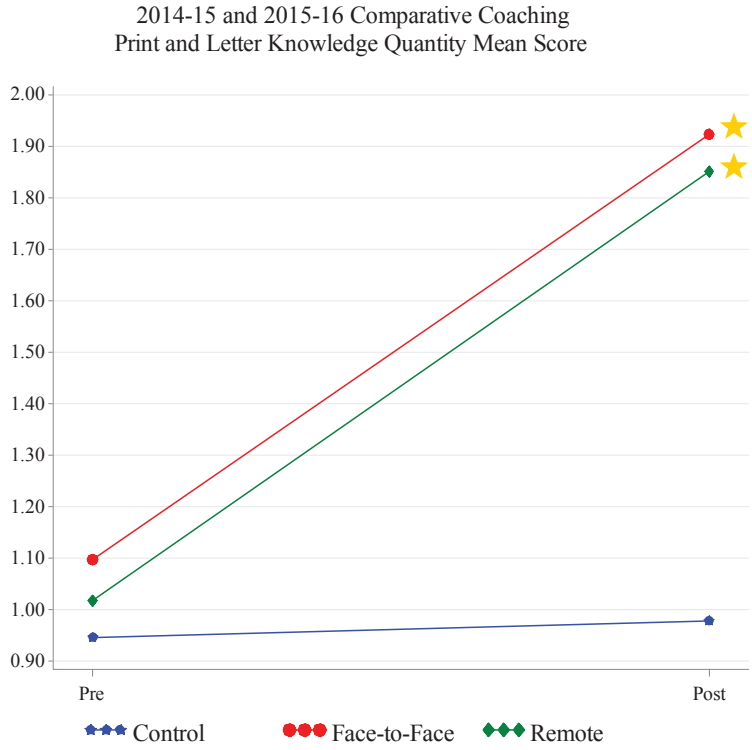
- Listening
- Sentence segmenting
- Syllable blending and segmenting
- Onset rime blending and segmenting
- Alliteration

Print and Letter Knowledge Quantity

- Promotes letter word knowledge
- Compares and discusses differences in letter and words
- Discusses concepts of print
- Breadth of print and letter activities
- Literacy connection in centers
- Print in the environment and centers
- Letter wall



Post-test significance: Face-to-Face & Control: P <.001 Remote & Control: P <.01



Post-test significance: Face-to-Face & Control: P <.001 Remote & Control: P <.001

2017 expansion projects

CHILD DEVELOPMENT ASSOCIATE TRAINING & RESOURCES

At the beginning of FY2016, the Children's Learning Institute began development work to expand our course library to provide early childhood teachers the training hours needed to apply for the Child Development Associate (CDA) Credential™ for Center-Based Programs. This training program maximizes Texas School Ready, as well as the Texas Rising Star program, by aligning their resources with a nationally recognized credential. Further, it provides a new professional development opportunity and career pathway to the early childhood teachers already enrolled in eCIRCLE professional development.

Leveraging eCIRCLE content in addition to new CDA courses, teachers will receive all 120 hours of high-quality professional development in the 13 CDA functional areas and support to complete the required CDA competency statements and professional portfolio. CLI is piloting the CIRCLE CDA Training Program with 30 preschool teachers currently enrolled in Texas School Ready for fall 2016. Following the pilot of the program, the online courses and materials will be available for all teachers enrolled in CLI Engage. Samples of the course concept design can be found in the appendices.

EXPANSION OF INFANT & TODDLER CAREGIVER RESOURCES

As previously discussed, TSR is expanding its resources to support teachers and parents of children ages birth to three. Approximately 50 activities are completed, as is the first course of the series, *Talk with Me: Promoting Early Language Development*. Courses use video of real teachers overlaid with expert commentary and annotation to hone in on the quality caregiving strategies that lay the foundation for later skill-building. Staff will focus development in FY2016 on courses covering early literacy, best practices around developmental screening, and early social-emotional development. All public school districts, Head Start and Early Head Start programs, Texas Rising Star-certified providers, and past and current Texas School Ready participating sites are eligible for free access to these resources.

CIRCLE ACTIVITY COLLECTION PREK UPDATE AND EXPANSION

The *CIRCLE Activity Collection: PreK* includes over 300 online activities in English and Spanish that support teachers in providing classroom experiences that build school readiness skills. Throughout FY2017, TSR staff will be filming and annotating videos to accompany a greater number of activities. These videos provide an extra layering of professional development and are used frequently by TSR coaches to target specific strategies. Additionally, new activity scripting will incorporate both downward and upward scaffolds to support teachers in providing more individualized instruction. Finally, the web-based collection will be redesigned to simplify navigation and improve filtering capabilities that support lesson planning. The revised collection is set to launch fall 2017.

PARENT ENGAGEMENT RESOURCES

CLI is strengthening the school-home connection through the launch of parent-friendly child progress monitoring reports that link directly to a publicly accessible *CIRCLE Activity Collection for Parents*. This web-based collection will provide easy, playful ways parents can support their child's development and will include annotated video demonstrations, tips, and learning links that show how activities build skills.Through the CLI Engage database, teachers can select activities to send directly to parents via email, and parents receive activities individualized to the needs of their child.

TECPDS WORKFORCE REGISTRY

In partnership with the Head Start State Collaboration Office, local workforce development boards, and the Texas Workforce Commission, CLI is exploring ways to increase enrollment in the Texas Early Childhood Professional Development System's Workforce Registry using CLI Engage outreach. A robust workforce registry would aid in the state's goal to create clear professional pathways for early childhood professionals. CLI is also interested in using the technologies of both CLI Engage and the Workforce Registry to align certificate data for those who have utilized professional development on CLI Engage.

PUBLIC RESOURCES ON CLI ENGAGE

CLI, in partnership with the Texas Workforce Commission and the Texas Education Agency, is working to provide more publicly available resources to support parents, teachers, and programs that are not formally involved with the Texas School Ready project. As CLI revises and develops new tools for teachers and parents of children from birth to kindergarten entry, these resoures will also be formatted for delivery through new public resource pages on CLI Engage. These pages will include informative videos, parent and teacher activities, courses (including completion certificates), and information about screenings and assessments.

INTEGRATED OUTREACH EFFORTS

TSR is planning an integrated communications and outreach campaign, beginning in January 2017 and extending through the TSR Summer Institute in July, that will target outreach for multiple initiatives:

1. Community events at all 20 education service centers to target enrollment of school districts in the Texas Kindergarten Entry Assessment and TSR Online;
2. 20 additional events at local workforce development boards to target enrollment in TSR Online for Texas Rising Star Certified Providers;
3. Meetings with leaders at higher education institutions to discuss collaborative ways to deliver Texas School Ready resources through programs that provide training for future early childhood professionals;
4. A minimum of five "training of trainers" events to support statewide delivery of new infant and toddler teacher resources.

The outreach campaign is leveraging personnel and funding resources by bundling communications, events, and meetings based on location and date.

APPENDICES

The following pages are intended to provide greater depth to the topics discussed in this report. These appendices include:

- Samples of the technology-based resources and tools housed on CLI Engage
- TSR's project management/budget overview, expenditure reports, and expenditure definitions
- Peer-reviewed publications describing the research behind the validity and effectiveness of TSR tools

Resource Samples

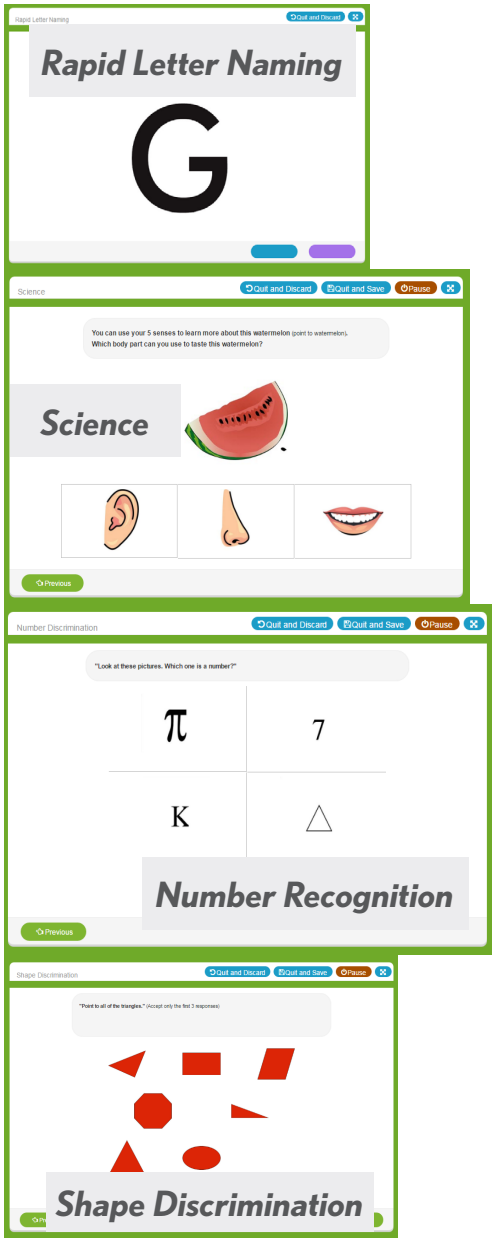
The following pages contain samples of TSR tools:

- CIRCLE Progress Monitoring
- eCIRCLE Professional Development Courses
- CIRCLE Activity Collection
- CIRCLE Observation Tools
- *Developing Talkers* Supplemental Curriculum
- Infant and Toddler Language Resources (Courses & Activity Collection)

PROGRESS MONITORING

The **CIRCLE Progress Monitoring System** (formerly known as C-PALLS+), is a user-friendly, technology-driven tool that enables the teacher to assess a child's progress in a particular skill area almost instantly. This simplistic yet reliable data collection prompts teachers to focus on lessons that target their students' least developed skill areas.

SAMPLE ITEMS



REPORTING

To maximize the benefits of student progress monitoring, teachers and administrators can pull reports of student skill levels at the individual, group, class, school, and district levels. The reports use clear visual indicators to flag students who fall below established benchmarks.

Student Summary

Measure		Maximum Score	Wave 1
Rapid Letter Naming		52	30
Rapid Vocabulary 1		55	15
Phonological Awareness	Syllabication	7	2
	Onset-Rime	5	2
	Alliteration	7	2
	Rhyming I	9	3
	Total	28	9

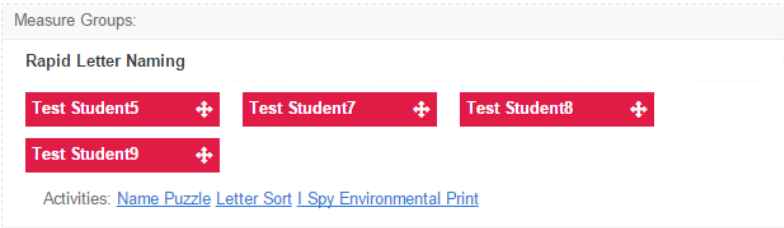
Class Summary

Math

Student Name	Rote Counting	Shape Naming	Number Discrimination	Number Naming	Shape Discrimination	Counting Sets	Operations	Total
Exclude All								
Maximum Score	2	5	2	5	6	5	3	28
Dem St 16								-
Dem St 19	0	5	2	5	0	5	3	20
Test Student1	2	4	2	2	6	3	3	22
Test Student2	2	5	2	3	6	4	3	25
Test Student3	2	4	2	5	3	2	2	20
Test Student4	0	1	1	1	1	1	2	7
Test Student5	1	2	1	2	1	4	1	12

GROUPING TOOL

Group reports use assessment data to aggregate all students who need assistance in a given area. The reports then provide direct links to activities for small group instruction in the CIRCLE Activity Collection. Teachers can also create custom groups to further refine instructional plans.



PROFESSIONAL DEVELOPMENT

eCIRCLE Professional Development represents more than 70 hours of online courses featuring extensive video-based demonstrations of effective instructional practices, as well as application assignments and activities. The courses cover a broad range of topics aligned with the Texas Prekindergarten Guidelines and include research-based key predictors of language and literacy development. Courses are also offered in emerging areas of early childhood instruction including science, technology, engineering, and math (STEM).

SELF-ASSESSMENTS

Brief, fun self-assessments ask course users to apply concepts to everyday scenarios.

A teacher at your school is frustrated. As far as she's concerned, there simply aren't enough hours in the day for children to meet all of the school's goals and standards. If the children have time to carry out their class jobs, they run out of time for phonological awareness exercises. If they spend too much time on the calendar or the weather report in circle time, she ends up running out of time for assessments.

What would you recommend to this teacher?

- A. She should make a tight schedule that enables her to focus on phonological awareness some days and vocabulary on others. She can schedule in time for assessments, daily routines, center times, and play. If she keeps to this schedule, every kind of activity will be sure to get its own specific time slot.
- B. The teacher can integrate language and vocabulary development exercises and informal assessments into other parts of the school day, such as center time, transition times, or in-between times.
  Tell the teacher to take some time to model the activity for the children, by creating a set of cutouts that they can try to emulate.
- C. The teacher should try to add some sort of basic language or math component to the art activity.

SAMPLE COURSE OVERVIEW

DOCUMENTARY-STYLE VIDEO

eCIRCLE uses expert interviews to discuss key concepts and analyze sample instructional videos.

In this commentary, Dr. Emily Solari and Dr. Carola Matera discuss the relationship between phonological awareness in English and Spanish, why phonological awareness is important in Spanish, and how to provide effective phonological awareness instruction in Spanish.

COMPLETION TRACKING

The learning management system tracks course completion, and reports can be pulled by community management personnel.

eCIRCLE Self-instructional

The eCIRCLE Professional Development Program includes 16 courses (73.5 hours) for teachers and administrators serving children three to five years of age. These courses include extensive video-based demonstrations of effective instructional practices covering topics in classroom management, language and literacy, social and emotional development, science, and mathematics. This program is self-paced.

eCIRCLE Building Vocabulary (Self-instructional)	Incomplete		Launch
eCIRCLE Classroom Management (Self-instructional)	Incomplete		Launch
eCIRCLE Discovering Early Childhood Science (Self-instructional)	Incomplete		Launch

ACTIVITY COLLECTION

The **CIRCLE Activity Collection** includes over 300 hands-on activities that teachers can implement during large group, small group, centers, and one-on-one instruction. Language, literacy, social emotional skills, mathematics, and science are the core concepts covered in CIRCLE activities. The updated collection includes new and expanded activities, videos of select activities performed in real classrooms, and direct links to activities from the CIRCLE Progress Monitoring System.

Videos include annotations to guide the viewer in reflecting on key concepts.

Teacher scripting provides for immediate implementation.

COLLECTION CHAPTERS

chapter 1 Introduction
chapter 2 Best Practices
chapter 3 Social & Emotional Development
chapter 4 Phonological Awareness
chapter 5 Written Expression
chapter 6 Language Development
chapter 7 Book Reading
chapter 8 Letter Knowledge
chapter 9 Mathematics
chapter 10 Science & Technology

SAMPLE ACTIVITY

What's in the Bag?

Setting

- Small Group

Materials

- Bag with theme related objects

Preparation

Collect theme items that have been reviewed in read alouds and theme discussions.

Example: construction theme—starfish, sunglasses, fish, goggles, shark, etc.

Define concept in child friendly terms

Boys and girls, we are going to play a game to find out what objects are in the bag. You will tell us what you know about the object.

Model and explain procedure

I will go first so you can see how we will play the game. Take the starfish out of the bag. This is a starfish. It's orange. We can feel him. How does he feel. It is hard. It's rough. How does it smell? Do you think it's going to smell? Could we taste this? No. Why? It has germs. Do you know where a starfish lives? What shape is he? Yes, he is a star.

Guided practice

Now it's your turn to play the game. Have the first child choose an object from the bag and tell what he/she knows about the object.

Scaffold child as needed by asking questions such as:

What is this called?

What do you use it for?

Have you ever used one?

What is the object like?

Continue until each child has had a turn.

As more objects are described and explained, the children connect the new concepts to deepen their understanding of theme vocabulary.

Summarize

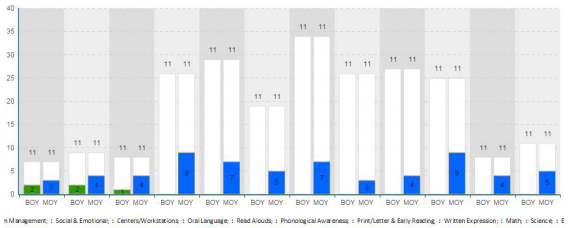
You all did a great job naming, describing, and explaining about the construction objects that were in the bag. I will place the items in the science center so you can talk about them and use them during center time.

OBSERVATION TOOLS

TSR Online includes three **observation tools**: the Classroom Observation Tool (COT), the Classroom Environment Checklist (CEC), and the Administrator Classroom Observation Tool (ACOT). The COT captures snapshots of a teacher's behavior and instruction during classroom observation visits that can be used to develop improvement plans and track a teacher's progress over time. The CEC's focus is the presence and quality level of instructional planning tools, meaningful literacy and print centers and materials, and the overall design and management of the classroom and individual centers. The ACOT is an abbreviated version of the COT and helps administrators focus their observations on instructional practices in preschool classrooms that are linked to important child outcomes.

REPORTING

Growth charts and other reports show progress in teachers' instructional strategies over time.



GOAL-SETTING

Automated goal-setting features allow coaches and teachers to set short-term goals and immediately connect to resources that support professional development.

SAMPLE COT ITEMS

Demonstrated behaviors are indicated in the "Obs" (observed) column, with "NS" marked if the behavior was observed but needs additional support.

Oral Language

Obs	NS	
Vocabulary Instruction		
☐	☐	Talk about vocabulary word(s) in the context of a me
☐	☐	Child-friendly definitions that explain the meaning of
☐	☐	Encourage children to say/repeat a vocabulary word
☐	☐	Encourage children to act out a vocabulary word.
☐	☐	Use graphic organizer to teach vocabulary.
☐	☐	Give examples and non-examples or synonyms/anto
Elicits Language		
☐	☐	Ask knowledge level, basic questions.
☐	☐	Ask higher level, open-ended, thinking questions.
☐	☐	Downward scaffolds oral language use.
☐	☐	Scaffolds oral language use.
☐	☐	Attempts to elicit language from all children.
☐	☐	Multiple turns about a conversational topic.

Community/District:
School: Brownsville
School Year: 2015-2016

Teacher:
Mentor:
Date: 11/12/2015

References

Item	Mentoring Guide	Prekindergarten Guidelines	Resources
Print/Letter & Early Reading			
PLER - The What			
109	**Discuss the broad range of understandings that children must acquire about letters to become good readers and writers.** • Letter names – Letter names are the labels that are used to talk about the symbols and sounds. There is no discernable reason why an "a" is called an "a" – it just is and it is something a child must learn.	III.C.1. Child names at least 20 upper and at least 20 lower case letters. III.C.2. Child recognizes at least 20 letter sounds.	PE_Names4 PE_Names5 PE_Names2 PE_Names3 PE_Names1
108	**Discuss the broad range of understandings that children must acquire about letters to become good readers and writers.** • Letter features – As children begin to look at print, they must determine the important things to look at. Is it the black lines or the white spaces? Letters must be placed into the 26 (just upper case) or 52 (upper and lower case) categories. Children must figure out what makes an "a" an "a", what makes a"b" a "b", etc. This requires many exposures to letters. In addition to features, children must also begin to understand that orientation matters. When the orientation is changed, the letter can become a totally different letter (p, q, b, d).	IV.B.1. Child independently uses letters or symbols to make words or parts of words. III.C.1. Child names at least 20 upper and at least 20 lower case letters. III.C.2. Child recognizes at least 20 letter sounds.	PE_Features2 PE_Features5 PE_Features1 PE_Features4 PE_Features3 PE_Features6
111	**Discuss the broad range of understandings that children must acquire about letters to become good readers and writers.** • Letter name/letter sound correspondence – Sometimes the letter name helps with the sound (j) and sometimes it can be very confusing (w).	III.C.2. Child recognizes at least 20 letter sounds. III.C.3. Child produces the correct sounds for at least 10 letters.	PE_Correspondence5 PE_Correspondence3 PE_Correspondence6 PE_Correspondence4 PE_Correspondence2 PE_Correspondence1

developing talkers

Developing Talkers and its Spanish counterpart, *Hablemos Juntos*, are curriculum supplements to promote oral language that follow a Pre-kindergarten Response to Intervention (P-RTI) instructional framework. These parallel English and Spanish versions are designed to meet the needs of many aspects of Tier 1 and Tier 2 pre-K oral language instruction. Specifically, listening comprehension and vocabulary skills are targeted in the book reading context by providing lessons, materials, and an instructional template to develop and strengthen children's oral language skills.

VOCABULARY CARDS

Vocabulary cards include images and teaching prompts on either side.

surface LESSON 1

Tier 1 (Whole Group) - Before Reading

- Students say word: **Say this word after me: "Surface."**
- Define: **The surface is the top part or outer part of something.**
- Describe picture: **The grass in this picture is growing on the earth's surface.**
- Act it out: **Imagine you are mowing the yard. Say, "Grass grows on the surface!"**

Preteach today's vocabulary cards, then use the talking points inside the book's front cover.

Tier 2 (Small Group) - Review & Discuss

- Students say word: **Say this word after me, "Surface."**
- Define: **The surface is the top part or outer part of something.**
- Discuss: **The grass is growing on the earth's surface. Can you think of any animals that live *under* the ground's surface?** Repeat, rephrase, or expand.

The Moon by Thomas K. Adamson

Image Credit 468973303, Zinco79, iStock, Getty Images

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developing talkers

LESSON GUIDES

Lesson guides use scaffolding techniques to match instruction to students' current skill levels

Lesson 1

Answer Guiding Question

What is the Moon like?

Optional T&T. Pick 2-3 students with equity sticks.

Possible correct answers:

- Its surface is rough/bumpy.
- The sky is always black.

*If **correct**, scaffold up:*

What else do you remember about the Moon?

*If **incorrect**, scaffold down:*

On the Moon, is the sky always black or is the sky always bright?

On the Moon, the sky is always bl___ (black).

Give answer. Help student repeat.

SCAFFOLD

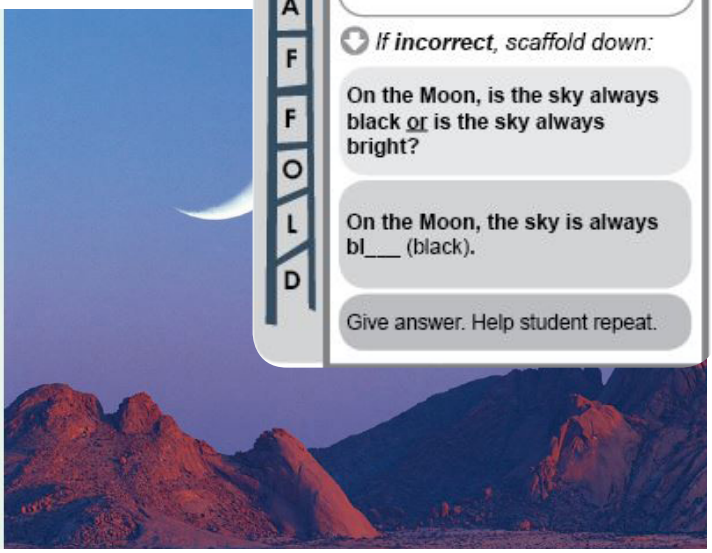
READING PROMPTS

Each book has discussion points inserted within the pages, including a "before reading" label on the inside cover of the book, several "during reading" stickers as the story moves along, and an "after reading" sticker at the end of the book.

The Moon seems to change shape during the month. The Moon can look round like a circle. It can look narrow like a banana.

La Luna parece cambiar de forma durante el mes. Puede verse redonda como un círculo. Puede verse tan delgada como un plátano.

Day 6: On the page before this one, the moon looked round. Show previous page. Now how does the moon look? Use cloze scaffold if needed. Now it looks long and sk___ (skinny).
Day 7: The author says the moon in this photograph looks like a banana. What else could you say the moon looks like? Use cloze scaffolding if needed. I think it also looks like a sm___ (smile).
Day 8: The Moon in this photograph looks narrow. When something is narrow, there is not a lot of space between one side and the other side. Hold your hands up, close together, so there is only a narrow space between them. Act it out.



INFANT & TODDLER RESOURCES

TSR is expanding its resources to support teachers and parents of children ages birth to three. Professional development courses and supporting activities will use videos of real teachers overlaid with expert commentary and annotation to hone in on the quality caregiving strategies that lay the foundation for later skill-building. With the language course completed, staff will focus development in FY2016 on courses covering early literacy, best practices around developmental screening, and early social-emotional development.

EXPERT COMMENTARY

CLASSROOM ACTIVITIES

Rain, Rain, Go Away

GETTING STARTED

OBJECTIVE: The child will use hand motions and body movements to respond to familiar words or actions.

SETTING: on a rainy day or during a curriculum theme about weather; small or large group

MATERIALS: none needed

EARLY LEARNING GUIDELINES

Texas Infant, Toddler, and Three-Year-Old Early Learning Guidelines
Domain: Language and Communication
Subdomain: Communication and Speaking

Early Head Start Alignment
Goal IT-LC 7: Child understands an increasing number of words used in communication with others.

LET'S PLAY

Say or sing "Rain, Rain, Go Away," and encourage the children to follow the directions they hear.

Rain, rain, go away
Come again another day
Little_____wants to play (replace with a child's name or class name [e.g., Ms. Kim's class])
Rain, rain, go away

Now let's think of some more ways we could tell the rain to go away.

Rain, rain, run away (have children run in place; model what this looks like)
Come again another day . . .

Additional ideas:

- **walk away** (have children walk in place)
- **tiptoe away**
- **clap away**
- **wave away**
- **blow away** (blow away the rain clouds)

Repeat chant along with the motion and encourage children to imitate your actions.

DIVING DEEPER

KEYWORDS

rain, go, away, walk, clap, tiptoe, wave, run, etc.

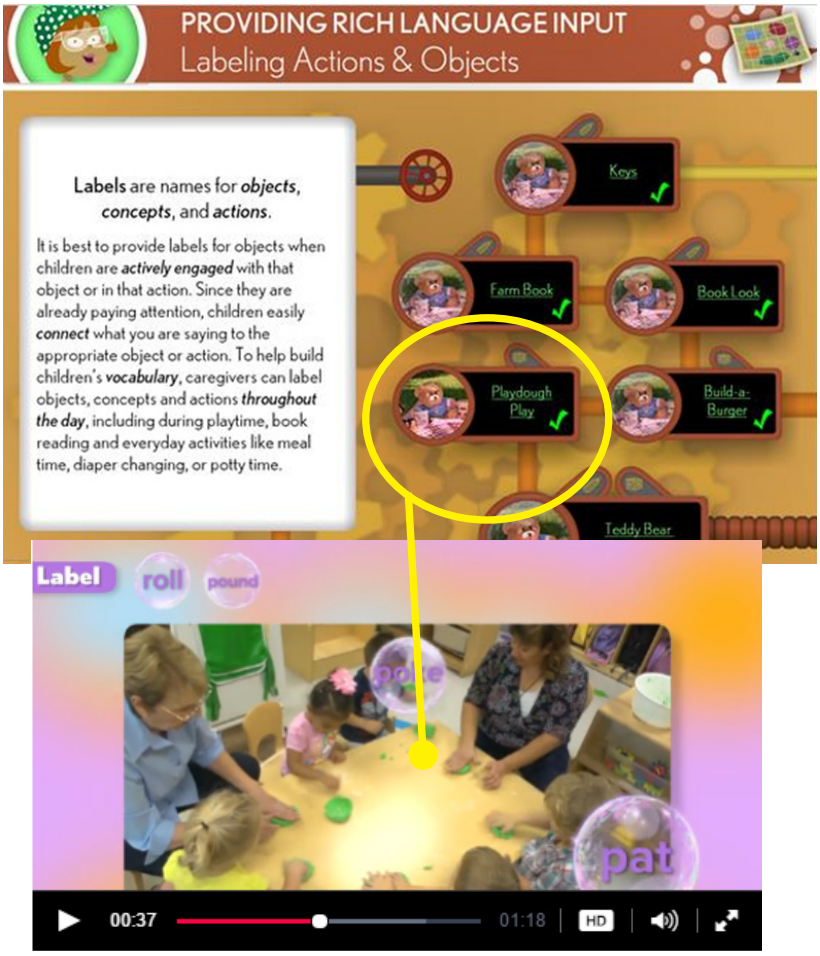
LEARNING LINKS

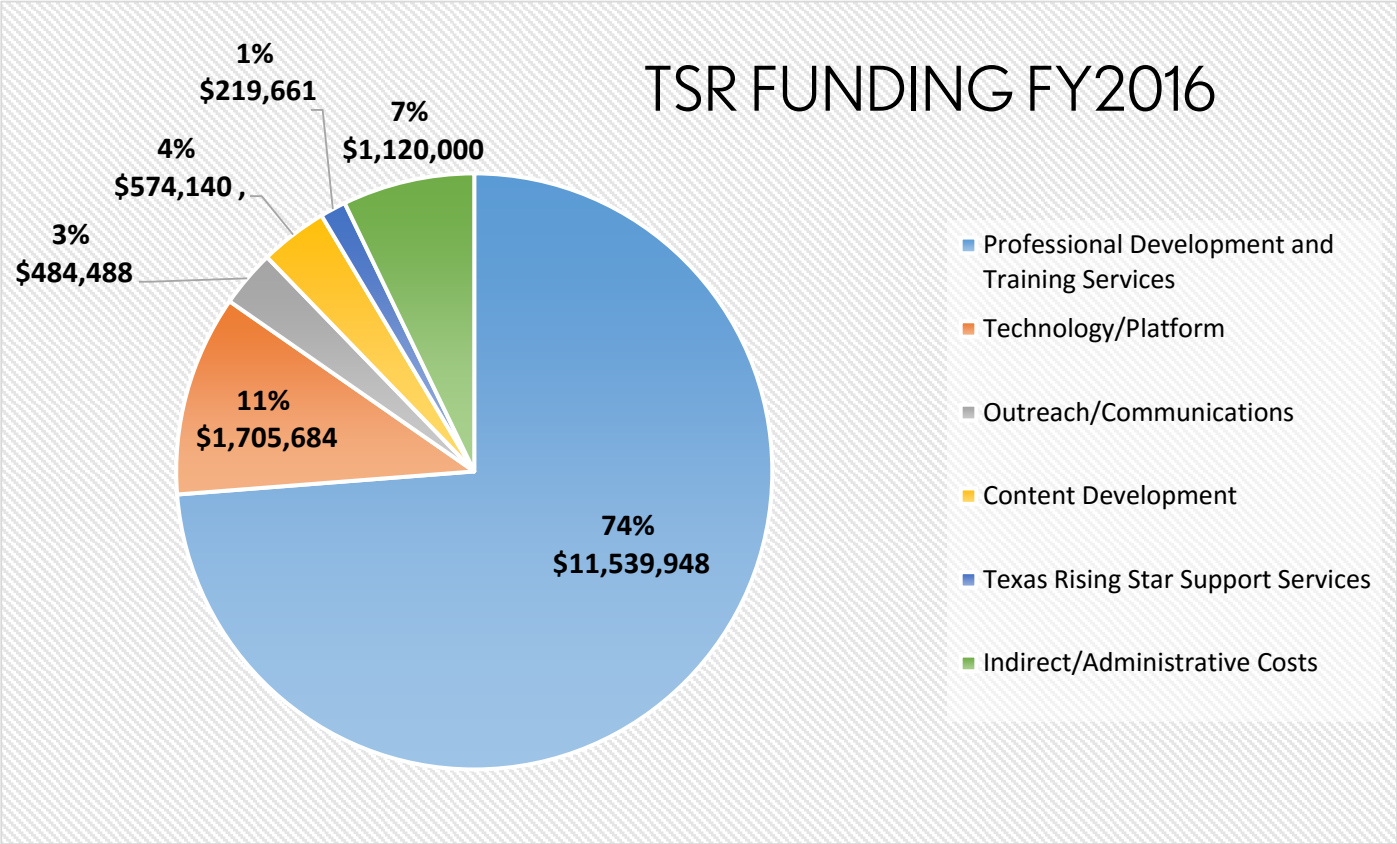
This activity links actions with words and helps children learn to follow directions. Controlling their body movements is part of learning self-regulation skills. This activity also lets children release physical energy and can be done indoors on days that children are unable to go outside for gross motor play.

TIPS

- When singing on a rainy day, combine this activity with talking about what rain is, where it comes from, and what it does. For example: it is water that comes from clouds in the sky; it is outside, not inside; it helps grass and plants to grow; it can make mud puddles.
- You can also introduce other vocabulary words and discussion topics connected with rain, such as *boots, raincoat, umbrella, water, wet*, and *splash*.
- Taking a walk in the rain can be fun if children have the necessary clothing. If you do this,

"SEE IT IN ACTION" : INSTRUCTIONAL STRATEGIES





PROJECT DELIVERABLE DESCRIPTIONS

Professional Development and Training Services
Delivery of high quality professional development and individualized coaching to teachers, administrators, and Texas School Ready staff through the three TSR delivery models and statewide training conferences.

Technology/Platform
Ongoing refinement and enhancement of CLI Engage, tools housed on the platform, and processes to manage continuing platform maintenance, development, and technical assistance for users.

Outreach/Communications
Regular consumer education activities to support TSR implementation and promote TSR and CLI Engage for eligible programs through e-communications, social media, webinars, collateral marketing materials, and face-to-face events.

Content Development
Ongoing review, refinement, and creation of high-quality supplemental curriculum, training, and online courses to support professional development and training of teachers, administrators, and coaches implementing TSR.

Texas Rising Star Support Services
Training and support services for Texas Rising Star assessors and mentors to support program implementation, including face-to-face and online training and ongoing technical assistance.

Indirect/Administrative Costs
General, fixed grant administrative costs not directly associated with a single activity.

Sample activities associated with these deliverables are provided in the following table. A budget summary and detailed budget report are also provided.

Category	Deliverables	Activities
Professional Development and Training Services	**TSR Comprehensive Direct Service:** Logistics and Operations	Recruiting local organizations to serve as TSR Lead Agents
		Monitoring program implementation
		Ensuring adherence to all TEA, TWC, and UTHealth business and finance policies
		Monthly, quarterly, and annual reporting
Professional Development and Training Services	**TSR Comprehensive Direct Service:** Management and Supervision of	Ensuring program fidelity across the state
		Performing continuous performance improvement activities
		Overseeing supervision of TSR coaches and coordinators
Professional Development and Training Services	**TSR Comprehensive and Online Plus Direct Service:** Curriculum and Classroom Materials	Ordering and distributing classroom kits and materials
		Ordering and distributing teacher manuals and guides
		Ordering and distributing teacher equipment
Professional Development and Training Services	**TSR Comprehensive Direct Service:** Professional Development and Coaching for Teachers	Delivering facilitated eCIRCLE and CIRCLE Progress Monitoring Training
		Delivering Face to Face coaching support to teachers
		Delivering remote coaching support to teachers
		Supporting community partners and school leadership
		Recruiting teachers and ensuring adequate retention
		Regular reporting on community implementation
		Delivering CIRCLE Preschool Foundations Training
		Participating in monthly coaching collaboration and feedback calls/webinars with TSR management
		Incentivizing teacher participation in ongoing professional development
		Enabling teacher participation in ongoing professional development (substitute pay to participating programs)
Professional Development and	**TSR Online Plus Direct Service**: Provide additional services to ISD	Launching application for districts/charters to apply for additional services

Category	Deliverables	Activities
Training Services	teacher through TSR Online Plus-CIRCLE Preschool Foundations Training and Developing Talkers	Determining awards and notifying districts/charters
		Providing Developing Talkers kits and online training through CLI Engage
		Providing CIRCLE Preschool Foundations training through CLI lead trainings and contracts with ESCs
Professional Development and Training Services	**TSR Online Plus Direct Service**: Provide additional services to ISD teacher through TSR Online Plus-Remote Coaching	Launching application for districts/charters to apply for additional services
		Determining awards and notifying districts/charters
		Partnering with district leaders to determine priorities for teacher coaching
		Onboarding participating teachers
		Distributing materials to prticipating teachers
		Providing 5 sessions of remote coaching to selected teachers and districts
Professional Development and Training Services	**Training and Professional Development:** Train directors and teachers on the ITELGs (materials only, staff support included in this deliverable: TSR Comprehensive Direct Service:	Developing the ITELG implementation plan
		Developing documents to support implementation: flyers, sign-in sheets, printing ITELG guides
		Producing quarterly and annual reports
		Field staff conducting community training infant and toddler teachers
Professional Development and Training Services	**Training and Professional Development:** Professional development and support to family child care providers	Ordering and distributing BEECH kits & activity guides
		Developing documents to support implementation: flyers, sign-in sheets
		Recruiting family child care providers for TSR-FCC
		Conducting orientation to the TSR-FCC project

Category	Deliverables	Activities
Professional Development and Training Services	**Training and Professional Development**: TSR Coaching Camp	Coaching Camp pre-work (defining the project, creating training content, securing contracts & procuring sole source paperwork, planning meeting with conference committee, finalizing hotel logistics, developing and printing training & printed materials, and seting up for Coaching Camp)
		Delivering Coaching Camp
		Post-Coaching Camp: Requesting invoices, conference evaluation, closing meeting with committee
Professional Development and Training Services	**Training and Professional Development:** TSR Early Childhood Summer Institute (non-personnel costs)	Pre-Institute Planning (defining the project, securing contracts & procure sole source paperwork, planning meeting with conference committee, finalizing hotel logistics, awarding scholarship recipients, developing and printing training & printed materials, and Setting up for Institute)
		Delivering Institute (Prioritizing topics for school readiness topics, developing Institute website, selecting presenters from call for papers)
		Post-Institute: Requesting invoices, conference evaluation, closing meeting with committee
Technology/ Platform	**Engage Platform Access and Support:** Routine platform maintenance	Fixing bugs to support up-time and Engage functioning
		Monthly reporting of Engage functioning
		Quarterly reporting on system performance
		Increasing bi-annual support periods for major program related events
		Monthly deployments of minor updates to application
Technology/ Platform	**Engage Platform Access and Support:** Ongoing platform enhancement	Designing and deploying new tools to CLI Engage, including: data uploading processes, new external COT, offline assessment tool, parent reporting features

Category	Deliverables	Activities
		Refining CLI Engage tools, including: child progress monitoring, LMS for online courses, classroom observation tools, collaboration tools, TRS online assessment tool, and school management tools
		Providing cost estimates for updates
		Consulting on feasibility of new functionality
		Implementing code and database requirements on Development servers
		Delivering updates as the result of User Acceptance Testing
		Updating code based on security and accessibility scanning
		Deploying code to production servers
Technology/ Platform	**Engage Platform Access and Support:** Technical assistance for all platform users	Providing technical assistance support to facilitate user effectiveness
		Supporting setup of TSR comprehensive communities
		Supporting Engage performance monitoring during peak periods
		Contributing to process and Tier 0 (self-support) training documentation
		Assisting in User Acceptance Testing during testing phases
		Documenting of business requirements and routine business processes
		Coordinating of user acceptance testing
		Coordinating of platform enhancement deployment
		Collaborating with vendors to provide for routine maintenance of platforms
		Routine reporting for program oversight
		Ad hoc reporting for program oversight
		Coding for systematic updates to Engage from regular district data sources

Category	Deliverables	Activities
		Coding to provide districts with reports of student performance currently out of scope of Engage functionality
Outreach/ Communications	**Consumer Education:** Outreach and Communications	Printing and distributing TSR banners for participating TSR Comprehensive sites
		Attending statewide conferences to promote recruitment of new TSR Comprehensive sites
		Hosting conference training sessions to promote TSR's online tools for eligible programs (public schools, child care, and Head Starts)
		Scheduling 13 events in conjunction with ESCS across the state to encourage ISDs/charters to utilize CLI Engage
		Hosting special CLI Engage technical assistance track at TSR Institute for ISD/charter and ESC staff for CLI Engage tools
		Sharing resources at TSR conference booths to promote TSR recruitment and the use of CLI Engage tools and resources for eligible programs
		Developing and distributing two regular newsletters to all TSR participants, TSR coaches, and other stakeholders
		Developing and distributing ongoing communications via email and social media to keep stakeholders informed of project developments
		Utilizing online email marketing and stock image services for communications and collateral marketing materials
		Printing collateral marketing materials to support eligible programs signing up and utilizing CLI Engage
		Hosting regular webinars to support implmentation of TSR Online and using the tools on CLI Engage
		Developing materials to support Texas Rising Star certified providers signing up and utilizing CLI Engage
		Utilizing online email marketing and stock image services for communications and collateral marketing materials

Category	Deliverables	Activities
		Creating new TSR recruitment video and post on TSR website to support TSR Comprehensive recruitment across the state
		Inviting Texas Rising Star certified providers to access CLI Engage
		Maintaining existing content and developing new content regularly for the CLI Engage, TSR, TRS, and related websites
		Providing regular updates on website metrics, including users and sessions
Content Development	**Training and Professional Development:** Training and Currriculum Content Development	Designing, developing, and producing training and content support materials and course layout
		Transitioning eCIRCLE courses from vendor system to CLI Engage
		Revising ITELG training modules, including powerpoint presentations, videos, facilitator guides, and participant guides for TSR Comprehensive
		Capturing, editing, and producing video and audio footage for course and training development
		Revising Texas Rising Star Assessor and Mentor course on CLI Engage with video of TRS measures
		Reviewing and updating current CIRCLE Activity Collection-PreK supplemental curriculum to include additional demonstration videos
		Reviewing and updating current CIRCLE Activity Collection to include alignments to 2015 Texas Prekindergarten Guidelines and Head Start Child Development and Early Learning Framework
		Reviewing and updating eCIRCLE facilitation guides for non-TSR Comprehensive users (mentors, coaches, specialists)

Category	Deliverables	Activities
		Developing new CIRCLE CDA Training Program for TSR Comprehensive participants to extend eCIRCLE training hours towards a CDA
		Creating and implementing new process on CLI Engage to allow approved coaches, specialists, and mentors to deliver facilitated eCIRCLE courses in their communities
Texas Rising Star Support Services	**Training and Professional Development:** Support for TRS assessors and mentors	Planning TRS Assessor/Mentor Training: hotel, travel, and training materials
		Designing, developing, and producing training and content support materials and course layout
		Capturing, editing, and producing video/audio footage for course and training development
		Designing, developing, and producing training and content support materials and course layout
		Providing customized remote technical assistance via email, phone, help ticket system
		Providing monthly TRS communication distribution
		Providing online training for TRS Assessor/Mentor/Provider
Indirect/ Administrative Costs	**Indirect/Administrative Costs**	Administrative activities would include, but not limited to - Purchasing of materials and services, Human Resources support, grant administration, financial monitoring and reconciliation, equipment and asset oversight, clerical support
		Indirect activities might include, but not limited to – University level IT support, Procurement and contract negotiation, legal services, office space and equipment rentals, HR support, Accounting – budgets, billing, payables

Summary by Community

From September 2015 to August 2016

COMMUNITY					
Description	TEA 10265	TWC 10431	TEA 11063	TWC 11281	Grand Total
Aldine ISD		$ 17,500.53	$ 11,202.56	$ 122,815.37	$ 151,518.46
Amarillo College	$ 83.42	$ 6,424.70	$ 20,995.53	$ 264,123.35	$ 291,626.99
AVANCE Dallas		$ 7,810.81	$ 27,274.17	$ 369,272.72	$ 404,357.71
Child Care Associates		$ 24,854.11	$ 30,278.86	$ 362,838.79	$ 417,971.76
Child Care Group		$ 537.88	$ 11.46		$ 549.34
EOAC Waco		$ 44,057.26	$ 30,776.30	$ 327,896.80	$ 399,970.93
Family Service Association	$ 780.00	$ 39,411.51	$ 46,149.38	$ 524,013.19	$ 610,354.08
Hands on Learning		$ 7,972.00	$ 11,744.18	$ 124,903.80	$ 144,619.98
Houston ISD		$ 3,968.94	$ 16,545.01	$ 178,629.96	$ 199,143.91
Kaleidoscope Youth Development Services DBA The Rhodes School		$ 12,906.85	$ 41,186.32	$ 469,969.28	$ 524,062.45
Kids R Kids Learning Academy		$ 18,772.43			$ 18,772.43
Kilgore College		$ 13,310.00	$ 37,860.88	$ 348,924.49	$ 399,685.97
La Joya ISD		$ 8,134.96	$ 21,337.85	$ 240,574.74	$ 270,047.55
Midland College			$ 15,913.68	$ 135,082.29	$ 150,995.96
North Texas United Way		$ 10,111.14	$ 22,331.36	$ 272,476.89	$ 304,919.40
Pharr,SanJuan,Alamo ISD	$ 4,777.21	$ 1,247.24	$ 20,669.22	$ 238,225.90	$ 264,919.57
Region 2, Education Service Center		$ 22,287.49	$ 23,400.91	$ 267,154.06	$ 312,842.47
Region 4, Education Service Center			$ 810.00	$ 2,430.00	$ 3,240.00
Region 5, Education Service Center		$ 7,542.86	$ 11,151.22	$ 91,176.58	$ 109,870.66
Region 6, Education Service Center		$ 6,375.53	$ 10,000.00	$ 9.73	$ 16,385.26
Region 8, Education Service Center		$ 31,594.74	$ 38,187.77	$ 355,960.09	$ 425,742.60
Region 10, Education Service Center			$ 5,988.64		$ 5,988.64
Region 14, Education Service Center		$ 3,101.45	$ 15,760.80	$ 131,313.42	$ 150,175.68
Region 19, Education Service Center	$ 13,149.49	$ 34,089.48	$ 31,659.83	$ 330,546.85	$ 409,445.64
Region 20, Education Service Center		$ 12,598.44	$ 10,307.79		$ 22,906.23
Sam Houston State University		$ 23,446.03			$ 23,446.03
San Jacinto College		$ 6,814.22			$ 6,814.22
Temple ISD		$ 11,183.31	$ 10,970.41		$ 22,153.72
Texas Migrant Council - Laredo		$ 11,670.91	$ 19,492.55	$ 262,122.03	$ 293,285.49
Texas Migrant Council - McAllen		$ 13,292.73	$ 18,652.28	$ 260,829.68	$ 292,774.69
Texas Migrant Council - Victoria			$ 12,343.72	$ 125,530.48	$ 137,874.20
Workforce Solutions Cameron	$ 9,999.99	$ 17,699.21	$ 50,093.12	$ 518,011.56	$ 595,803.88
Workforce Solutions Capital Area			$ 17,474.13	$ 307,515.84	$ 324,989.96
Workforce Solutions South Texas		$ 4,063.36	$ 7,676.95	$ 149,755.83	$ 161,496.14
YWCA Lubbock		$ 36,305.80	$ 19,951.79	$ 218,327.87	$ 274,585.46
CLI Houston & Remote Classrooms	$ 211.41	$ 1,643.33	$ 278,393.88	$ 1,179,570.31	$ 1,459,818.93
Engage ISD Communities & Community Expenses	$ 9,488.36	$ 76,087.42	$ 827,742.06	$ 357,688.52	$ 1,269,920.02
Sub-Total	**$ 38,489.88**	**$ 536,816.67**	**$ 1,764,334.61**	**$ 8,537,690.41**	**$ 10,877,331.57**
INFRASTRUCTURE					
Salaries and Fringe			$ 730,822.41	$ 1,753,214.71	$ 2,484,037.12
Professional and Contracted Services	$ 654,677.17	$ 266,299.93	$ 586,844.26	$ 345,848.71	$ 1,853,670.07
Supplies and Materials	$ 541.59	$ 6,033.28	$ 16,631.85	$ 19,896.88	$ 43,855.80
Other Operating Costs		$ 686.00	$ 9,782.44	$ 2,295.50	$ 13,075.09
Sub-Total	**$ 655,218.76**	**$ 273,019.21**	**$ 1,344,080.96**	**$ 2,121,255.80**	**$ 4,393,574.73**

TOTALS					
Description	TEA 10265	TWC 10431	TEA 11063	TWC 11281	Grand Total
TOTAL DIRECT COSTS	$ 693,708.64	$ 809,835.88	$ 3,108,415.57	$ 10,658,946.21	**$ 15,270,906.30**
TOTAL INDIRECT COSTS	$ 4,232.28	$ 19,417.52	$ 389,561.81	$ 374,062.43	**$ 787,274.04**
GRAND TOTAL	**$ 697,940.92**	**$ 829,253.40**	**$ 3,497,977.38**	**$ 11,033,008.64**	**$ 16,058,180.34**

COMMUNITY

Description	TEA 10265	TWC 10431	TEA 11063	TWC 11281	Grand Total
Aldine ISD	**$ -**	**$ 17,500.53**	**$ 11,202.56**	**$ 122,815.37**	**$ 151,518.46**
Salaries - Program Manager			$ 1,300.48	$ 6,222.34	$ 7,522.82
Classroom Materials: Curriculum				$ 16,144.32	$ 16,144.32
Classroom Materials: Kits				$ 8,435.50	$ 8,435.50
Postage and Shipping				$ 8.45	$ 8.45
Professional Services Agreement (PSA)		$ 17,500.53	$ 8,200.00	$ 76,728.79	$ 102,429.32
Substitute Teacher Reimbursement			$ 1,425.00		$ 1,425.00
Teacher Incentives				$ 13,975.00	$ 13,975.00
Teacher Resources				$ 965.08	$ 965.08
Teacher/Coach Training			$ 265.03	$ 227.45	$ 492.48
Travel			$ 12.05	$ 108.43	$ 120.48
Amarillo College	**$ 83.42**	**$ 6,424.70**	**$ 20,995.53**	**$ 264,123.35**	**$ 291,627.00**
Salaries - Program Manager			$ 4,361.16	$ 20,876.95	$ 25,238.11
Classroom Materials: Curriculum				$ 50,673.43	$ 50,673.43
Classroom Materials: Kits				$ 43,858.88	$ 43,858.88
Postage and Shipping			$ 26.67	$ 1,650.60	$ 1,677.27
Professional Services Agreement (PSA)	$ 83.42	$ 6,424.70	$ 12,500.00	$ 117,135.39	$ 136,143.51
Substitute Teacher Reimbursement			$ 300.00	$ 75.00	$ 375.00
Teacher Incentives				$ 27,338.75	$ 27,338.75
Teacher Resources			$ 1,930.15	$ 1,930.15	$ 3,860.30
Teacher/Coach Training			$ 1,846.78	$ 274.90	$ 2,121.68
Travel			$ 30.77	$ 309.30	$ 340.07
AVANCE Dallas	**$ -**	**$ 7,810.81**	**$ 27,274.17**	**$ 369,272.72**	**$ 404,357.71**
Salaries - Program Manager			$ 1,916.70	$ 9,175.38	$ 11,092.08
Classroom Materials: Curriculum				$ 71,727.76	$ 71,727.76
Classroom Materials: Kits				$ 71,786.45	$ 71,786.45
Postage and Shipping				$ 1,233.26	$ 1,233.26
Professional Services Agreement (PSA)		$ 7,810.81	$ 21,401.07	$ 171,163.36	$ 200,375.24
Substitute Teacher Reimbursement			$ 838.00	$ 272.00	$ 1,110.00
Teacher Incentives				$ 39,440.00	$ 39,440.00
Teacher Resources			$ 1,487.83	$ 1,487.83	$ 2,975.66
Teacher/Coach Training			$ 1,394.75	$ 388.43	$ 1,783.18
Travel			$ 235.82	$ 2,598.26	$ 2,834.08
Child Care Associates	**$ -**	**$ 24,854.11**	**$ 30,278.86**	**$ 362,838.79**	**$ 417,971.77**
Salaries - Program Manager			$ 5,750.09	$ 27,526.13	$ 33,276.22
Classroom Materials: Curriculum				$ 66,295.98	$ 66,295.98
Classroom Materials: Kits				$ 44,651.00	$ 44,651.00
Postage and Shipping				$ 513.68	$ 513.68
Professional Services Agreement (PSA)		$ 24,854.11	$ 20,401.07	$ 177,978.16	$ 223,233.34
Substitute Teacher Reimbursement				$ 3,130.50	$ 3,130.50
Teacher Incentives				$ 40,550.00	$ 40,550.00
Teacher Resources			$ 1,608.46	$ 1,608.46	$ 3,216.92
Teacher/Coach Training			$ 2,473.10	$ 388.43	$ 2,861.53
Travel			$ 46.14	$ 196.46	$ 242.60
Child Care Group	**$ -**	**$ 537.88**	**$ 11.46**	**$ -**	**$ 549.34**
Postage and Shipping			$ 11.46		$ 11.46
Professional Services Agreement (PSA)		$ 421.15			$ 421.15
Travel		$ 116.73			$ 116.73
EOAC Waco	**$ -**	**$ 44,057.26**	**$ 30,776.30**	**$ 327,896.80**	**$ 402,730.36**
Salaries - Program Manager			$ 3,706.60	$ 17,770.18	$ 21,476.78
Classroom Materials: Curriculum				$ 52,508.70	$ 52,508.70
Classroom Materials: Kits				$ 35,133.05	$ 35,133.05
Postage and Shipping				$ 1,181.91	$ 1,181.91
Professional Services Agreement (PSA)		$ 41,297.83	$ 18,231.17	$ 178,908.49	$ 238,437.49
Substitute Teacher Reimbursement			$ 2,202.00	$ 724.00	$ 2,926.00
Teacher Incentives				$ 40,964.50	$ 40,964.50
Teacher Resources			$ 5,147.06		$ 5,147.06
Teacher/Coach Training		$ 2,759.43	$ 1,489.47		$ 4,248.90
Travel				$ 705.97	$ 705.97

Description	TEA 10265	TWC 10431	TEA 11063	TWC 11281	Grand Total
Family Service Association	**$ 780.00**	**$ 39,411.51**	**$ 46,149.38**	**$ 524,013.19**	**$ 610,354.08**
Salaries - Program Manager			$ 6,539.03	$ 31,286.99	$ 37,826.03
Classroom Materials: Curriculum				$ 47,121.40	$ 47,121.40
Classroom Materials: Kits				$ 72,614.50	$ 72,614.50
Postage and Shipping				$ 2,274.12	$ 2,274.12
Professional Services Agreement (PSA)		$ 39,411.51	$ 31,200.00	$ 295,400.54	$ 366,012.05
Substitute Teacher Reimbursement			$ 2,685.76	$ 424.41	$ 3,110.17
Teacher Incentives	$ 780.00			$ 71,258.00	$ 72,038.00
Teacher Resources			$ 3,297.34	$ 3,297.34	$ 6,594.68
Teacher/Coach Training			$ 2,415.20	$ 227.45	$ 2,642.65
Travel			$ 12.05	$ 108.43	$ 120.48
Hands on Learning	**$ -**	**$ 7,972.00**	**$ 11,744.18**	**$ 124,903.80**	**$ 144,619.98**
Salaries - Program Manager			$ 1,289.25	$ 6,180.93	$ 7,470.18
Classroom Materials: Curriculum				$ 7,152.07	$ 7,152.07
Classroom Materials: Kits				$ 20,854.00	$ 20,854.00
Postage and Shipping				$ 637.05	$ 637.05
Professional Services Agreement (PSA)		$ 7,972.00	$ 8,631.17	$ 73,310.10	$ 89,913.27
Substitute Teacher Reimbursement			$ 750.00	$ 375.00	$ 1,125.00
Teacher Incentives				$ 15,510.00	$ 15,510.00
Teacher Resources				$ 884.65	$ 884.65
Teacher/Coach Training			$ 1,026.86		$ 1,026.86
Travel			$ 46.90		$ 46.90
Houston ISD	**$ -**	**$ 3,968.94**	**$ 16,545.01**	**$ 178,629.96**	**$ 199,143.91**
Salaries - Program Manager			$ 2,619.28	$ 12,532.33	$ 15,151.60
Classroom Materials: Curriculum				$ 29,783.60	$ 29,783.60
Classroom Materials: Kits				$ 20,835.40	$ 20,835.40
Postage and Shipping				$ 400.96	$ 400.96
Professional Services Agreement (PSA)		$ 3,968.94	$ 12,000.00	$ 86,069.22	$ 102,038.16
Substitute Teacher Reimbursement				$ 951.00	$ 951.00
Teacher Incentives				$ 21,926.50	$ 21,926.50
Teacher Resources			$ 1,648.66	$ 1,648.67	$ 3,297.33
Teacher/Coach Training			$ 265.03	$ 4,373.85	$ 4,638.88
Travel			$ 12.05	$ 108.43	$ 120.48
Kaleidoscope Youth Development Services DBA The Rhodes School	**$ -**	**$ 12,906.85**	**$ 41,186.32**	**$ 469,969.28**	**$ 524,062.45**
Salaries - Program Manager			$ 5,238.55	$ 25,064.65	$ 30,303.20
Classroom Materials: Curriculum				$ 83,333.36	$ 83,333.36
Classroom Materials: Kits				$ 57,875.67	$ 57,875.67
Postage and Shipping				$ 14.60	$ 14.60
Professional Services Agreement (PSA)		$ 12,906.85	$ 26,600.00	$ 255,775.00	$ 295,281.85
Substitute Teacher Reimbursement			$ 4,609.60	$ 3,632.80	$ 8,242.40
Teacher Incentives				$ 42,873.00	$ 42,873.00
Teacher Resources			$ 4,342.83		$ 4,342.83
Teacher/Coach Training			$ 265.03	$ 227.45	$ 492.48
Travel			$ 130.31	$ 1,172.75	$ 1,303.06
Kids R Kids Learning Academy	**$ -**	**$ 18,772.43**	**$ -**	**$ -**	**$ 18,772.43**
Professional Services Agreement (PSA)		$ 18,772.43			$ 18,772.43
Kilgore College	**$ -**	**$ 13,310.00**	**$ 37,860.88**	**$ 348,924.49**	**$ 400,095.37**
Salaries - Program Manager			$ 5,763.69	$ 27,563.89	$ 33,327.58
Classroom Materials: Curriculum				$ 33,158.18	$ 33,158.18
Classroom Materials: Kits				$ 40,110.05	$ 40,110.05
Postage and Shipping			$ 18.97	$ 2,272.71	$ 2,291.68
Professional Services Agreement (PSA)		$ 13,063.32	$ 25,833.33	$ 192,179.95	$ 231,076.60
Substitute Teacher Reimbursement			$ 2,926.00	$ 1,003.00	$ 3,929.00
Teacher Incentives				$ 49,720.00	$ 49,720.00
Teacher Resources			$ 2,010.58	$ 2,010.58	$ 4,021.16
Teacher/Coach Training			$ 1,116.65	$ 266.33	$ 1,382.98
Travel		$ 246.68	$ 191.66	$ 639.79	$ 1,078.13

Description	TEA 10265	TWC 10431	TEA 11063	TWC 11281	Grand Total
La Joya ISD	**$ -**	**$ 8,134.96**	**$ 21,337.85**	**$ 240,574.74**	**$ 270,047.55**
Salaries - Program Manager			$ 1,709.54	$ 8,183.50	$ 9,893.03
Classroom Materials: Curriculum				$ 42,995.47	$ 42,995.47
Classroom Materials: Kits				$ 45,466.30	$ 45,466.30
Postage and Shipping			$ 156.45	$ 464.27	$ 620.72
Professional Services Agreement (PSA)		$ 8,134.96	$ 14,500.00	$ 125,974.57	$ 148,609.53
Substitute Teacher Reimbursement			$ 150.00	$ 300.00	$ 450.00
Teacher Incentives				$ 16,965.00	$ 16,965.00
Teacher Resources			$ 2,573.51		$ 2,573.51
Teacher/Coach Training			$ 2,191.85	$ 139.25	$ 2,331.10
Travel			$ 56.50	$ 86.39	$ 142.89
Midland College	**$ -**	**$ -**	**$ 15,913.68**	**$ 135,082.29**	**$ 150,995.96**
Salaries - Program Manager			$ 2,180.58	$ 10,438.48	$ 12,619.06
Classroom Materials: Curriculum				$ 28,678.42	$ 28,678.42
Classroom Materials: Kits				$ 22,733.15	$ 22,733.15
Postage and Shipping				$ 457.93	$ 457.93
Professional Services Agreement (PSA)			$ 7,500.00	$ 57,952.45	$ 65,452.45
Substitute Teacher Reimbursement			$ 1,342.50	$ 225.00	$ 1,567.50
Teacher Incentives				$ 11,575.00	$ 11,575.00
Teacher Resources				$ 1,608.46	$ 1,608.46
Teacher/Coach Training			$ 4,859.83	$ 274.90	$ 5,134.73
Travel			$ 30.77	$ 1,138.50	$ 1,169.27
North Texas United Way	**$ -**	**$ 10,111.14**	**$ 22,331.36**	**$ 272,476.89**	**$ 304,919.40**
Salaries - Program Manager			$ 3,833.39	$ 18,350.76	$ 22,184.15
Classroom Materials: Curriculum				$ 50,215.17	$ 50,215.17
Classroom Materials: Kits				$ 41,516.35	$ 41,516.35
Postage and Shipping				$ 918.74	$ 918.74
Professional Services Agreement (PSA)		$ 10,111.14	$ 11,901.07	$ 130,812.68	$ 152,824.89
Substitute Teacher Reimbursement			$ 1,591.26	$ 629.00	$ 2,220.26
Teacher Incentives				$ 26,730.00	$ 26,730.00
Teacher Resources				$ 2,010.58	$ 2,010.58
Teacher/Coach Training			$ 4,929.63	$ 531.53	$ 5,461.16
Travel			$ 76.01	$ 762.09	$ 838.10
Pharr,SanJuan,Alamo ISD	**$ 4,777.21**	**$ 1,247.24**	**$ 20,669.22**	**$ 238,225.90**	**$ 264,919.57**
Salaries - Program Manager			$ 1,709.54	$ 8,183.50	$ 9,893.03
Classroom Materials: Curriculum				$ 37,633.65	$ 37,633.65
Classroom Materials: Kits				$ 43,257.00	$ 43,257.00
Postage and Shipping			$ 36.81	$ 101.42	$ 138.23
Professional Services Agreement (PSA)	$ 4,777.21	$ 1,247.24	$ 13,500.00	$ 109,267.69	$ 128,792.14
Teacher Incentives				$ 39,300.00	$ 39,300.00
Teacher Resources			$ 4,503.65		$ 4,503.65
Teacher/Coach Training			$ 886.28	$ 139.25	$ 1,025.53
Travel			$ 32.95	$ 343.39	$ 376.34
Region 2, Education Service Center	**$ -**	**$ 22,287.49**	**$ 23,400.91**	**$ 267,154.06**	**$ 312,842.47**
Salaries - Program Manager			$ 2,619.28	$ 12,532.33	$ 15,151.60
Classroom Materials: Curriculum				$ 70,653.32	$ 70,653.32
Classroom Materials: Kits				$ 37,387.20	$ 37,387.20
Postage and Shipping				$ 179.88	$ 179.88
Professional Services Agreement (PSA)		$ 22,287.49	$ 17,500.00	$ 116,121.10	$ 155,908.59
Substitute Teacher Reimbursement			$ 900.00	$ 450.00	$ 1,350.00
Teacher Incentives				$ 26,900.00	$ 26,900.00
Teacher Resources			$ 1,608.46	$ 1,608.46	$ 3,216.92
Teacher/Coach Training			$ 761.13	$ 227.45	$ 988.58
Travel			$ 12.05	$ 1,094.33	$ 1,106.38
Region 4, Education Service Center	**$ -**	**$ -**	**$ 810.00**	**$ 2,430.00**	**$ 3,240.00**
Teacher/Coach Training			$ 810.00	$ 2,430.00	$ 3,240.00

Description	TEA 10265	TWC 10431	TEA 11063	TWC 11281	Grand Total
Region 5, Education Service Center	**$ -**	**$ 7,542.86**	**$ 11,151.22**	**$ 91,176.58**	**$ 109,870.66**
Salaries - Program Manager			$ 1,921.23	$ 9,187.96	$ 11,109.19
Classroom Materials: Curriculum				$ 19,842.03	$ 19,842.03
Classroom Materials: Kits				$ 12,399.90	$ 12,399.90
Postage and Shipping			$ 1.99	$ 465.29	$ 467.28
Professional Services Agreement (PSA)		$ 7,542.86	$ 8,233.33	$ 31,559.40	$ 47,335.59
Substitute Teacher Reimbursement			$ 270.00	$ 75.00	$ 345.00
Teacher Incentives				$ 15,185.00	$ 15,185.00
Teacher Resources				$ 965.08	$ 965.08
Teacher/Coach Training			$ 649.30	$ 266.33	$ 915.63
Travel			$ 75.37	$ 1,230.58	$ 1,305.95
Region 6, Education Service Center	**$ -**	**$ 6,375.53**	**$ 10,000.00**	**$ 9.73**	**$ 16,385.26**
Postage and Shipping				$ 9.73	$ 9.73
Professional Services Agreement (PSA)		$ 6,375.53			$ 6,375.53
Teacher/Coach Training			$ 10,000.00		$ 10,000.00
Region 8, Education Service Center	**$ -**	**$ 31,594.74**	**$ 38,187.77**	**$ 355,960.09**	**$ 425,742.60**
Salaries - Program Manager			$ 9,623.46	$ 46,022.60	$ 55,646.06
Classroom Materials: Curriculum				$ 39,285.86	$ 39,285.86
Classroom Materials: Kits				$ 33,628.90	$ 33,628.90
Postage and Shipping			$ 18.71	$ 1,235.61	$ 1,254.32
Professional Services Agreement (PSA)		$ 31,594.74	$ 24,233.33	$ 194,121.67	$ 249,949.74
Substitute Teacher Reimbursement			$ 2,490.33	$ 75.00	$ 2,565.33
Teacher Incentives				$ 38,100.00	$ 38,100.00
Teacher Resources				$ 2,814.56	$ 2,814.56
Teacher/Coach Training			$ 1,793.01	$ 266.33	$ 2,059.34
Travel			$ 28.93	$ 409.56	$ 438.49
Region 10, Education Service Center	**$ -**	**$ -**	**$ 5,988.64**	**$ -**	**$ 5,988.64**
Teacher/Coach Training			$ 5,988.64		$ 5,988.64
Region 14, Education Service Center	**$ -**	**$ 3,101.45**	**$ 15,760.80**	**$ 131,313.42**	**$ 150,175.68**
Salaries - Program Manager			$ 5,924.33	$ 28,360.26	$ 34,284.59
Classroom Materials: Curriculum				$ 16,408.97	$ 16,408.97
Classroom Materials: Kits				$ 12,399.90	$ 12,399.90
Postage and Shipping				$ 420.13	$ 420.13
Professional Services Agreement (PSA)		$ 3,101.45	$ 8,001.07	$ 63,113.41	$ 74,215.93
Substitute Teacher Reimbursement			$ 575.55	$ 489.65	$ 1,065.20
Teacher Incentives				$ 8,225.00	$ 8,225.00
Teacher Resources				$ 965.08	$ 965.08
Teacher/Coach Training			$ 1,175.31	$ 388.43	$ 1,563.74
Travel			$ 84.54	$ 542.60	$ 627.14
Region 19, Education Service Center	**$ 13,149.49**	**$ 34,089.48**	**$ 31,659.83**	**$ 330,546.85**	**$ 409,445.64**
Salaries - Program Manager			$ 6,541.74	$ 31,315.43	$ 37,857.17
Classroom Materials: Curriculum				$ 48,342.80	$ 48,342.80
Classroom Materials: Kits				$ 49,599.60	$ 49,599.60
Postage and Shipping				$ 830.26	$ 830.26
Professional Services Agreement (PSA)	$ 13,149.49	$ 34,089.48	$ 19,000.00	$ 151,278.84	$ 217,517.81
Substitute Teacher Reimbursement				$ 3,377.00	$ 3,377.00
Teacher Incentives				$ 41,555.00	$ 41,555.00
Teacher Resources			$ 4,101.53		$ 4,101.53
Teacher/Coach Training			$ 1,985.79	$ 2,317.45	$ 4,303.24
Travel			$ 30.77	$ 1,930.47	$ 1,961.24
Region 20, Education Service Center	**$ -**	**$ 12,598.44**	**$ 10,307.79**	**$ -**	**$ 22,906.23**
Professional Services Agreement (PSA)		$ 12,598.44	$ 10,307.79		$ 22,906.23
Sam Houston State University	**$ -**	**$ 23,446.03**	**$ -**	**$ -**	**$ 23,446.03**
Professional Services Agreement (PSA)		$ 23,446.03			$ 23,446.03
San Jacinto College	**$ -**	**$ 6,814.22**	**$ -**	**$ -**	**$ 6,814.22**
Professional Services Agreement (PSA)		$ 6,814.22			$ 6,814.22

Description	TEA 10265	TWC 10431	TEA 11063	TWC 11281	Grand Total
Temple ISD	**$ -**	**$ 11,183.31**	**$ 10,970.41**	**$ -**	**$ 22,153.72**
Professional Services Agreement (PSA)		$ 11,183.31	$ 10,845.41		$ 22,028.72
Teacher/Coach Training			$ 125.00		$ 125.00
Texas Migrant Council - Laredo	**$ -**	**$ 11,670.91**	**$ 19,492.55**	**$ 262,122.03**	**$ 293,285.49**
Salaries - Program Manager			$ 1,709.54	$ 8,183.50	$ 9,893.03
Classroom Materials: Curriculum				$ 45,932.13	$ 45,932.13
Classroom Materials: Kits				$ 30,999.75	$ 30,999.75
Postage and Shipping				$ 1,281.15	$ 1,281.15
Professional Services Agreement (PSA)		$ 11,670.91	$ 15,000.00	$ 137,783.37	$ 164,454.28
Substitute Teacher Reimbursement				$ 2,750.50	$ 2,750.50
Teacher Incentives				$ 30,495.00	$ 30,495.00
Teacher Resources				$ 1,849.73	$ 1,849.73
Teacher/Coach Training			$ 2,726.51	$ 2,383.77	$ 5,110.28
Travel			$ 56.50	$ 463.14	$ 519.64
Texas Migrant Council - McAllen	**$ -**	**$ 13,292.73**	**$ 18,652.28**	**$ 260,829.68**	**$ 292,774.69**
Salaries - Program Manager			$ 1,709.54	$ 8,183.50	$ 9,893.03
Classroom Materials: Curriculum				$ 45,041.01	$ 45,041.01
Classroom Materials: Kits				$ 28,933.10	$ 28,933.10
Postage and Shipping		$ 21.66		$ 1,088.94	$ 1,110.60
Professional Services Agreement (PSA)		$ 13,271.07	$ 15,000.00	$ 139,906.48	$ 168,177.55
Substitute Teacher Reimbursement				$ 1,927.06	$ 1,927.06
Teacher Incentives				$ 34,900.00	$ 34,900.00
Teacher/Coach Training			$ 1,816.91	$ 139.25	$ 1,956.16
Travel			$ 125.83	$ 710.35	$ 836.18
Texas Migrant Council - Victoria	**$ -**	**$ -**	**$ 12,343.72**	**$ 125,530.48**	**$ 137,874.20**
Salaries - Program Manager			$ 1,289.25	$ 6,180.93	$ 7,470.18
Classroom Materials: Curriculum				$ 9,379.32	$ 9,379.32
Classroom Materials: Kits				$ 14,466.55	$ 14,466.55
Postage and Shipping			$ 16.82	$ 609.37	$ 626.19
Professional Services Agreement (PSA)			$ 8,631.17	$ 78,637.91	$ 87,269.08
Substitute Teacher Reimbursement				$ 1,088.00	$ 1,088.00
Teacher Incentives				$ 12,270.00	$ 12,270.00
Teacher Resources			$ 1,608.44		$ 1,608.44
Teacher/Coach Training			$ 761.51	$ 2,245.49	$ 3,007.00
Travel			$ 36.53	$ 652.91	$ 689.44
Workforce Solutions Cameron	**$ 9,999.99**	**$ 17,699.21**	**$ 50,093.12**	**$ 518,011.56**	**$ 595,803.88**
Salaries - Program Manager			$ 4,273.84	$ 20,458.75	$ 24,732.59
Classroom Materials: Curriculum				$ 55,960.07	$ 55,960.07
Classroom Materials: Kits				$ 65,075.00	$ 65,075.00
Postage and Shipping				$ 1,718.32	$ 1,718.32
Professional Services Agreement (PSA)	$ 9,999.99	$ 17,699.21	$ 33,200.00	$ 306,283.79	$ 367,182.99
Substitute Teacher Reimbursement			$ 1,050.00	$ 375.00	$ 1,425.00
Teacher Incentives				$ 67,915.00	$ 67,915.00
Teacher Resources			$ 8,283.53		$ 8,283.53
Teacher/Coach Training			$ 3,229.25	$ 139.25	$ 3,368.50
Travel			$ 56.50	$ 86.39	$ 142.89
Workforce Solutions Capital Area	**$ -**	**$ -**	**$ 17,474.13**	**$ 307,515.84**	**$ 324,989.96**
Salaries - Program Manager			$ 2,417.35	$ 11,589.25	$ 14,006.59
Classroom Materials: Curriculum				$ 84,416.17	$ 84,416.17
Classroom Materials: Kits				$ 56,431.98	$ 56,431.98
Postage and Shipping				$ 818.61	$ 818.61
Professional Services Agreement (PSA)			$ 14,131.17	$ 116,391.02	$ 130,522.19
Substitute Teacher Reimbursement				$ 4,723.23	$ 4,723.23
Teacher Incentives				$ 31,135.00	$ 31,135.00
Teacher Resources				$ 2,010.58	$ 2,010.58
Teacher/Coach Training			$ 925.61		$ 925.61

Description	TEA 10265	TWC 10431	TEA 11063	TWC 11281	Grand Total
Workforce Solutions South Texas	**$ -**	**$ 4,063.36**	**$ 7,676.95**	**$ 149,755.83**	**$ 161,496.14**
Salaries - Program Manager			$ 854.77	$ 4,091.75	$ 4,946.52
Classroom Materials: Curriculum				$ 54,179.31	$ 54,179.31
Classroom Materials: Kits				$ 31,187.25	$ 31,187.25
Postage and Shipping				$ 632.40	$ 632.40
Professional Services Agreement (PSA)		$ 4,063.36	$ 5,800.00	$ 42,824.93	$ 52,688.29
Substitute Teacher Reimbursement				$ 300.00	$ 300.00
Teacher Incentives				$ 12,500.00	$ 12,500.00
Teacher/Coach Training			$ 834.34	$ 2,395.53	$ 3,229.87
Travel			$ 187.84	$ 1,644.67	$ 1,832.51
YWCA Lubbock	**$ -**	**$ 36,305.80**	**$ 19,951.79**	**$ 218,327.87**	**$ 274,585.46**
Salaries - Program Manager			$ 4,361.16	$ 20,876.95	$ 25,238.11
Classroom Materials: Curriculum				$ 28,355.90	$ 28,355.90
Classroom Materials: Kits				$ 18,599.85	$ 18,599.85
Postage and Shipping				$ 1,315.02	$ 1,315.02
Professional Services Agreement (PSA)		$ 36,305.80	$ 13,500.00	$ 114,974.94	$ 164,780.74
Substitute Teacher Reimbursement				$ 225.00	$ 225.00
Teacher Incentives				$ 31,315.00	$ 31,315.00
Teacher Resources				$ 1,849.73	$ 1,849.73
Teacher/Coach Training			$ 2,034.16	$ 274.90	$ 2,309.06
Travel			$ 56.47	$ 540.58	$ 597.05
CLI Houston & Remote Classrooms	**$ 211.41**	**$ 1,643.33**	**$ 278,393.88**	**$ 1,179,570.31**	**$ 1,459,818.93**
Salaries - Field Staff (Coach, Coordinator)			$ 243,684.41	$ 362,784.13	$ 606,468.54
Salaries - Program Manager			$ 17,454.42	$ 127,039.25	$ 144,493.67
Salaries - Project Manager				$ 60,369.80	$ 60,369.80
Salaries - TSR Support Staff			$ 11,318.15	$ 47,464.67	$ 58,782.82
Classroom Materials: Curriculum				$ 205,601.35	$ 205,601.35
Classroom Materials: Kits				$ 251,086.60	$ 251,086.60
Office Supplies			$ 62.39	$ 201.10	$ 263.49
Postage and Shipping	$ 11.41		$ 829.51	$ 8,069.06	$ 8,909.98
Substitute Teacher Reimbursement			$ 450.00	$ 4,040.00	$ 4,490.00
Teacher Incentives	$ 200.00	$ 800.00		$ 94,059.00	$ 95,059.00
Teacher Resources			$ 1,376.93	$ 9,312.99	$ 10,689.92
Teacher/Coach Training			$ 1,381.08	$ 1,894.54	$ 3,275.62
Telecommunications		$ 119.97	$ 569.53	$ 959.76	$ 1,649.26
Travel		$ 723.36	$ 1,267.46	$ 6,688.07	$ 8,678.89
Engage ISD Communities & Community Expenses	**$ 9,488.36**	**$ 76,087.42**	**$ 827,742.06**	**$ 357,688.52**	**$ 1,271,006.36**
Salaries and Fringe	**$ -**	**$ -**	**$ 119,702.39**	**$ 152,760.70**	**$ 272,463.09**
CLI Engage - Project Manager			$ 97,648.51		$ 97,648.51
Project Manager			$ 22,053.88	$ 81,802.76	$ 103,856.64
TSR Support Staff				$ 70,957.94	$ 70,957.94
Professional and Contracted Services	**$ 9,461.96**	**$ 75,031.62**	**$ 344,789.16**	**$ 141,255.44**	**$ 570,538.18**
Community Outreach			$ 36,595.59	$ 35,230.33	$ 71,825.92
Computer Equipment		$ 45,600.00	$ 14,719.60	$ 14,898.85	$ 75,218.45
Consultants-Course Development	$ 7,057.00	$ 7,058.00	$ 13,777.00	$ 14,038.00	$ 41,930.00
Pre-K Summit	$ 2,319.00	$ 21,600.00	$ 198,730.37	$ 10,945.84	$ 233,595.21
Teacher/Coach Training	$ 85.96	$ 773.62	$ 80,966.60	$ 50,389.88	$ 132,216.06
TRS Training				$ 15,752.54	$ 15,752.54
Supplies and Materials	**$ -**	**$ -**	**$ 346,607.01**	**$ 55,818.90**	**$ 402,425.91**
Classroom Materials: Kits			$ 319,901.03	$ 55,668.12	$ 375,569.15
Postage and Shipping			$ 319.62	$ 77.73	$ 397.35
Teacher Resources			$ 17,290.91		$ 17,290.91
Training Materials & Supplies			$ 9,095.45	$ 73.05	$ 9,168.50
Other Operating Costs	**$ 26.40**	**$ 1,055.80**	**$ 16,643.50**	**$ 7,853.48**	**$ 25,579.18**
Telecommunications	$ 26.40	$ 1,055.80	$ 1,186.87	$ 4,792.97	$ 7,062.04
Travel			$ 15,456.63	$ 3,060.51	$ 18,517.14

Description	TEA 10265	TWC 10431	TEA 11063	TWC 11281	Grand Total
Sub-Total	**$ 38,489.88**	**$ 536,816.67**	**$ 1,764,334.61**	**$ 8,537,690.42**	**$ 10,877,331.57**
INFRASTRUCTURE					
Salaries and Fringe	**$ -**	**$ -**	**$ 730,822.41**	**$ 1,753,214.71**	**$ 2,484,037.12**
Director			$ 74,084.85	$ 110,358.37	$ 184,443.22
Faculty Support			$ 34,646.42	$ 63,864.66	$ 98,511.08
Program Manager			$ 17,035.09	$ 55,048.84	$ 72,083.93
Project Manager			$ 122,934.35	$ 274,615.15	$ 397,549.50
Research Assistants			$ 45,040.72	$ 172,246.60	$ 217,287.32
TSR Support Staff			$ 132,383.25	$ 270,769.54	$ 403,152.79
Adminstrative Support			$ 126,074.18	$ 207,163.46	$ 333,237.64
CLI Engage - Director			$ 34,555.05	$ 69,791.94	$ 104,346.99
CLI Engage - Project Manager			$ 12,059.79	$ 133,835.90	$ 145,895.69
CLI Engage - User and Project Support			$ 132,008.71	$ 395,520.25	$ 527,528.96
Professional and Contracted Services	**$ 654,677.17**	**$ 266,299.93**	**$ 586,844.26**	**$ 345,848.71**	**$ 1,853,670.07**
CLI Engage	$ 654,677.17	$ 266,299.93	$ 519,660.00	$ 279,998.21	$ 1,720,635.31
Copy/Print			$ 14,370.88	$ 19,043.36	$ 33,414.24
Data Analysis Work Group			$ 50,387.58	$ 37,103.94	$ 87,491.52
Storage Space			$ 2,425.80	$ 9,703.20	$ 12,129.00
Supplies and Materials	**$ 541.59**	**$ 6,033.28**	**$ 16,631.85**	**$ 19,896.88**	**$ 43,103.60**
Computer Equipment	$ 736.52	$ 6,337.08	$ 2,664.04	$ 9,463.54	$ 19,201.18
Office Supplies	$ (211.67)	$ (774.85)	$ 6,591.88	$ 4,649.07	$ 11,006.63
Postage and Shipping			$ 57.58	$ 868.95	$ 926.53
Software/Licenses	$ 16.74	$ 471.05	$ 7,318.35	$ 4,915.32	$ 12,721.46
Other Operating Costs	**$ -**	**$ 686.00**	**$ 9,782.44**	**$ 2,295.50**	**$ 12,763.94**
Parking		$ 326.00	$ 1,602.00	$ 370.00	$ 2,298.00
Telecommunications			$ 1,472.10	$ 348.60	$ 1,820.70
Travel		$ 360.00	$ 6,708.34	$ 1,576.90	$ 8,956.39
Sub-Total	**$ 655,218.76**	**$ 273,019.21**	**$ 1,344,080.96**	**$ 2,121,255.80**	**$ 4,393,574.73**

TOTALS

Description	TEA 10265	TWC 10431	TEA 11063	TWC 11281	Grand Total
TOTAL DIRECT COSTS	$ 693,708.64	$ 809,835.88	$ 3,108,415.57	$ 10,658,946.22	**$ 15,270,906.30**
TOTAL INDIRECT COSTS	$ 4,232.28	$ 19,417.52	$ 389,561.81	$ 374,062.43	**$ 787,274.04**
GRAND TOTAL	**$ 697,940.92**	**$ 829,253.40**	**$ 3,497,977.38**	**$ 11,033,008.65**	**$ 16,058,180.34**

Texas School Ready Project
Community Expenditure Descriptions

Community – A collection of public schools, Head Start programs, and licensed child care facilities participating in the TSR project under the leadership of a local LEA or community agency (e.g. Region 8 ESC, Family Services Association, The Rhodes School, etc.) The communities may also be known as TSR "Lead Agencies."

Project Manager – An early childhood expert employed by the Children's Learning Institute (CLI) at The University of Texas Health Science Center at Houston (UTHealth) to provide leadership and support to the TSR project; part of the role of the project manager is to:

- Act as liaison between CLI and community leadership
- Provide guidance to program managers on TSR implementation
- Travel to local communities to conduct outreach and ensure program fidelity
- Analyze data to determine community needs and provide guidance and support accordingly

CLI Engage Project Manager – A project manager employed by CLI to provide direct, highly customized support to current and prospective users on CLI Engage; this customized support can include:

- Outreach to encourage school districts, charter schools, Head Start programs, and child care programs to sign up for CLI Engage
- Support to high-level CLI Engage users with implementation of the TSR tools on the platform
- Development of customized technical solutions for CLI Engage
- Management of CLI Engage database and assisting with complex account infrastructure set-up

Program Manager – A professional employed by CLI to provide specialized support to the TSR project for outreach/communications, coaching, and field-based implementation. Six of the TSR Program Managers provide regional, field-based support to TSR communities and Field Staff to ensure fidelity to the TSR model. Specifically, these six Program Managers:

- Act as liaisons between CLI and communities
- Provide technical assistance to communities and LEAs in their assigned regions
- Train and support coordinators in their assigned regions
- Train and support coaches in their communities
- Provide training/professional development to classroom teachers
- Provide teachers with mentoring and support
- Collect data and submit reports

Field Staff (Coordinators, Coaches) – Early childhood professionals employed by TSR communities, with salary reimbursed through a professional service agreement with CLI, to implement the TSR project within a particular community. TSR Field Staff complete the following activities:

- TSR Coordinators oversee TSR implementation within the community
- TSR Coordinators act as liaisons between the community and local partners
- TSR Coordinators train and support coaches in their communities
- TSR Coordinators and Coaches provide training/professional development to classroom teachers
- TSR Coordinators and Coaches provide teachers with coaching and support, in-classroom or remotely
- TSR Coordinators and Coaches collect data and submit reports

TSR Support Staff – Professional employed by CLI to provide customized support to the TSR project across a broad range of activities:

- Develop online courses
- Film, edit, and produce video
- Conducting communications and outreach activities
- Support finance and inventory activities
- Write original content for online courses and supplemental curriculum
- Provide customized support to teachers participating in TSR's special projects (e.g. BEECH)
- Support quality improvement activities with TSR leadership and field staff

Consultants – Course Development – Early childhood experts who provide highly specialized content on a contract basis. Consultants may provide written content and/or appear in expert video explanations for online courses and supplemental curriculum.

Professional Services Agreement (PSA) – Professional Services Agreements are contracts between CLI and vendors who provide various services (e.g. reimbursement of coordinators/mentors' salary/fringe and associated costs, consultants to provide training to teachers, etc.) in order to successfully implement the TSR project.

Classroom Materials: Curriculum – If needed, participating classrooms are equipped with a state-approved set of books, materials, and instructions, called a curriculum, to guide classroom teachers in lesson planning and activities to enhance students' learning in all subject areas at the prekindergarten level.

Classroom Materials: Kits – Various kits of select instructional materials are provided to teachers participating in the TSR project to enhance teachers' classroom management and students' literacy skills that are facilitated by classroom teachers. These kits include:

- Classroom Start-Up Kit
- School Readiness Kit plus supplemental materials
- PRTI Kit (Developing Talkers/Habelmos Juntos)

Teacher Resources – Printed copies of resources to support teacher's content knowledge in school readiness areas and Texas' early learning guidelines. These teacher resources include:

- Texas Prekindergarten Guidelines
- Texas Infant, Toddler, and Three-Year-Old Early Learning Guidelines
- CIRCLE Teacher's Manual (supplemental curriculum)

Travel – Community field staff and CLI project management staff travel to various communities and classrooms within the community to support TSR implementation and coach teachers.

Teacher/Coach Training – First year participating teachers are required to attend the two-day CIRCLE Preschool Foundations Training and one-day progress monitoring training. Additionally, first and second year participating teachers attend up to 20, two-hour eCIRCLE sessions throughout the year.

Substitute Teacher Reimbursement – Teachers who participate in the TSR project are required to attend 3 full days of training, two days for CIRCLE Preschool Foundations Training and one day for progress monitoring training. CLI reimburses up to $75/day to schools that provide substitute teachers so the teachers can attend these trainings.

Teacher Incentives – First and second year participating teachers are eligible to earn up to $1,000 in incentive pay for participating in the eCIRCLE professional development sessions throughout the school year and implementing the TSR model in the teacher's classroom.

CLI Houston and Remote Classrooms – CLI Houston is a community in which TSR professional development and coaching is delivered to teachers directly by coaches employed by CLI. Some teachers (and their classrooms) in the CLI Houston community receive TSR professional development and coaching remotely, including online, through phone calls, and with video reflection. Originally designed for teachers in remote geographic areas in Texas where distance to and from a training location for face-to-face meetings was cost prohibitive, teachers in remote classrooms in the CLI Houston community may be located anywhere in the state. Specially-trained remote coaches use video editing software to provide annotated feedback on a teacher's own instructional videos, drawing teacher's attention to positive strategies already in place and missed opportunities for interaction or instruction.

Pre-K Summit – The prekindergarten summit (Texas School Ready Early Childhood Summer Institute) is a three-day, research and training conference that provides professional development opportunities to early childhood administrators, practitioners, and leaders to raise awareness of proven best practices in early childhood education. TSR recruits nationally-recognized child development experts to provide keynotes and special sessions, as well as qualified trainers throughout Texas. While all participants receive free registration to the event, TSR provides scholarships to current TSR participants to offset hotel accommodation for those teachers with the greatest need.

Texas Rising Star (TRS) Training – The Texas Workforce Commission contracted with CLI to provide training on the updates to the Texas Rising Star Certification Guidelines and ongoing support for the TSR Online Assessment Tool on CLI Engage for all TRS assessors and mentors from the 28 local workforce development boards.

Indirect Costs – These expenditures reflect costs associated with the support and oversight provided to the project by UTHealth. The Texas Education Agency and the Texas Workforce Commission allow a maximum of 15% or 5% in indirect charges, depending on the program and funding source. These expenditures are used to recapture costs such as office space, equipment, contract services, legal services, human resources, information technology, procurement, and accounting.

Texas School Ready Project
Infrastructure Expenditure Description

Director — Early childhood expert employed by the Children's Learning Institute (CLI) at The University of Texas Health Science Center at Houston (UTHealth) to serve as the leadership for the TSR project and work closely with all stakeholders (legislators, TEA, TWC, etc.) to provide direction and oversight of the project's implementation. Directors support project management staff in the overall management of the TSR project.

Faculty Support – CLI faculty provide their knowledge and expertise to the TSR Project in the design, creation, and delivery of high quality training and professional development for TSR staff; help in the interpretation of research data and findings toward improving the TSR project.

Program Manager – A professional employed by CLI to provide specialized support to the TSR project for outreach/communications, coaching, and field-based implementation. Six of the TSR Program Managers provide regional, field-based support to TSR communities and Field Staff to ensure fidelity to the TSR model. Specifically, these six Program Managers:

- Act as liaisons between CLI and communities
- Provide technical assistance to communities and leas in their assigned regions
- Train and support coordinators in their assigned regions
- Train and support coaches in their communities
- Provide training/professional development to classroom teachers
- Provide teachers with mentoring and support
- Collect data and submit reports

Project Manager – Early childhood expert employed by CLI to provide leadership and support to the TSR project; part of the role of the project manager is to:

- Act as liaison between CLI and community leadership
- Provide guidance to program managers on TSR implementation
- Travel to local communities to conduct outreach and ensure program fidelity
- Analyze data to determine community needs and provide guidance and support accordingly

Research Assistant – Professional employed by CLI to supports TSR management team and staff in the development and implementation of coach and teacher training.

TSR Support Staff – Professional employed by CLI to provide customized support to the TSR project across a broad range of activities:

- Develop online courses
- Film, edit, and produce video
- Conducting communications and outreach activities
- Support finance and inventory activities
- Write original content for online courses and supplemental curriculum
- Provide customized support to teachers participating in TSR's special projects (e.g. BEECH)
- Support quality improvement activities with TSR leadership and field staff

Administrative Support – Professional employed by CLI to provide finance, human resources, purchasing, administrative, equipment, and grant administration support.

CLI Engage – Director – Project management expert employed by CLI to provide leadership and support for the maintenance and ongoing enhancement of the CLI Engage platform; part of the role of the CLI Engage – Director is to:

- Act as liaison between CLI and UTHealth information technology teams
- Provide guidance on platform maintenance and enhancement opportunities
- Manage vendor contracts for the platform's development and enhancement

CLI Engage Project Manager – Project manager employed by CLI to provide direct, highly customized support current and prospective users on CLI Engage; this customized support can include:

- Outreach to encourage school districts, charter schools, Head Start programs, and child care programs to sign up for CLI Engage
- Support to high-level CLI Engage users with implementation of the TSR tools on the platform
- Development of customized technical solutions for CLI Engage
- Management of CLI Engage database and assisting with complex account infrastructure set-up

CLI Engage – User and Project Support – Professional employed by CLI to provide customized technical support to the TSR project, under the leadership of the CLI Engage – Director; this customized support can include the following activities:

- Data collection and management throughout the year
- Custom data reporting on TSR participation and CLI Engage usage
- Technical assistance to all CLI Engage users and TSR participants
- Web development and maintenance for CLI Engage, TSR, and related websites
- Project management support from initial planning to implementation
- User acceptance testing for CLI Engage enhancements

CLI Engage – CLI Engage is the online professional development and child progress monitoring system that hosts TSR's online tools and resources available to all Texas public schools, Head Start programs, Texas Rising Star certified providers, and TSR participants free of charge beginning in FY2016. CLI Engage includes child and teacher progress monitoring tools, a learning management system to house online courses, an assessment development environment, administrative tools to upload and manage data, and a collection of classroom activities with video demonstrations. To build the CLI Engage platform, CLI partnered with the following:

- SunNet Solutions – to develop requirements with CLI, and design and build the technology-driven platform
- Learning Stacks – to customize the learning management system (LMS) component in CLI Engage
- UTHealth Data Center Operations and Services (DCOS) – to provide internet technology guidance and server management

Data Analysis Work Group – CLI faculty and staff that oversee the capture of progress monitoring data, ensure data reliability, manage multiple databases, provide data reporting, and assist in the development and enhancement to data systems and processes.

Indirect Costs – These expenditures reflect costs associated with the support and oversight provided to the project by UTHealth. The Texas Education Agency and the Texas Workforce Commission allow a maximum of 15% or 5% in indirect charges, depending on the program and funding source. These expenditures are used to recapture costs such as office space, equipment, contract services, legal services, human resources, information technology, procurement, and accounting.

Study of the Effectiveness of Professional Development For Teachers of At-Risk Preschoolers[1]

Children's Learning Institute
UT Health Science Center at Houston
Susan H. Landry, Jason Anthony, Paul R. Swank, and Pauline Monseque-Bailey

Many states estimate that half of their students begin kindergarten without the foundational skills necessary to have a good chance of succeeding in school.[1] Scientific research continues to show that a child's experiences *before* elementary school directly impact brain development in ways that affect later learning, behavior, and physical and mental health.[2] Children from families at poverty levels of income, because of life stresses, psychological distress, and poor parental role models, are at the *highest risk* for not engaging in experiences that are most likely to promote school readiness, including those that advance a child's language and literacy development.[3]

Quality early childhood education is the primary means for overcoming these deficiencies and giving children from low-income backgrounds an opportunity to start kindergarten with the skills necessary to succeed.[4] Research evidence shows that children from impoverished backgrounds who are supported by teachers trained in instructional strategies that promote key foundational skills can demonstrate average levels of development by the time they enter kindergarten.[5] Because low-income families tend to rely on early childhood programs that accept federal subsidy[6], it is critical that these programs promote the best possible learning for young children and school readiness.

There is often a serious mismatch between the preparation of early childhood educators and the preparation needed to optimize classroom practices. However, effective professional development has been shown, even with early childhood educators lacking a formal educational background, to improve early childhood program quality.[7] Therefore, *comprehensive professional development* for early childhood educators may be a key element in ensuring that at-risk preschool students have access to teachers with a deep understanding of research-based instructional practices who can prepare them for school success.

Study Description

The primary objective of this study was to demonstrate that teachers serving low-income children in three types of early childhood education programs—subsidized childcare, Head Start, and public school prekindergarten—could be directed through high-quality training to use effective instructional practices that promote children's development of language and literacy.

The study was conducted in four states—Florida, Maryland, Ohio, and Texas—during the 2004-2005 and 2005-2006 school years. Study participants included 262 early childhood educators in 158 schools. The following table summarizes the demographic characteristics of the participating preschool teachers and classrooms.

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[1] Published in Volume 101 (No. 2), 2009, *Journal of Educational Psychology*.

Classroom and Teacher Characteristics by Study Site

Characteristic	*Florida (65 teachers)*	*Maryland (59 teachers)*	*Ohio (65 teachers)*	**Texas (73 teachers)**
Classroom type (%)				
Public school	0	74	0	38
Head Start	27	26	100	37
Child Care	73	0	0	25
Language of instruction (%)				
English	40	96	100	85
Spanish	60	4	0	15
Length of day (%)				
Full day	88	96	35	77
Half day	12	4	65	23
Teacher education (%)				
High school/CDA	97	0	26	23
2-year college	3	0	40	30
4 or more years college	0	100	34	47
Teacher ethnicity (%)				
African American	19	53	37	6
Caucasian	6	42	60	22
Hispanic	75	5	3	72
PreK Teaching Experience				
Mean years	7.31	6.00	8.55	8.15
***Note.* CDA = Child development associate**				

This multisite study specifically tested the effectiveness of four professional development programs that were developed using scientifically based research and models of successful professional development. To measure the effectiveness of the professional development programs, schools were randomly assigned to *one of five* conditions—"business as usual" (control group) or to one of the four professional development programs.

Teachers in the study, including those in the control group, were required to follow a published curriculum—but not any particular published curriculum—that built-in a scope and sequence for language and literacy learning activities to be used in a purposeful but playful way.

In addition, children from each study classroom were randomly selected to participate in pre- and post-assessments to determine the effectiveness of each professional development model. Across the four sites, 1,786 children were assessed. About 42 percent of the children were Hispanic, 34 percent were African American, 17 percent were Caucasian, 2 percent were Asian, and 5 percent were other.

All four professional development programs had a set of common components, which included year-long, facilitated small-group training using an online course, eCIRCLE, developed by the Children's Learning Institute at the UT Health Science Center at Houston. This course emphasizes language and literacy instruction, practice of learned material in the classroom, and participation in online message boards with fellow teachers. All four programs also required

teachers to use the same supplemental curricula and associated materials and the same curriculum based measures to assess student progress.

The programs differed in whether they included regularly scheduled in-classroom mentoring with a trained facilitator and detailed feedback on progress monitoring data that provided recommendations for grouping children and for instructional activities included in the supplemental curriculum. Specifically, schools participated in one of these four professional development conditions:

- Teachers received both *in-classroom mentoring* and *detailed*, instructionally linked feedback concerning children's progress in language and literacy using a personal digital assistant (PDA) version of an assessment (C-PALLS) for early childhood phonological awareness, language and literacy.
- Teachers received *no mentoring* but did receive the *detailed*, instructionally linked feedback on children's progress using the PDA version of C-PALLS.
- Teachers received *in-classroom mentoring* but only *limited* feedback on children's progress, which was not linked to curricular activities.
- Teachers received *no mentoring* and only *limited* feedback on children's progress.

Teacher and Student Results

The impact of the different professional development approaches on teaching and student learning were measured using multiple assessments. Teachers were rated before and after the completion of the professional development program using The CIRCLE-Teacher Behavior Rating Scale (TBRS).[8] The TBRS rates the quality and frequency of specific teaching behaviors in the classroom including activities related to book reading, oral language development, print and letter recognition, written expression, and phonological awareness. Student learning was measured using the Expressive One-Word Picture Vocabulary Test[9], Preschool Language Scale—Fourth edition[10], Developing Skills Checklist[11], and the Preschool Comprehensive Test of Phonological and Print Processing[12]. These assessments measure a preschooler's expressive vocabulary, language development, and phonological and print awareness.

The most powerful of the four professional development approaches for improving the overall quality of teaching and specifically the quality and frequency of instruction of early writing, phonological awareness, letter knowledge, and shared reading was the most comprehensive approach that included *in-classroom mentoring* and *detailed* instructionally linked feedback. The differences between teachers in this group and those without the professional development program were highly significant, and the effectiveness was seen across all four sites. In short, teachers who received comprehensive professional development became better teachers.

Not only was the most comprehensive professional development effective in improving the quality of teaching and classroom environments, but it was also effective in promoting children's learning. Students of these teachers graduated with better language comprehension, more advanced phonological awareness, larger breadth of expressive vocabulary, and more print and letter knowledge than children in the control group. The effects were significant and showed meaningful improvements in children's readiness for kindergarten.

It is notable that children's learning outcomes were significantly improved through professional development of hundreds of teachers rather than through costly and labor-intensive direct intervention with thousands of children.

The use of *technology* was an important key to the success of the professional development. Not only was the eCIRCLE training delivered to all four professional development groups online, but some of the most robust findings from the study were tied to the use of the PDA-based progress monitoring tool. The PDA version provided teachers with immediate feedback about children's learning from one assessment to the next, provided comparisons across multiple skill areas for each child, recommended how to group children into small groups, and identified specific instructional activities to use with smaller groups of children. All of this consistently resulted in improvements in teachers' instruction and children's learning.

Challenges to Implementing Program Broadly

This study brought to light several challenges to executing an early childhood educator professional development program more broadly. It is critical that these challenges be addressed as part of any effort to broaden the availability of comprehensive professional development for preschool teachers.

- Staff at all levels, including superintendents, directors, coordinators, and teachers, must be committed and supportive of the program. A thorough explanation of the intervention, including a discussion of the demands on a teacher's time and the level of commitment required to achieve effects, is critical.
- Local and centralized technology support must be provided because of the extensive use of technology to deliver this professional development program. The study not only encountered minor problems with the technology platform and locating computer labs for group sessions, but also found a need to train some teachers to work with computers and PDAs.
- Some oversight and communication among project managers and facilitators is essential in order to ensure fidelity of program implementation and maximize effectiveness.
- Curriculum used in the classroom must have a strong focus on emergent literacy and have a scope and sequence of instructional activities that parallels the objectives in the online courses even though a specific, mandated curriculum is not required.

Future Directions

This study demonstrated impacts on teachers' behavior, classroom environments, and children's learning *within the same year* that teachers received the professional development. The learning outcomes for the children in some areas, such as vocabulary and phonological awareness were sometimes small, so it will be important to assess effects of the professional development programs after teachers participate for a second year. This will determine whether another "dose" provides an opportunity for teachers to hone their skills, which may result in even better student learning results.

The study was unable to determine if the effectiveness of the professional development program varied by teacher education (high school/child development associate, 2-year college, 4 or more years of college) because of the limited sample of classrooms at each study site. However, the study anecdotally found that the least competent teachers required the more comprehensive professional development to change their instructional practices to an extent that increased student learning. Identification of recommended dosage levels for teachers of different

competence levels is an important issue to examine since it will help ensure that resources earmarked for professional development are most effectively allocated.

Conclusions

- The most powerful of the four professional development approaches for improving the overall quality of preschool teaching and student learning was the most comprehensive approach that included in-classroom mentoring and detailed instructionally linked feedback.

- Comprehensive professional development provided to preschool teachers can significantly improve children's learning outcomes at a lower cost than providing costly, direct intervention to children once they reach elementary school.

- Technology was an important key in successfully and cost-effectively delivering professional development to preschool teachers and in providing them with immediate feedback about children's progress and instructional needs, which resulted in improved teacher instruction and children's learning.

- Comprehensive professional development can have an immediate impact on preschool teachers' behavior, classroom environments, and children's learning.

Footnotes

[1]Highlighting NAEP 2003 (2003); Zill & West (2001).
[2]DiPietro (2000); Landry et al. (2001); Neville et al. (1998).
[3]Hart & Risley (1995); Neuman (1996).
[4]Bowman et al. (2001) ; Snow et al. (1998).
[5]Landry et al. (2001).
[6]Phllips et al. (1994).
[7]Howes, Phillips, & Whitebook (1992) ; Kontos, Howes, & Galinsky (1997).
[8]Landry et al. (2000)
[9]Brownell (2000)
[10]Zimmerman, Steiner & Pond (2002)
[11]Developing Skills Checklist (1990)
[12]Lonigan et al. (2003)

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April Crawford
Tricia Zucker
Bethanie Van Horne
Susan Landry

Integrating Professional Development Content and Formative Assessment with the Coaching Process: The Texas School Ready Model

Instructional coaching is becoming common in early childhood programs to provide individualized, job-embedded professional development. Yet relatively few studies have tried to "unpack" the coaching process and delineate the specific features of coaching that contribute to teacher change. In this article, we describe an evidence-based preschool-quality improvement program, Texas School Ready (TSR), attending to the integration of program content and coaching process made possible through a defined competency framework and technology-driven tools that aid coaches in providing high-quality mentoring.

April Crawford, Tricia Zucker, Bethanie Van Horne, and Susan Landry are all at the Children's Learning Institute, University of Texas Health Science Center at Houston.

Correspondence should be directed to Dr. April Crawford, Children's Learning Institute, University of Texas Health Science Center at Houston, 7000 Fannin Suite 1900, Houston, TX 77062. E-mail: april.crawford@uth.tmc.edu.

Theoretical Underpinnings of Coaching

PROFESSIONAL DEVELOPMENT (PD), grounded in adult learning theory (Bransford, Brown, & Cocking, 2000; Putnam & Borko, 2000), is frequently conceptualized as a progression that varies depending on teachers' knowledge and includes cycles of learning, implementation, feedback, and reflection (Snow,

Griffin, & Burns, 2005; Spodek, 1996). PD can be delivered in a variety of ways (e.g., training workshops) and should align with these key principles: (a) developing teachers' content knowledge with clear linkages between theory and practice; (b) using interactive, hands-on approaches to adult learning, including ongoing and personalized training and mentoring; and (c) providing opportunities for feedback and self-reflection (Desimone, 2009; NAEYC, 1994). These principles are difficult to apply in widely available PD offerings like workshops (Garet, Porter, Desimone, Birman, & Yoon, 2001); however, these principles are well aligned with sustained, individualized coaching approaches that, when combined with coursework, have been shown to improve teacher and child outcomes (Landry, Anthony, Swank, & Monseque-Bailey, 2009; Neuman & Cunningham, 2009).

Three key dimensions that vary across coaching models include *structural* parameters defining the frequency, duration, and intervals of coaching sessions; *process* features that include the specific behaviors used by coaches to support change; and *content* that is the substantive, topic-driven focus of the intervention (Powell & Diamond, 2013). Model structure and content are usually specific to particular coaching approaches. Process features, typically under-specified, generally include these key strategies:

1. *Reflective questioning* is used to help teachers notice how children are responding to instruction and interacting with others; it is often embedded into feedback sessions. Video supports reflection as it provides adults an opportunity to see, in the moment, what children are experiencing (Zucker, Crawford, & Landry, 2013). Individualized opportunities to reflect on what is happening in the classroom appear particularly important in high poverty classrooms where children's needs are greatest (Pianta, Mashburn, Downer, Hamre, & Justice, 2008).
2. *Feedback* linked to data is a defining characteristic of multiple successful coaching models (Denton, Swanson, & Mathes, 2007; Pianta et al., 2008) and typically emphasizes using teacher and child-level data to identify strengths and weakness, target improvement, and measure success. Data collection and reporting is commonplace in schools, but further steps to support interpretation and translation of findings into actions are needed (Coburn & Turner, 2012; Goren, 2012). Coaches can play a vital role in establishing stable organizational routines that include repeated cycles of data collection, collaborative analysis of results, and improvement planning (e.g., Sherer & Spillane, 2011).
3. *Demonstration* helps teachers bridge theory and practice by showing teachers "how" effective instruction looks in action (Poglinco & Bach, 2004). Demonstration is a high intensity coaching strategy (i.e., coach directly interacts and does the so-called *heavy lifting*) that targets specific behaviors (Zucker et al., 2013). Evidence suggests this strategy is underutilized, with coaches spending too little time targeting instructional change (Sheridan, Edwards, Marvin, & Knoche, 2009) and preferring lower intensity strategies (e.g., observing, setting goals, providing feedback; Neuman & Wright, 2010). Demonstration systematically varies based upon the coaching modality. In-class, face-to-face coaching allows coaches to begin with demonstration and move teachers through a gradual release progression (Pearson & Gallagher, 1983). Asynchronous, remote coaching typically relies on video libraries to demonstrate evidence-based practices and lessons rather than seeing how strategies work in one's own classroom.

Our Approach to Coaching Competencies

Since 2003, we have used coaching as part of a comprehensive, statewide PD program that has served more than 25,000 pre-K teachers across the state of Texas. In our experience, implementing a PD coaching model at scale, we find that

coaches are often unaware of the theoretical underpinnings and suggested mechanisms of change that link coaching with improvements in teaching behaviors. Instead, coaches often view their role as simply supporting teachers' efforts and showing teachers how they, themselves, would implement a lesson or interact with children—an orientation toward coaching that fails to address key mechanisms of change. To address this concern, we developed a generalized set of coaching competencies, shown in Table 1, that describe five dimensions of coach behavior that support implementation. Within our program, the competencies are used to train coaching staff, set clear expectations for coach engagement, and guide monitoring of fidelity. The competencies articulate coaching behaviors aligned with the theoretical underpinnings of our model. In this article, we explain how coaching competencies are contextualized within specific components of our intervention.

Coaches' Role in Each Program Component

The Texas School Ready (TSR) project includes five major components: in-service training and sustained teacher PD, provision of teaching resources, community-based technical assistance through stakeholder engagement, web-based child progress monitoring, and individualized data-driven coaching. As we describe in the following, coaches play a central role the program, delivering support for all five components experienced by participating teachers.

Teacher PD. Coaches facilitate: (a) face-to-face introduction to the foundational concepts of the TSR program and its tools; (b) *Progress Monitoring Training* that highlights the goals of tracking child progress, how to conduct the assessments on our web-based tool, and pulling reports on child progress throughout the year; and (c) *eCIRCLE PD*, which consists of more than 100 hr of online courses featuring extensive video-based demonstrations of effective instructional practices, as well as application-based assignments and activities. The courses cover a broad range of topics aligned with early learning guidelines, and represent the content focus within our competency framework.

Resources and curricula. TSR provides coach support to encourage utilization of: (a) a high-quality commercial curriculum; (b) state learning guidelines; (c) a tiered supplemental language and literacy curriculum; (d) the CIRCLE Activity Collection, a print and online resource that includes more than 300 hands-on activities that teachers can implement in a variety of instructional settings; and (e) Classroom Startup and School Readiness Kits. Within our competency framework, these resources supplement our content focus and that ensure teachers have the materials needed to follow-through with actionable feedback provided by coaches.

Stakeholder engagement and sustainability planning. Coaches are typically employed by a community agency and play a vital part in building buy-in and encouraging sustainability. To do this, coaches provide routine communication and updates and host meetings that bring principals and directors together to discuss program aims and requirements and learn how to interpret child-progress monitoring results.

Child progress monitoring. Coaches support teachers with implementation of the CIRCLE Progress Monitoring System across the 3-year participation period. This tool (formerly known as C-PALLS+) is a user-friendly, technology-driven tool that is aligned with the Texas Prekindergarten Guidelines and Head Start Early Learning Framework. It includes direct assessments (e.g., picture naming) and observation-based measures (e.g., writing) that allow teachers to quickly assess a child's progress, access student level reports, view small group recommendations based on child benchmark status, and view instructional activities linked to learning domain and benchmarks that include scripted lessons accompanied by video-annotated demonstrations (Figure 1).

Coaches (a) integrate progress monitoring report analysis into routine instructional planning

Table 1

Coaching Competencies

	Intensity of Coaching	*Content Focus*	*Actionable Feedback*	*Supportive Presence*	*Reflective Guidance*
Competency	Adjust the level of support provided to match teacher needs in a given instructional situation.	Identify gaps in a teacher's content knowledge and provide accurate guidance regarding skill development and core concepts.	Combine content-related input with specific guidance regarding appropriate pedagogy and teaching behavior.	Transmit information and provide support in a non-threatening and collaborative manner.	Help teachers recognize connections between teacher behavior, child signals, and content aims across contexts.
Behaviors	Corrects misunderstandings in content or pedagogy in the moment rather than waiting until the lesson is over Supports teacher to complete actions on his/her own rather than taking over instruction Interjects and offers clues/tips for modification Focuses on teacher behavior rather than issues unrelated to instruction Clearly articulates/ thinks aloud about processes and actions Builds on what teacher is already doing and pushes for more sophisticated thoughts/ actions	References key learning objectives Uses domain-specific language directly linked to observation tools and standards Rarely misses opportunities for content talk Content reference / guidance is age appropriate	References: – specific teaching strategies – practices directly linked to observation tools – goal behaviors Minimally narrates or summarizes events Suggests adaptations / modification / extensions to improve delivery of instruction / support	Uses positive language (verbal and non-verbal) Encourages collaboration Reinforces existing positive practices Moves on once teacher indicates/shows understanding Recognizes and responds sensitively if teacher shows discomfort / resistance	Uses reflective prompts/ language Orients teacher to child signals during instruction Connects specific teacher action(s) to child behaviors / response Connects reflection to standards, objectives, exemplars, assessment results

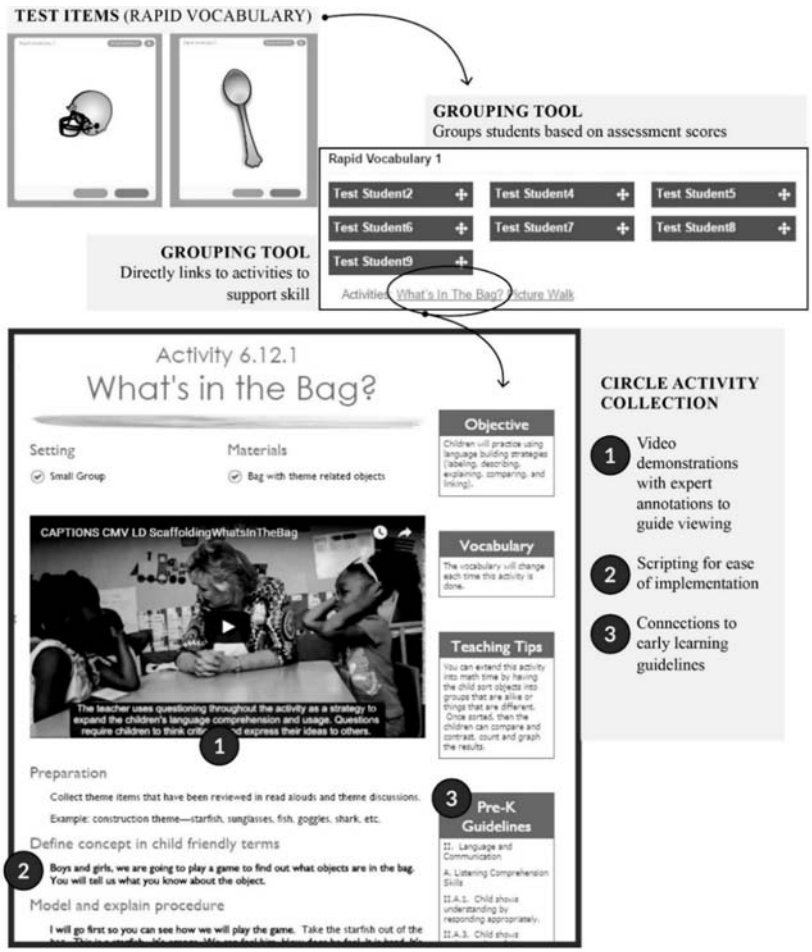

Figure 1. How Progress Monitoring Directly Informs Classroom Instruction.

sessions; (b) support teachers to establish small group instruction recommended by CIRCLE-PM; and (c) assign independent review of annotated video demonstrations and associated activity scripts in the online activity library; this technology-assisted extension of coaching helps teachers learn the basics on their own, allowing coaches to focus on more challenging aspects of lesson implementation such as scaffolding child responses. CIRCLE-PM is tightly aligned with our competency framework, automating connections between content focus, reflective guidance, and actionable feedback.

Data-driven coaching. Teachers in our program receive individualized coaching that is delivered in the classroom or through remote feedback linked to recordings of a teacher's own instruction. Coaching is structured to provide 4 hr of individualized coaching per month during the first year of participation, 2 hrin the second year, and 1 hr in the third year. Three formative assessments, designed specifically to integrate the coaching process with a content focus, form the foundation of individualized coaching sessions: (a) CIRCLE Progress Monitoring System, discussed previously; (b) The Classroom

Environment Checklist (CEC); and (c) the Classroom Observation Tool & Goal Setting System (COT). Our data-driven coaching approach encourages reflection and motivates change through repeated cycles of: (a) observation and data collection using CIRCLE, CEC, and COT; (b) feedback and goal setting based on identified need; and (c) implementing teacher improvement plans alongside well-matched coaching strategies (i.e., the *intensity* component of our coaching competency framework) and assessment-linked activities.

The CEC is a 21-item observation tool used by coaches and teachers 3 times per year. Items are rated on a 3-point scale and capture evidence that classroom management systems are in place, quantity and quality of content-related centers, presence of instructional planning tools, and the extent of meaningful literacy materials linked to current topics and themes. Coaches complete the CEC during their first classroom visit and collaborate with teachers at the end of the coaching session to set goals for change in aspects of the classroom environment. Coaches enter CEC data into our web-based platform, CLI Engage, which produces a report that organizes items based on lowest to highest score and provides photographs of high-quality examples linked to each item in the CEC.

The COT was designed specifically for coaches to improve alignment with the content foci of our teacher PD program and to encourage more intentional coach-teacher goal setting behavior (Crawford, Zucker, Williams, Landry, & Bhavsar, 2013). The COT captures snapshots of a teacher's behavior and instruction during a 2-hr classroom observation that can be used to develop improvement plans and track a teacher's progress over time (see Appendix A). The goal-setting system is an extension of the COT that leverages technology to routinize feedback and goal setting, allowing for greater accuracy and efficiency than generally achieved through more manual methods. Teacher and coach collaborate to set goals at the conclusion of each coaching session by selecting indicators they want to appear on the Short Term Goals Report. By reviewing the individualized COT report, they identify gaps in teaching skill and prioritize goals based on: (a) student progress monitoring reports; (b) current PD topics; or (c) an area of instruction the teacher is highly motivated to improve. To strengthen the fidelity of our goal setting approach, an extensive set of high-quality teaching examples has been aligned with each item from the COT. These clips ensure that teachers have an opportunity to see what good performance looks like before attempting to implement agreed upon changes.

The following is an example of how pairing coaching competencies with the COT shapes coach–teacher interactions in our program: During a coaching session, a teacher is implementing a lesson focused on sorting plastic letters into two groups—letters in the child's name and those not in the child's name—as compared to a child's printed name card. Some children have successfully completed the task and are waiting while the teacher helps the remaining children recognize the features that distinguish the letters in their names. The coach provides *reflective guidance* by asking the teacher what she notices about the engagement level of the children who have already finished the task. After the teacher responds, the coach provides *actionable feedback* by suggesting a modification to the activity for children who have mastered the objective. Using specific *content-focused* language from the COT, the coach cues the teacher to *upward scaffold* by removing the children's name cards and encouraging them to sequence the letters in their own names, and to *downward scaffold* by bringing the name card back for comparison or support when needed. These scaffolding goals are new for the teacher, and the coach is prepared to model the strategy if the teacher is missing an opportunity or requires that level of coaching *intensity* to work toward more effective practice.

As we worked to unpack the coaching process within our own program and increase our coaches' intentionality, we recognized the need for an integrative approach that provides coaches (a) clear articulation of underlying assumptions driving change in teaching that are reflected in a set of coaching competencies; (b) data-driven tools to inform instruction and goal setting; and

(c) ongoing coach training and supervision to support continuous improvement. Integration among these ingredients is strengthened by leveraging technology to directly link formative assessments with feedback and recommendations for additional training and instructional activities, and to allow for cost-efficient supervision and training.

Synthesis of Evidence Supporting the Program

Since 1999, components of what is now called the Texas School Ready program have been evaluated and refined in three separate large-scale studies. An initial study, carried out across Head Start programs in multiple communities in Texas, demonstrated the importance of implementing eCIRCLE online PD courses in small-group formats, where teachers were actively engaged in learning, combined with in-classroom mentoring (Landry, Swank, Smith, Assel, & Gunnewig, 2006). Next, a four-state experimental study was conducted with a design that allowed us to determine the added benefit of combining our CIRCLE Child Progress Monitoring System with coaching and eCIRCLE PD (Landry et al., 2009). A third random assignment study, conducted across Head Start, public school, and child care, examined the effectiveness of the combined approach (i.e., eCIRCLE PD + coaching + CIRCLE PM) with 215 classrooms across 11 communities (Landry, Swank, Anthony & Assel, 2011). Each of these studies show that participants in the intervention conditions make greater gains in instructional practices and child outcomes, and that the combination of eCIRCLE PD, coaching, and CIRCLE PM resulted in the most optimal changes in teachers' instructional practices and children's school readiness outcomes.

Additional research on our coaching model is being fueled primarily by advances in technology-mediated approaches that have the potential to lower the costs of delivering services and increase access for geographically or linguistically hard-to-reach programs. We are currently conducting a randomized control trial in which teachers are assigned to one of three conditions: (a) business-as-usual control group, (b) TSR with remote coaching, and (c) TSR with face-to-face coaching. Teachers in the remote coaching condition upload videos of instruction for coaches to provide careful reflection via annotated feedback (e.g., subtitled comments, praise, observations, and questions). Teachers review these annotated videos during a feedback phone call with their coach to set goals for improvement. In the face-to-face condition, teachers experience traditional, live classroom coaching including modeling, coteaching, and feedback sessions. This study will shed light on the importance of mechanisms of change within coaching as we examine whether strategies such as modeling within one's own classroom context are more effective than the online approximations of these strategies that use pre-recorded video exemplars as models. We conducted a preliminary analysis of global classroom quality from our first cohort of 55 teachers; we will include 210 teachers across all cohorts. Preliminary findings show significant changes for face-to-face teachers versus controls, with a large effect size (Cohen's $d = 0.92$, $p < .05$). Teachers receiving remote coaching also showed greater gains than control teachers ($d = 0.41$). Although teachers receiving face-to-face coaching made greater gains than remotely coached teachers, these differences were not significant ($d = 0.50$) and require further data collection to confirm the extent of differences across the coaching models. This study will conclude with a comparison of the cost-effectiveness of our remote and face-to-face coaching models to determine if potential trade-offs in effectiveness are outweighed by the cost and scalability of each approach.

Next Steps to Refine Coaching

Although instructional coaching is quickly gaining popularity, the availability of evidenced-based, coach-specific, training and support models is limited. Many questions remain regarding the specific coaching strategies that improve teaching practice, and the school- and program-based conditions that support or constrain the impact

of a particular approach. In particular, research is needed to further unpack the coaching process and to identify the key drivers of change that characterize effective coach-teacher partnerships. The emergence of coaching competency frameworks can facilitate this line of inquiry by clearly articulating the range of strategies that need testing. For example, by assigning teachers to coaching groups that vary in intensity (e.g., reflective feedback only, side-by-side coaching only) we can determine the importance of providing support in-the-moment versus outside of instructional time. By extension, does the level of directness or specificity in coach goal-setting practices with teachers' impact effectiveness? The answers to these questions may vary in important ways based on specific teacher characteristics, such as prior content knowledge or general receptivity to change.

Beyond the coach–teacher partnership, many more questions remain regarding the school- and policy-level factors that influence the fit and feasibility of a particular coaching model. For example, coaching approaches implemented by in-house staff members may differ in important ways from services delivered by external organizations. Specifically, in-house staff members may be expected to wear multiple hats, and are therefore less likely to hone their coaching skills; they may also be more likely to work across multiple grade levels that require a broad range of instructional knowledge, without which coaching content focus may suffer. We also need to examine the role that school leaders' play in establishing and maintaining conditions favorable to coaching, including setting the tone for continuous improvement and building buy-in for the coaching program among teaching staff. Perhaps most important are questions regarding the impact of explicitly linking coaching with performance appraisals, corrective actions, and financial incentives.

Identifying effective training and professional development for coaches is another important next step in refining instructional coaching. In our own work implementing at-scale, we are focused on building coaches' competencies by establishing a culture of continuous improvement that includes a 5-day in-person training at the beginning of each school year to learn about or reemphasize our coaching framework and provide practice opportunities. Coaches also participate in monthly web-based lunch-and-learns focused on evi-denced-based practices linked to current teacher PD topics, and engage in monthly small-group collaborative coaching web-conferences in which selected coaches share a video of themselves engaged in coaching to receive feedback grounded in the coaching competencies from peers and program leadership. Additional study is needed to determine the effectiveness of such approaches at improving coaches' skills and ensuring adherence to research-based programs.

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An experimental study evaluating professional development activities within a state funded pre-kindergarten program

Susan H. Landry · Paul R. Swank · Jason L. Anthony · Michael A. Assel

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Abstract This paper describes the implementation and evaluation for scaling up a comprehensive early childhood teacher professional development program into 11 communities across 2 years with funding through state legislative actions. The comprehensive program had four major components based on results from a previous multi-condition random assignment study across four states. The previous results demonstrated that the most optimum approach for supporting children's school readiness included: (1) teacher on-line professional development with facilitation, (2) classroom mentoring, (3) implementation of a research-based curriculum, and (4) technology-driven progress monitoring that informed instruction. The comprehensive professional development program was evaluated in a new state program designed to bring childcare, Head Start, and public school pre-kindergarten together into integrated partnerships. In Year 1, 220 teachers serving 3834 children were randomly assigned to either receive the comprehensive program or not. Teachers who served as controls in Year 1 received the program in Year 2, and those who received the program in Year 1 participated for an additional year in Year 2, allowing for examination of the effects of one versus 2 years of participation. The program improved teachers instructional practices relative to controls, and a second year of participation resulted in greater gains in children's language and literacy. Results support the need for well-integrated, comprehensive professional development for early childhood educators.

Keywords Early education · Professional development · Pre-kindergarten · State initiative · Early reading

S. H. Landry (✉) · P. R. Swank · J. L. Anthony · M. A. Assel
Department of Pediatrics, Children's Learning Institute, The University of Texas Health Science Center, 7000 Fannin, Ste. 2300, Houston, TX 77030, USA
e-mail: susan.landry@uth.tmc.edu

Introduction

Understanding how to provide young children with an early foundation in school readiness skills is becoming a primary goal of many states in order to decrease the high incidence of school failure and drop-out, particularly for children from low income homes (Kauerz, 2008; National Assessment for Educational Progress-NAEP, 2003; National Research Council, 2001). States estimate that as many as half of their children, particularly those from low socioeconomic (SES) backgrounds and/or learning English as a second language (ESL), are entering kindergarten programs without the basic foundational skills necessary for them to succeed (NAEP, 2003). Discrepancies between early skills for children from low SES versus more advantaged families are known to persist through formal schooling (National Center for Education Statistics, 2001a, b; National Research Council, 2001). Evidence from longitudinal intervention studies demonstrates that there is a long lasting positive influence of quality early childhood education (Campbell, Ramey, Pungello, Sparling, & Miller-Johnson, 2002; Reynolds, Ou, & Topitzes, 2004; Schweinhart, Barnes, & Weikart, 1993) and results from a number of recent studies provide information about key characteristics of a quality program (e.g., Assel, Landry, Swank, & Gunnewig, 2006; Bierman et al., 2008; Hindson et al., 2005; Vasilyeva, Huttenlocher, & Waterfall, 2006; Wasik, Bond, & Hindman, 2006). As many states are seeking solutions for how to provide children from low-income backgrounds with a quality early education (Kagan & Rigby, 2003; Kauerz, 2008) recent empirical evidence can inform these efforts.

For young children, a quality education includes teachers being skilled in the use of instructional approaches that are sensitive to the child's developmental needs and expose them to experiences with language, emergent literacy, and math within a responsive environment that supports social-emotional development (Burchinal et al., 2008; Hirsh-Pasek & Burchinal, 2006; Landry, 2008). Recent research has demonstrated that children need to enter kindergarten ready to learn academic skills. This includes an understanding and use of vocabulary, complex oral language, and early writing (National Institute for Literacy, 2007). Specific skills include phonological awareness, phonological short-term working memory, and the efficient use of phonological representations of words (Anthony, Williams, McDonald, & Francis, 2007; Anthony et al., 2006). Letter knowledge including naming letters and knowing that they are associated with sounds is also a critical foundation skill (NIL, 2007). It is now accepted that teachers trained in instructional strategies that expose children to experiences with emergent literacy skills are more likely to have students who show cognitive gains that carry into kindergarten (Whitehurst & Lonigan, 1998; Zevenbergen et al., 1997). This body of research directly informed the development of the professional development examined within this report.

The importance of this is highlighted in a recent report where data from six longitudinal data sets that examined the estimated links between three key elements of school readiness (i.e., school-entry academic, attention, social-emotional) and later reading and math achievement across children 8–14 years of age is described (Duncan et al., 2007). In all six studies, the strongest predictors were early academic skills followed by attention skills. Further support of the importance of early

language and literacy skills for reading success comes from a newly released national report (National Early Literacy Panel, 2008). This large meta-analysis demonstrates that young children's language skills, including vocabulary and complex language, as well as early literacy abilities, specifically phonological awareness and letter knowledge, are associated with better reading outcomes in elementary school. Thus, in finding solutions to better preparing children for school, it would appear that attention needs to be given to training teachers in instructional practices that support children's learning of these skills.

Issues in professional development

While early childhood educators may not always possess the formal educational background to prepare them for the classroom, effective professional development has been shown to improve the quality of early childhood programs (Howes, Phillips, & Whitebook, 1992; Kontos, Howes, & Galinsky, 1997). However, access to effective professional development has not kept up with the increased acknowledgement of its significance. For example, the Committee on Early Childhood Pedagogy found that for the most part, professional development for early childhood teachers tends to be limited, inconsistent, and fragmented (National Research Council, 2001). There are additional challenges in the early childhood field when attempting to implement meaningful and ongoing changes in teacher practices, including staff turnover, few funds for substantial professional development efforts, and uncertainty around appropriate learning goals for teachers (Dickinson & Brady, 2005).

Conceptual and research models describe the need for a comprehensive set of supports (e.g., professional development, research based curriculum) in order for teachers to assure children develop a range of cognitive and social skills necessary for later school success (Barnett, 2003; Hyson, 2003; Gallagher, Clifford, & Maxwell, 2004; National Association for the Education of Young Children-NAEYC, 2008a; Sullivan, 1999). However, inconsistency has been found across many elements of available professional development programs, including content, approach, duration, and quality (Dickinson & Brady, 2005). Adding to the incoherence, professional development programs frequently occur with no conceptual framework to adequately define teacher development so that determining goals, choosing instructional strategies, and evaluating outcomes is difficult (e.g., Little, 1994; Miles, 1995). The lack of integration, or connection, across professional development experiences compromises teachers' ability to transfer these experiences into effective classroom practices. To further support good implementation, teachers need learning over time, practice within the classroom, and follow-up of these efforts (Smylie, Allensworth, Greenberg, Harris, & Luppescu, 2001), characteristics that are often lacking in professional development for early childhood teachers.

Guidelines for early childhood professional development exist, such as a position statement developed by the NAEYC (2008a), that support the need for early childhood teachers to understand the role of curriculum content, optimal conditions

under which young children learn, and the ability to engage in reflection of one's teaching practices (NAEYC, 2008a; National Research Council, 2001). Other guidelines address program delivery characteristics, for example that activities must be sustained and that participation be collective, the importance of being responsive and sensitive to individual differences in children's learning and the role of the home environment and cultural backgrounds in the learning process (NAEYC, 2008a; National Association of Child Care Professionals, 2008).

While establishing standards of quality is facilitated by these types of guidelines; they do not detail facets of teacher change, nor elucidate how teachers gain skills in specific domains. For example, even those teachers who are fairly well-qualified, but obtained their education before the mid-1990s, have an understanding of early literacy development that is limited, since what is known in this field has grown vastly in the past two decades (e.g., Dickinson & Neuman, 2005; Sulzby & Teale, 1991).

Theoretical framework for proposed professional development

Our professional development program was guided by an approach that is systematic and connected to solid practices of effective teacher development. Based on research describing effective elements of professional development programs, we attended to teacher's attitudes and beliefs about the content that should be incorporated within a preschool classroom. Based upon this theoretical framework, it was expected that attention to teachers' beliefs that might be at odds with our professional development model would allow teachers and staff to address these areas and work through resistance and be more accommodating to new learning (Bereiter, 1972; Richardson, Anderson, Tidwell, & Lloyd, 1991; Speck, 1996). We also recognized teachers' existing knowledge of child-development theory and expectations about children. We incorporated models for teachers to construct knowledge with opportunities for exploration and questioning so that the incorporation of new knowledge into their teaching practices was more likely. Our framework provided support for teachers to work with others in their field for fuller engagement with ideas and materials. It also assured time for practicing new skills in a way that recognized teachers as adult learners and as professionals, utilizing their current expertise. This was done in an effort to allow teachers to become fully competent in the new content and strategies that would better ensure teachers were able to put them into practice (e.g., Bransford, Brown, & Cocking, 2000; Corcoran, 1995; Kennedy, 1997; Elmore, 2002; Learning First Alliance, 2000; Putnam & Borko, 2000). This framework was expected to promote a high level of intellectual engagement in the subject matter by giving teachers the opportunity to understand theory and rationales for new practices, as well as participation in collaborative problem solving, and learning in authentic contexts.

Some models of professional development also describe how the availability of an on-going coach or mentor can support teachers to try new instructional approaches that have been presented in their professional development training (International Reading Association & NAEYC, 1998; Spodek, 1996). This has

improved teacher-child interactions (Corsini & Caruso, 1989; Epstein, 1993) and through the availability of a network of support decreased feelings of isolation (Hayes, Palmer, & Zaslow, 1990).

Empirical support for approach of the current study

Prior to conducting the current study, an empirical study was conducted to determine the added benefit of combining multiple types of support to facilitate early childhood teachers' instructional practices (Landry, Anthony, Swank, & Monsegue-Bailey, 2009). In this previous study, three components, highlighted in the literature as important for early childhood teachers, were tested in a multi-condition, random assignment approach. These included mentoring, progress monitoring that informs instruction, and web-based professional development with a facilitator. A control "business as usual" condition was compared to four conditions that all included an on-line professional development approach that has been shown to facilitate change in teachers' behaviors and children's outcomes. Across the four professional development on-line conditions, mentoring versus non-mentoring was crossed with a standard paper/pencil approach to assessing children's learning across the year versus a progress monitoring system that provided feedback to the teacher regarding child needs and instructional ideas through the use of a personal digital assessment (PDA) system. The study allowed for assessment of the combination of these components on teaching behaviors and children's outcomes. The results demonstrated that the most optimum approach for supporting children's school readiness included teacher on-line professional development with facilitation and classroom mentoring as well as the use of technology-driven progress monitoring that informed instruction.

Previous studies have demonstrated the efficacy of research-based curriculum that includes scope and sequence of comprehensive language and literacy instructional practices on children's outcomes (e.g., Preschool Curriculum Evaluation Research Consortium-PCER, 2008). Thus, with a conceptual framework supported by the early childhood literature and recent empirical evidence for the importance of combining training and resources, the impact of scaling up a comprehensive professional development program on teacher and child outcomes was evaluated in 11 communities across a large state.

The present study

The present study involved scaling up a comprehensive professional development program for early childhood educators across three types of service delivery systems (i.e. Public school, Head Start, Childcare) in 11 communities. These are the three types of programs funded in the United States to provide preschool for low-income children. It was not the study intent to examine for the differential effectiveness of the professional development for the three service delivery agencies as funding was not appropriated to examine this question. Instead, the state model stressed integration among service delivery programs, and community partners were encouraged to put state-funded, degreed, public school teachers in Head Start and

subsidized childcare classrooms. The program components were guided by a conceptual framework informed by the current early childhood professional development literature (e.g., Bransford et al., 2000; Putnam & Borko, 2000) and empirical evidence from our previous random assignment study (Landry et al., 2009). Key characteristics of the framework that guided the development of the program included: (1) a comprehensive set of teacher supports that have clearly identified connections that inform teachers in how to plan and implement language and literacy instructional activities, (2) a comprehensive scope and sequence of learning activities that support teachers to carry out an effective program, and (3) progress monitoring approaches that inform teachers about individual learning needs and appropriate small group practices. Two constraints on the research design were necessarily imposed by the study being part of a state funded initiative. The first constraint that was dictated by the state was that all teachers in the demonstration project must be provided with some level of professional development by the end of the 2 year project. The second constraint was that implementation began in the middle of the school year (December) during the first year of the project because that was when state funds were allocated to the project.

The *first objective* was to examine the effectiveness of the program in terms of change in teachers' instructional practices. To address this objective, teachers in Year 1 were randomly assigned to control or intervention conditions and the change in their instructional practices over the course of the Year 1 intervention were compared. For the first objective, we hypothesized that teachers receiving the professional development program would show significantly greater gains in language and literacy instructional practices compared to teachers in the control condition. Because the implementation in Year 1 was constrained to only 4.5 months, we did not expect the program to benefit child outcomes (e.g., language and literacy skills), although an evaluation of these outcomes was conducted.

The *second objective* was to determine if more exposure to the program resulted in greater improvements in teachers' instruction and greater improvements in children's language and literacy outcomes. This objective was addressed in Year 2 by having teachers who were trained in Year 1 receive an additional year of the program in Year 2 and by having teachers who were controls in Year 1 receive the program for the first time in Year 2. We hypothesized that professional development of increasing length would lead to greater gains in teacher practices and thus improve child language and literacy outcomes.

Finally, the *third objective* (a within group analysis) was to examine the impacts of the program on instructional practices and child outcomes within the group of teachers who were controls in Year 1 and who later participated in the program in Year 2. We hypothesized that teachers who received the program in the second year would show greater gains in their instructional practices compared to the gains they showed within the first year of the study and this would lead to greater gains in children's outcomes during the second year. The research design as related to the three study objectives is summarized in Fig. 1.

Tracking of two groups of teachers across experimental conditions and time.

Number of Years in PD Program by End of Year	Label for Study Condition	School Year 2003/2004	School Year 2004/2005
0	control teachers	Group 1[a,c]	
1	1st year program teachers	Group 2[a]	Group 1[b,c]
2	2nd year program teachers		Group 2[b]

Fig. 1 Illustration of study objectives and group comparisons. *Note*. Teachers were randomly assigned to Group 1 or Group 2 in late 2003. [a] Between group comparison to address objective 1. [b] Between group comparison to address objective 2. [c] Within group comparison to address objective 3

Methods

Participants

Communities

A request for applications was opened in September 2003 for communities interested in participating in the professional development program. All applicants had to meet certain criteria. Programs were required to bring together a leadership committee that crossed three early childhood programs that serve low-income children (i.e., Head Start, subsidized childcare, school district) into a partnership to identify common school readiness goals (e.g., all agreed to use the same curriculum). Programs also had to identify a lead agency to coordinate offices for program coordinators and mentors and agree to random assignment of 20 classrooms within the partnership to "business as usual" vs. participation in the program with stratification across the three types of classrooms. In addition, the community partnership had to agree to use a research-based language and literacy curriculum from the state approved list. The partnership also was required to use the professional development model including the progress monitoring system, a facilitated on-line course, and in-classroom mentoring. Finally, they had to agree to participate in training for multiple levels of partners within the community (i.e., leadership, mentor, teacher), and in meetings throughout the year to ensure effective implementation. Of the 17 communities that applied, 11 met the above criteria and were accepted into the first year of the program.

In addition, an Advisory Panel, mandated by the state legislation, was comprised of the key state agencies involved with young children (e.g., the Head Start collaborative office, State Department of Family and Protective Services) assisted with program oversight. The State Center also developed a resource panel comprised of national early childhood experts to inform and advise the project.

Classrooms

Each of the 11 community partnerships recruited 20 classrooms to participate, for a total of 220 classrooms in Year 1. Community partners were instructed to recruit only one classroom per building to avoid spillover and compensatory rivalry effects. Community partners were also instructed to recruit classrooms from all three service delivery systems. Within community partnership, half of the recruited classrooms from each service delivery system were randomly assigned by the investigators to receive the comprehensive professional development program and the other half served as control classrooms. Because partnerships sometimes had an uneven number of classrooms from a given service delivery system, we occasionally had to balance the assignments across partnerships. For example, if a community partner had five Head Start classrooms and five childcare classrooms, one program type would be allocated three control classrooms and two intervention classrooms and the other program type would be allocated three intervention and two control classrooms. These assignments would subsequently be balanced by those for another community partner who had an uneven number of Head Start classrooms and child care classrooms. Table 1 provides a summary of the participating community partnerships and type of settings within each partnership.

Although 220 classrooms were randomized, teachers from 7 classrooms dropped out of the project in Year 1 (see Table 2). In addition, there was teacher turnover during the first half of the school year, i.e., prior to initiation of the professional development program, in 13 classrooms. These 13 classrooms were retained and the new teachers from these classrooms were given their classroom's original assignment.

Teachers who participated in the evaluation in Year 1 were invited to continue to participate in Year 2 in order to address our second objective. As reported in Table 2, 209 teachers desired to continue their participation in Year 2. Teacher turnover during the summer or the first two months of the school year resulted in

Table 1 Type of classrooms in the eleven community partnerships at completion of Year 1

Community	ISD	Head start	Child care
Partnerships			
Community 1	14	2	4
Community 2	10	3	6
Community 3	9	5	5
Community 4	4	3	13
Community 5	6	6	8
Community 6	8	8	4
Community 7	7	8	5
Community 8	8	7	5
Community 9	9	6	3
Community 10	6	8	4
Community 11	9	3	7
n	90	59	64

ISD Independent School District, 82% of these partnerships placed district degreed teachers into childcare and/or Head Start classrooms, anonymity of community partners was maintained for purposes of the blind review process

Table 2 Number of teachers and children participating in Years 1 and 2

	Year 1		Year 2	
	Pre	Post	Pre	Post
Teachers				
Full sample	220		214	
Remained		200		203
Replaced		13		6
Dropped		7		5
Observed sample	99		96	
Remained		85		79
Dropped		14		17
Children				
Observed sample	1427		1571	
Remained		1264		1328
Dropped		163		243

Teachers replaced in a target classroom received training but no teachers were replaced after Dec. of the study year. If teachers were dropped, then children in that classroom were necessarily dropped as well. Teachers and children who were dropped were excluded from analyses

replacement of 6 teachers from among the 209 teachers who had hoped to continue to participate.

Teachers

Of the teachers who participated in the Year 1 evaluation that addressed Objective 1, 107 served as controls and 106 served as 1st year program teachers. Table 3 summarizes the educational experience of these teachers separately for each condition. There were no significant group differences in years of experience, educational attainment, certification in early childhood, or class size (see Table 3). The majority of teachers were female, i.e., 98%. The teachers in Year 1 were ethnically diverse; 48.5% Hispanic/Latino, 22% African American, 27% White, and 2.5% self reported as "other".

In Year 2, there were 209 teachers whose participation addressed our second objective, with 126 teachers receiving the professional development program for the first time (i.e., 1st year program teachers), and 83 receiving a second year of the program (i.e., 2nd year program teachers). The ethnic breakdown of teachers in Year 2 was similar to that in Year 1; 46% Hispanic/Latino, 20% African-American, 31.5% White, and 2.5% Other.

Our third objective was addressed with a subset of teachers who served as controls in Year 1 and then as 1st year program teachers in Year 2. From the original pool of 107 teachers who served as controls in Year 1, nearly half were randomly selected to be observed in Year 1. Of the teachers observed in Year 1, 14 were among the 79 teachers randomly selected for observations in Year 2. Thus, objective 3 was addressed with 14 teachers who provided observation data in both years. All of these teachers were female. Most of these teachers were Hispanic/Latino (71%) and the remaining teachers were split evenly between African American and

Table 3 Characteristics of classrooms and teachers in Year 1 by Objective 1 study condition

	Controls	Targets	*df*	t/χ^2	*p*
Classroom					
Class size *M* (SD)	17.86 (3.95)	17.74 (4.23)	1,172	.19	.848
Teacher					
Yrs experience *M* (SD)	5.59 (4.90)	7.09 (7.21)	1,172	2.65	.104
Education level (%)			4	2.29	.682
High school diploma	7	10			
Child development associate	16	21			
Associate degree	15	13			
Bachelor degree	33	42			
Postgraduate degree	6	13			
Early childhood Ed. Cert (%)			1	.09	.760
Yes/No	34/43	46/53			
n	76	99			

Teacher data was available for 80% of classrooms

White/non-Hispanic. Thus, the subset of teachers who provided data for Objective 3 was very similar to the full sample of teachers who provided data for Objectives 1 and 2.

Children

The 213 classrooms enrolled in Year 1 served 3834 children, and the 209 classrooms enrolled in Year 2 served 3150 children. Each year, up to 8 children with parental consent for testing were randomly selected from each classroom to provide assessment data. Thus the sample of children in Year 1 was comprised of 1264 children, and the sample in Year 2 was comprised of 1328 children (see Table 2).

Because the Year 1 evaluation of program effects on child outcomes yielded null results as expected by the short duration of the program in Year 1, we primarily report the demographic characteristics of children who participated in Year 2. More specifically, this sample of 1328 children, who provided data to address Objective 2, was relatively balanced by gender (51% female) and was ethnically diverse; 68% Hispanic/Latino, 19% African American, 12% Caucasian, and 1% "other". The Year 2 sample averaged four and half years of age at pretest. Table 4 reports demographics of the Year 2 sample disaggregated by study condition. There were no significant differences in age, gender, ethnicity, or language of testing between children whose teachers were in their first year of the professional development program and children whose teachers were in their second year of the professional development program, Fs = .00 to 1.24; ps = >.20 (see Table 4). Children enrolled in Head Start, public pre-Kindergarten, and childcare programs within the 11 communities that participated in the current project were culturally diverse and from low-income families.

Table 4 Characteristics of children in Year 2 sample separated by Objective 2's study conditions

	1st year teacher			2nd year teacher			*df*	*F*	*p*
Age at pretest (years)[a]									
M (SD)	4.4	.4	802	4.4	.4	528	1,1328	−1.24	.21
Gender (%)							1,1076	.00	.99
Male/female	48.8/51.2			49.1/50.9					
Ethnicity (%)							3,1074	.04	.99
African American	19.5			18.5					
Hispanic/Latino	66.8			68.5					
Caucasian	12.1			12.0					
Other	1.6			1.0					
Language of testing (%)							1,1086	1.53	.22
Spanish/English	20.8/79.2			13.6/86.4					
n	800			527					

Data are for 96% of children evaluated at both pretest and posttest unless otherwise indicated

[a] Data are for all children with pretest data

Table 2 reports the numbers of randomly selected children who remained in the study and who were lost to attrition each year. Within the Year 2 sample, there were no significant differences between study conditions in terms of the proportion of children who dropped versus remained in the study, based on a nonlinear mixed model that accounted for nesting, $t(df = 1297) = .77$; $p = .442$.

The children whose teachers were in the control condition in Year 1 and were in the 1st year program condition in Year 2 represent two independent groups of children (Objective 3). Therefore, we compared demographics between the groups to determine if they were similar. They had similar breakdowns on race/ethnicity, $\chi^2(3, \ n = 203) = 3.80$; $p = .28$ (.30 by exact test), and gender, $\chi^2(1, n = 203) = .15$; $p = .70$ (.78 by exact test).

Description of professional development program components

Online professional development program

The genesis of the online professional development program was the face-to-face training workshops developed in a prior study conducted within Head Start centers across Texas (Landry, Swank, Smith, Assel, & Gunnewig, 2006). Given the challenge of scaling up the professional development program across multiple communities, the previously developed multiple day workshops were adapted to be appropriate for an online application, called eCIRCLE. The nine courses covered the following topics: (1) Classroom management, (2) Best practices/responsive teaching, (3) Setting the stage for children's talk, (4) Reading aloud, (5) Phonological awareness, (6) Letter knowledge, (7) Mathematics, (8) Written expression, and (9) Language development. Within each course current research-based instructional practices were included. For example, in the phonological

awareness course, teachers are presented with the stages of phonological development with rationale for the scope and sequence of activities that are appropriate within a pre-K setting. In addition, they view teachers engaging in age-appropriate phonological awareness instruction via video clips with teacher commentaries on why particular activities and materials are selected. Assessment practices to monitor progress are also discussed along with follow-up activities that meet the needs of individual learners are high-lighted. A similar approach is used in the other courses.

Consistent with theoretical frameworks, the online course involved: (a) small-group interactive learning facilitated by a trainer, (b) extensive videotaped modeling of content related activities and expert commentaries that allowed teachers to see examples in realistic contexts that were relevant to their classroom experiences, (c) interactive engagement with online coursework and online assessments of knowledge, (d) opportunity for independent review of all course contents, (e) opportunity for practicing specific skills within the small group (e.g., role playing, development of lesson plans), (f) practice of specific instructional activities in one's own classroom, (g) teacher postings of classroom experiences, and (h) trainer review of postings and feedback. The eCIRCLE online professional development was developed to provide teachers with the appropriate balance between implementing developmentally appropriate activities that are teacher-directed and designed to foster development of specific skills and implementing activities that are child-directed and designed to allow children to enhance mastery and breadth of skills through active exploration. By acknowledging and working within teachers' existing philosophies of instructional practices, it was expected that the program would be more effective in facilitating a high fidelity of implementation. Teachers in the target condition attended bimonthly small group eCIRCLE sessions ($n =$ about 16 teachers) that were facilitated by trained and experienced early childhood educators.

Research has indicated that adults will learn most effectively when they are intellectually engaged in the subject matter through opportunities to understand the theory and rationale for new instructional practices and the learning is situated in authentic contexts (i.e., demonstrating techniques with teachers in classroom settings). It is also important to provide opportunities to do collaborative problem solving and practice specific skills with learning experiences extended over time (e.g., Bransford et al., 2000; Elmore, 2002; Putnam & Borko, 2000).

Based on current research, professional development for early childhood educators has moved from a predominate focus on child-centered approaches to one in which children have opportunities for both self-directed discovery, and times when they are presented with explicit information about vocabulary, number concepts, and letters in a more teacher-directed approach (e.g., NAEYC, 2008b). Professional development often does not provide teachers with current information and the level of specification in their training needed to effectively present and sequence activities in ways that integrate child and teacher directed learning. The on-line program was developed to provide teachers with the appropriate balance. This included implementing developmentally appropriate activities that are teacher-directed and designed to foster development of specific skills, and activities that are child-directed and designed to allow children to enhance mastery and breadth of

skills through active exploration. What distinguishes the pedagogy of the online professional development model in this study is the goal of providing a balance between implementing teaching strategies based on research regarding school readiness and what developmental research indicates about how children learn most effectively.

In general, in our professional development model teachers learned a set of five key elements: (1) consistent use of a responsive interaction style to support learning, (2) content that builds cognitive and social skills, (3) to plan and sequence input and learning activities so that children build concepts, (4) a balance of teaching strategies between teacher vs. child directed, and (5) flexible groupings where instruction occurs in small and large group activities (Landry, 2008). Because teachers had to attend the on-line course after hours, each was provided a $750 stipend once the course was completed for that year. Paraprofessionals (e.g., aides, teacher assistants) that attended at least some of the course received $250. Other incentives for teachers and staff included coordination with teacher training colleges to allow for college credit for the professional development program.

In-classroom teacher mentoring

Mentoring is thought to provide teachers with opportunities to try new approaches with guided support and a knowledge resource without concerns regarding the mentor having a supervisory role (Eisenhower National Clearinghouse for Mathematics and Science Education, 1998). In this demonstration project, mentoring included planning for 3 h of daily cognitive readiness activities in planful, purposeful, but playful ways, classroom demonstration of how to implement activities effectively, and side by side coaching. The goal was to provide individualized coaching support that met the learner's needs which may be important for early childhood teachers who vary in education and training. Mentors provided the following types of support to teachers in the intervention condition: helping with classroom arrangement, modeling instruction, supporting instructional planning including lesson plans, and reflective follow-up during meetings where CIRCLE "Glows and Grows" reports were provided. Facilitators mentored each teacher twice per month during the first and second year of the project for two hours per visit. Part of the mentor's role was to support teacher's independence in planning, provision of effective instruction, and use of data to guide instruction.

Progress monitoring by teachers

The progress monitoring system was implemented with the use of Personal Digital Assistant (PDA) technology to assist the teacher in receiving systematic guidelines in the assessment procedures. Evaluation of child skills in the areas of letter knowledge, vocabulary, and phonological awareness are included in the progress monitoring system. The system was designed to be used three times across an academic year (i.e., fall, winter, and spring). Teachers are provided a time window of 2–3 weeks to complete the assessments on all children enrolled in their classrooms. The 3-week window is used during the initial progress monitoring data

collection wave given that teachers have to become comfortable using the PDA system and subsequent data collection waves occurred across a 2 week window. Due to the starting the project during the winter in Year 1, progress monitoring activities were completed two times (i.e., winter and spring). Most children can complete the 3 measures (i.e., Letter Naming, Vocabulary, and Phonological Awareness) in less than 10 min.

The system included evaluation of children's vocabulary and letter knowledge using a 60 s fluency method. Using a flip chart booklet, children were shown pictures of objects and actions and asked to name them. This same approach was used with pictures of letters, upper and lower-case. The PDA cued teachers to move forward with the next item after a certain number of seconds when the child had not answered. Three separate stimulus booklets were used across the year to assure that the children saw different pictures and letters at each assessment point. Each of the three vocabulary booklets contained 70 pictures and the three letter knowledge booklets included a separate random order of the upper and lower case letters. The system also included individual child assessment of phonological awareness by asking the child to demonstrate knowledge of rhyming words, sentence segmenting, alliteration, separating words into syllables, and onset rime. For each of the three skill areas, the teacher was cued to input the child's response as either correct or incorrect. The PDA also allowed the teacher to make observations of a child's social and early writing skills as well as a checklist of the classroom environment. The teachers' instructional activities were not directly linked to the items assessed with the PDA approach but rather included a large array of activities in each language and literacy area to promote general growth in these skills that would be expected to translate into higher skills across the year.

An advantage to the technology approach is that the teacher received immediate feedback about an individual child's growth in each skill, how to group children for more effective learning, and specific activities to use with different groups of children. Grouping of children according to learning needs is known to maximize instructional impact (e.g., National Research Council, 2001; Leeper & Witherspoon, 1984). Progress monitoring measurements are sensitive to change within and across children, and assist teachers in focusing on learning outcomes as they are shown to correlate with standardized measures of comparable child skills and have good inter-rater reliability (Landry et al., 2009).

State approved language and literacy curricula and classroom materials

At the time of program implementation, the state had an approved list of pre-kindergarten curricula selected by a panel of experts for state adoption. This included seven language and literacy curricula from which classroom participants could choose. The majority of the classrooms chose to use Building Language and Literacy (Scholastic Inc., 2003), Let's Begin with the Letter People (Abrams & Co., 2003), or DLM Childhood Express (SRA/McGraw-Hill, 2003). Other curricula used in a smaller number of classrooms included Doors to Discovery (Wright Group/McGraw, 2002), Pebble Soup (Rigby/Harcourt, 2002), and We Can! (Sopris West, 2003). In addition to the curriculum, each classroom was provided with a set of

materials to organize the classroom and a School Readiness kit (i.e., series of small containers filled with literacy rich manipulatives and books).

Design and evaluation procedures

Mentor and teacher fidelity

To assure fidelity of the mentor's implementation of the program, the following procedures were put in place. A five-day training for mentors was first conducted and covered all aspects of the program (e.g., ordering materials, teacher mentoring, weekly teacher observation, teacher training, progress monitoring, and external observations and child testing). At the beginning of the year, a Classroom Environmental checklist was completed on every program classroom and was discussed on follow up visits. Monthly conference calls were conducted with focused agendas between State Center management staff and mentors.

Teacher fidelity was evaluated by the 11 mentors submitting monthly reports of success and challenges in the key program components and "Glows and Grows" reports of their visits with each program teacher plus a mentoring log where the activity in the classroom was coded. In addition, two fidelity visits to observe the teacher mentor process were completed by investigators across Year 1 and three across Year 2 at each of the 11 sites. If a teacher or mentor was perceived as being less than effective, an additional visit was made. Communication between the investigators and community partnerships as well as the mentors occurred throughout the year. Finally, the mentors and community partnership leaders participated in a 2-day meeting at the State Center three times during each year for additional training and problem solving.

Evaluation of teacher outcomes

Eighty-five randomly selected teachers were observed at the beginning and end of the program in Year 1 (Objective 1). This same process was repeated in Year 2 and 79 teachers were observed at pre and post program implementation (Objective 2). Classroom observations occurred during winter and spring during Year 1 and fall and late spring for Year 2. Because the random selection for observations was repeated each year, a smaller number of teachers ($n = 14$) had post-program implementation observations when they were control classrooms in Year 1 and in program classrooms in Year 2 (Objective 3).

Evaluation of child outcomes

In Year 1, 639 children from control classrooms completed pre and post testing as did 626 children from 1st year teacher program classrooms. In Year 2, 800 children had 1st year teachers and 527 children had 2nd year teachers. There were fewer children for 2nd versus 1st year teachers because communities were only allowed to replace 2nd year teachers who did not return in Year 2 with 1st year program teachers. This was necessary to address Objective 2.

Assessment of children also occurred by research staff blind to the classroom treatment condition. Assessors were trained to spend time talking with each child in a playful manner to help them become comfortable before initiating the assessment process. Children took breaks for toileting, snacks, and/or to allow movement as needed on a per child basis. Consequently, testing sessions ranged from 10 to 30 min in length, and multiple testing sessions were encouraged if needed. Testing of a given child was usually completed in a single day. For classrooms employing bilingual instruction with children whose home language was Spanish, the teacher was interviewed using a systematic set of questions for each of the children selected for testing. From this information, a determination was made as to whether to assess individual children in Spanish or English.

Measure of teacher behaviors

The Teacher Behavior Rating Scale (TBRS) (Landry, Crawford, Gunnewig, & Swank, 2000) was used to evaluate change in teaching behaviors in intervention and control classrooms. The Teacher Behavior Rating Scale contains 10 subscales and a total of 54 individual items that were rated on a 5 point scale. The TBRS includes the following subscales: (1) responsive teaching practices, (2) centers, (3) lesson plans, (4) oral language, (5) book reading, (6) print & letter knowledge, (7) written expression, (8) phonological awareness, and (9) team teaching. Each subscale contains between two items (i.e., Phonological Awareness subscale) and nine items (i.e., Book Reading subscale). For example, the Oral Language subscale contains seven items and evaluates the ability of teachers to speak clearly and use grammatically correct sentences, ability to model how to express ideas in complete sentences, use of scaffolding language, use of thinking questions, relating previously learned material or concepts to a classroom activity, encouragement of language development throughout the observation, and engaging children in conversations that involve turn taking. Items are scored on a 5-point scale with ratings of 1 indicating very low quality interactions and ratings of 5 indicating frequent high quality teacher-child interactions. Within the emergent literacy and language areas, TBRS subscales scores that are close to 1 indicate that there is little to no instruction or interaction occurring that is tied to TBRS concepts (e.g., Phonological Awareness, Print and Letter Knowledge). Ratings of 2 represent infrequent moderate quality interactions or instruction, or more frequent low quality interactions with students (e.g., not engaging for children). In these classrooms, teachers are referencing or presenting early academic concepts to students across TBRS content areas. TBRS scores in the 3 and above range indicate more frequent, moderate quality interactions that engage children. These teachers not only present early academic content but do so in a way that allows children more opportunities to interact verbally and manipulate materials that are linked to learning goals. To obtain subscale scores, scores on individual items are averaged across each subscale. The TBRS Total score represents average of ratings across all items on the entire measure. Appendix A provides a description of the types of questions contained within each TBRS subscale.

The TBRS was designed during a prior professional development project in order to have a measure that documented the specific language and literacy instructional practices shown by recent research to be important for later reading competence (Assel, Landry, & Swank, 2007). The TBRS also provides attention to responsive teaching practices, quality of language input, as well as classroom organization and effectiveness in helping children with routines that provide support for behavioral regulation. Individuals participating in the professional development program were not provided with copies of the TBRS during any phase of the current project. In past professional development projects that have used the TBRS, effect sizes (i.e., Cohen's d) obtained on TBRS subscales in intervention classrooms as compared to control classrooms have been in .5 to 1.0 range (Landry et al., 2006). Inter-rater reliability for the TBRS using generalizability coefficients was high, ranging from .80 to .98 (Mitchell, 1979). Internal consistency also was high, .96. Although significant correlations between subscales are found, these were not so high that the information was redundant. Validity was established by examining gains in teacher scores with gains in child scores on standardized measures of language and literacy. Prior predictive validity research on the TBRS (Assel et al., 2007) has demonstrated that the teacher scores on the TBRS are correlated with child outcomes at high levels. Specifically, the correlations between the TBRS total score and child language outcomes were .60 and .63 when language outcomes were evaluated with the Preschool Language Scale—4 (Zimmerman, Steiner, & Pond, 2002) and the Expressive Vocabulary Test (Brownell, 2000). In addition, the correlation between the TBRS Total score and child scores on the Woodcock Johnson—III Letter Word Identification subtest was .51 (Woodcock, McGrew, & Mather, 2001).

Measures of child outcomes

To provide further assessment of the professional development program, children's gains in language and literacy skills were obtained using a group of standardized measures that have been used in other evaluations of early childhood intervention effectiveness (e.g., PCER, 2008).

Child vocabulary

The Expressive One-Word Picture Vocabulary Test (EOWPVT) (Brownell, 2000) was used to measure children's oral language skills. The EOWPVT measures children's ability to correctly label an action or concept depicted for individuals 2–18 years of age and has English and Spanish versions. Examinees are presented with stimulus pages containing an individual color picture and asked to correctly label each picture. Internal consistency values for 2- to 5-year-olds range from .96 to .98 for split-half values (corrected) and from .93 to .95 for Cronbach's alpha values. Test–retest reliabilities over a 20-day interval are .88 and .89 for 2- to 4-year-olds and 4- to 7-year-olds, respectively. A number of studies show concurrent validity with correlations ranging from .64 to .87 with other language measures and from .67 to .90 with other specific measures of vocabulary (Brownell, 2000).

Child composite language

The English and Spanish versions of the Preschool Language Scale—4th Ed. (PLS-4) (Zimmerman et al., 2002) were used to assess complex receptive language development. This measure has been highly sensitive to demonstrating change in young children's language development in relation to teacher enhancement projects (e.g., (Landry et al., 2009). Six day test–retest reliability for the Auditory Comprehension Scale is .87 and .95. Internal consistency ranges from .91 to .93. Validity for the PLS-4 also has been established through correlating with other measures of language and accurately identifying children with differences in language development (Zimmerman et al., 2002).

Child phonological awareness

The Elision subtest of the Preschool Comprehensive Test of Phonological and Print Processing (Pre-CTOPPP) (Lonigan, Wagner, Torgesen, & Rashotte, 2003) was used in Year 1 to measure phonological awareness. It was designed as a downward extension of the Comprehensive Test of Phonological Processing (Wagner, Torgesen, & Rashotte, 1999). This subtest measures children's ability to identify or produce a target word resulting from the deletion of a part of a stimulus word. Initial items require children to delete a one- or two-syllable word from a compound word (e.g., seesaw without see). Middle items require deletion of a syllable from a word (e.g., candy without /di/), and final items require removal of a phoneme from a word (e.g., lamp without /p/).

In Year 2, because of difficulty finding basal levels with the young children in the study on the Elision subtest of the Pre-CTOPPP, the Auditory subscale from the Developing Skills Checklist was used (CTB/McGraw-Hill, 1990). This subtest evaluates a range of phonological processing skills including rhyming, syllabication, and alliteration and provides raw scores and percentages. Internal consistency of the Auditory subscale for pre-kindergarten aged children was .84 (Kuder-Richardson Formula 20). The mean score of the Auditory subtest for the standardization sample was 12.78 (out of 21 possible items) with a standard error of measurement of 1.87 (CTB/McGraw-Hill, 1990).

Child letter & print knowledge

The Pre-CTOPPP (Lonigan et al., 2003) was used to assess print knowledge. The Print Knowledge subtest assesses children's knowledge of print concepts, letter discrimination, word discrimination, letter-name knowledge and letter-sound knowledge. Internal consistency for the Print Awareness subtest is moderate to high for 3 to 5-year-old children (i.e., alphas .89 to .95, respectively) as is test–retest reliabilities (.50 to .90), and validity coefficients (>.43) (Lonigan et al., 2003).

Results

Data analyses: examination of missing data

As across the two years of the study there was some loss of teachers and children from pre to post-testing, multilevel analyses were used to examine if there were differences in pretest scores between those with and without posttest data. From the randomly selected subset of teachers to be observed, there were 99 teachers observed at least one time during the first year and 85 who were observed at least twice (Objective 1). There was no significant difference in the proportion of first year (7.8%) and control (20.8%) teachers who had one versus two observations in Year 1, $\chi^2(1, n = 99) = 3.44$; $p = .064$. There also were no difference between groups on education level, $\chi^2(4, n = 82) = .83$; $p = .935$ (.937 by exact test), program type, $\chi^2(3, n = 58) = 2.24$; $p = .524$ (.552 by exact test), race/ethnicity, $\chi^2(3, n = 82) = 4.86$; $p = .182$ (.198 by exact test), or gender, $\chi^2(1, n = 82) = 1.60$; $p = .205$ (.501 by exact test).

In Year 2, 96 teachers were observed at least once and 79 who were observed at least twice (Objective 2). There was no significant difference in the proportion of first year or second year teachers who had one versus two observations during the year, $\chi^2(1, n = 96) = 1.49$; $p = .222$. Of those with data at both pre and post, there was no difference in the breakdown by education, $\chi^2(4, n = 78) = 2.71$; $p = .607$ (.632 by exact test), race/ethnicity, $\chi^2(2, n = 78) = 1.18$; $p = .757$ (.947 by exact test), or by gender, $\chi^2(1, n = 78) = .21$; $p = .650$ (.849 by exact test).

For the second year of the project, children with and those without posttest data demonstrated equivalent abilities on all pretest measures except the Pre-CTOPPP Print Awareness, for which children with posttest data demonstrated higher scores, $t(385) = 2.32$, $p < .05$. However, the effect size for this difference was only .15 standard deviations. Thus, the missing as compared to available data appears to be mostly at random.

Data analyses for examining three objectives

Teacher behaviors

For Objective 1, analysis of covariance (i.e., ANCOVA) was used to examine differences between the 85 teachers with pre and post data on post-test TBRS scores, controlling for pre-test TBRS scores. To address Objective 2, ANCOVAs were used to assess the extent to which more experience with the program made a difference in teaching behaviors between two independent groups of teachers ($n = 79$), those who were 1st year teachers versus those who were 2nd year teachers, controlling for pre-test TBRS scores. For Objective 3, analysis of variance (i.e., ANOVA) examined post-test differences on the TBRS between teachers ($n = 14$) who were randomly assigned as control teachers in Year 1 to those same teachers who became 1st year program teachers in Year 2.

Child skills

Child testing occurred during winter and spring of Year 1 and fall and spring of Year 2. The children in Year 1 vs. Year 2 classrooms were different and thus, the student observations were independent across years and nested within classrooms, that is, the design is multilevel. To handle the nesting we used a general linear mixed models analysis via SAS Proc Mixed (SAS, 2007). Mixed models include those models referred to as hierarchical linear models (HLM) plus many others. Thus, the nesting of children into classrooms is controlled. We did not expect differences for child outcomes in Year 1 given the short time period and analyses confirmed these expectations (Objective 1). For Objective 2, multilevel ANCOVAs examined post-test child scores with the pretest, age at pre-test, language of testing (English or Spanish), and time between assessments used as covariates/moderator. Interactions among covariates and treatment conditions were retained if significant. Any variable or interaction that was nested within a significant interaction was retained in the model. Treatment condition (first vs. second year of program participation) was the independent variable. For Objective 3, the multilevel ANOVA analyses were conducted using posttest data only for the children of control teachers in Year 1 and children of those same teachers who were 1st year teachers in Year 2. The two groups of students did not differ on race/ethnicity, $\chi^2(3, n = 1017) = 4.64$; $p = .20$, or on gender, $\chi^2(1, n = 1015) = .49$; $p = .484$. For all analyses, only the final models are presented.

Significance of the program effects

To evaluate the significance of the program results, effects sizes are reported as Cohen's d (Cohen, 1988). This statistic is determined by obtaining the differences between groups' post-test scores after partialing covariate effects and dividing by the pooled standard deviations at pre-test. This has the advantage of not depending on the sample size for the model being tested (Raudenbush & Liu, 2001). The practical significance for effect sizes are: small, $d = .20$; moderate, .50, and large, .80 (Cohen, 1988).

Objective 1: Effect of Program on Teaching Behaviors

Before comparing groups on the outcomes, we examined for group differences on the TBRS pretest scores. The program group was significantly higher than controls only for the written expression, $F(1, 83) = 5.13$; $p = .026$, effect size = .50). Appendix B provides the Means (SD) and statistics for all the pretest TBRS scores. When examining for the effects of the program, pre to post-test significant differences were found on most of the TBRS subscales in favor of program teachers relative to control teachers. The results are summarized in Table 5, illustrated in Fig. 2, and model parameters provided in Appendix C. With just 4 months of the program in Year 1, 1st year program teachers showed greater gains in their use of language-building activities including the quality of their book reading, general conversations with children, and the use of oral language activities to build these

Table 5 Summary of changes on the teacher behavior rating scale for Objectives 1 and 3

	Objective 1				Objective 3		
	df	*F*	*p*	*d*	*F*	*p*	*d*
Teaching behaviors							
Total	1, 82	19.74	.0001	.84	32.60	.0001	1.71
Language							
Book reading	1, 79	9.27	.003	.57	39.56	.0001	2.27
Oral language	1, 82	5.89	.017	.40	57.61	.0001	2.04
Emergent literacy							
Phonolog awareness	1,82	9.10	.003	.66	27.98	.0001	2.45
Print knowledge	1,82	25.16	.0001	1.03	25.50	.0002	1.98
Written expression	1, 81	3.36	.071	.39	3.61	.0793	.55
Responsive teaching practices							
Total	1, 82	9.78	.002	.56	40.32	.0001	2.21
Classroom organization							
Centers	1, 81	8.48	.005	.63	19.18	.0007	1.22
Lesson plans	1, 79	6.15	.015	.59	19.36	.0007	1.45

For Objective 3, all $df = 1, 13$

skills. Small to moderate effect sizes were found. More positive gains also were found in emergent literacy instructional practices including phonological processing and print knowledge activities with moderate to large effect sizes. In addition, teachers who received the professional development program showed better responsive teaching practices, organization of their centers, and the use of lesson plans. These program effects were moderate with a large effect size found for differences on the total TBRS score.

Objective 2: Effect of Length of Program Participation on Teaching Behaviors and Child Skills

In Year 2, teachers who were in the control condition during year one moved into the program (i.e., 1st year teachers) while teachers who were in the program during Year 1 continued to receive more training (i.e., 2nd year program teachers). This design allowed us to compare the quality of instruction between teachers who differed in the amount of program participation. A similar comparison could be made of child outcomes between children with teachers in their second versus first year of the program.

Comparison of teaching behaviors

Pretest differences were found in favor of the 2nd year teachers for book reading, $F(1, 95) = 9.41$; $p = .003$, effect size = .63, and centers, $F(1, 95) = 6.88$; $p = .01$. Appendix B reports the Means (SD), and test statistics for comparisons of pretest TBRS scores between 1st and 2nd year teachers. No statistically

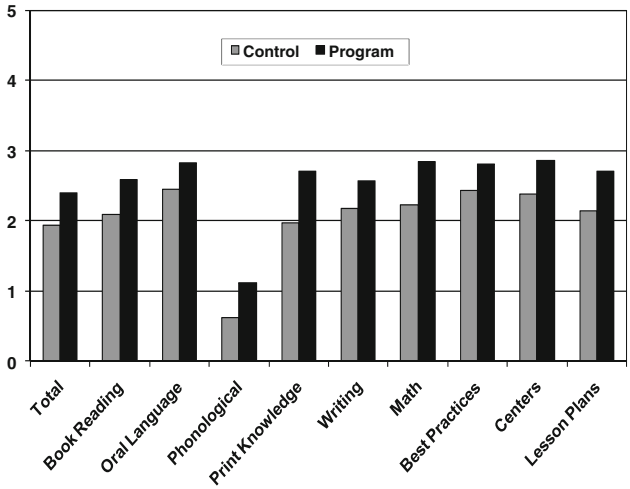

Fig. 2 Comparison of teaching behaviors for control versus 1st year teachers (Objective 1)

significant post-test differences on the TBRS subscales were observed between 2nd and 1st year program teachers. Effect sizes ranged from .01 to .53.

Comparison of child skills

We examined the Year 2 data for group differences in children's pretest scores before analyzing the Year 2 data for treatment effects. Appendix D reports means, standard deviations and test statistics for comparison of pretest scores between children with 1st year program teachers and those with 2nd year teachers. There were no statistically significant differences on any of the language or literacy measures at pretest, with effect sizes ranging from—.06 to .09. Next, we examined effects of the intervention on child outcomes. Appendix E provides the parameter estimates of models that describe the effects of amount of teacher participation in the program on children's language and emergent literacy outcomes.

Vocabulary. The final model for children's vocabulary skills revealed a significant effect of the length of their teachers' program participation that depended upon age at pretest, $F(1, 1061) = 4.73$; $p < .03$, effect size = .16. That is, children of 2nd year teachers demonstrated larger vocabularies at the post test and this was especially true for younger children (Fig. 3, top). In addition, the program effect was dependent upon pretest and the language of testing, $F(1, 1061) = 4.29$; $p < .04$; effect size = .35. In other words, having a teacher who was in their second year of the program was particularly beneficial for the vocabulary development of English language learners who had low vocabulary at the beginning of the year.

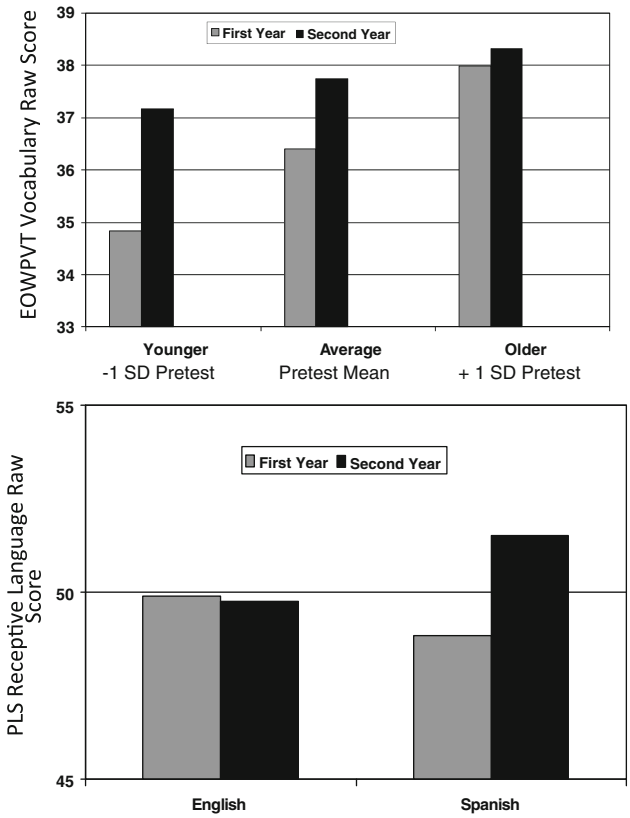

Fig. 3 Effects of teachers' length of program participation on children's expressive vocabulary by age (*top*). Complex receptive language by test language is shown at the *bottom* (Objective 2)

Complex language. A positive, significant, main effect was found for amount of teachers' participation in the program on children's complex language, $F(1, 1107) = 14.44$, $p = .0002$. However, this depended on the pretest score and age at pretest, $F(1, 1107) = 19.49$; $p < .0001$, as well as the language of testing, $F(1, 1107) = 11.41$, $p = .0008$. Figure 3 (bottom) illustrates the interaction with test language. Children tested in English had high post-test scores regardless of the amount of teacher training but those tested in Spanish had higher posttest scores if their teachers were in the second year of training, effect size = .34. With regard to the interaction with pretest scores, the findings show that the second year of teacher preparation was especially beneficial for younger children who were also higher on the pretest and for older children who were lower on the pretest, effect size = .44.

Letter and print knowledge. Significant differences also were found for the print knowledge total score but this was dependent on children's pretest scores, $F(1, 1118) = 9.29$, $p < .003$, effect size = .34 (Fig. 4). The finding indicated that the posttest scores were significantly higher for children who had teachers in their

second year of the program relative to children who had teachers in their first year of the program, but this was particularly true for those children who showed lower scores at the pretest. Thus, the effect of the second year of training seemed to be particularly important for children with lower print knowledge skills at the beginning of the year.

Phonological awareness. On the Developing Skills Checklist phonological awareness subtest there was a significant group by age by language of testing interaction, $F(1, 1116) = 6.13$; $p < .02$ (Fig. 4). Children tested in Spanish, particularly those who were older at the beginning of the year, had higher posttest scores if their teacher was in their second year of training, effect size = .50. Conversely, children of 2nd year teachers who were tested in English seemed to do better if they were younger at the beginning of the year, effect size = .26 (Fig. 4).

Objective 3: Comparison of the Same Teachers without and with the Program

Across the 2 years, there were some teachers who were in the control condition in year 1 and who participated in the program in year 2. These teachers had two

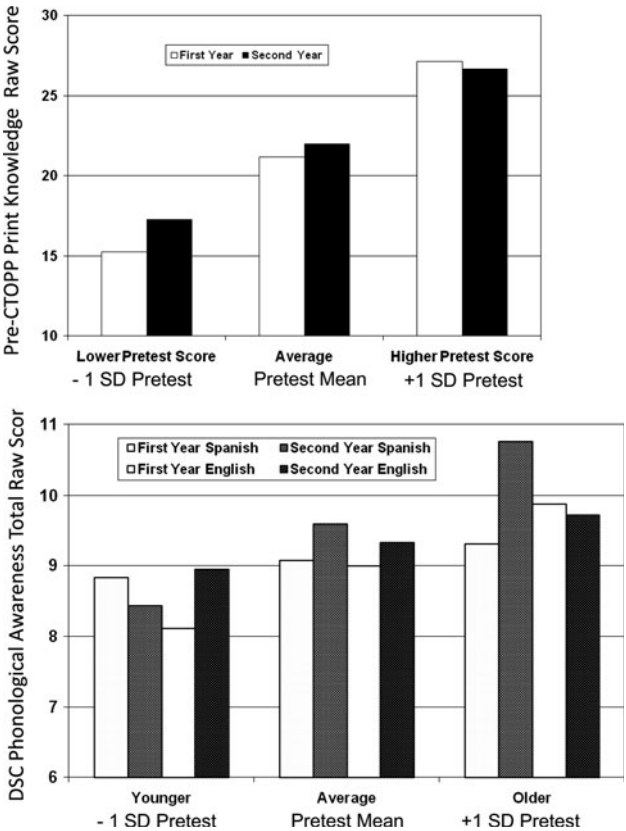

Fig. 4 Effects of teachers' length of program participation on children's print knowledge (*top*) and phonological awareness (*bottom*) skills (Objective 2)

different cohorts of children who could be compared; children in control classrooms in Year 1 ($n = 491$) and children in program classrooms in Year 2 ($n = 506$). Differences were compared on post-test TBRS data and post-test child data. Thus, while the TBRS analyses were based on 14 randomly selected teachers with data across both years, the child outcomes were based on all children tested in control classrooms for Year 1 and first year program classrooms in Year 2. Model parameters are provided in Appendix F for comparison of teaching behaviors and in Appendix G for child outcomes.

Comparison of teaching behaviors

The comparison of teaching behaviors for the same teachers as control vs. first year program teachers showed similar, but stronger effects than the teaching results for Objective 1 (Table 5; Fig. 5). Large effect sizes were found for language building, book reading, and emergent literacy activities, phonological awareness and print and letter knowledge. Teachers who participated in the professional development program demonstrated more responsive teaching practices, for which there was a large effect size as well as a large effect size for the total TBRS score.

Comparison of child vocabulary and complex language

Results based on the EOWPVT indicated that the scores for the children who were taught by teachers after they participated in the program were significantly higher than scores for the children under the control condition, $F(1, 904) = 17.90$; $p < .0001$, and that this depended upon the age of the child, $F(1,904) = 5.63$; $p < .02$, effect size = .26 (Fig. 6). The greatest differences in vocabulary between the groups were found among older children. No significant differences were found for children's complex receptive language.

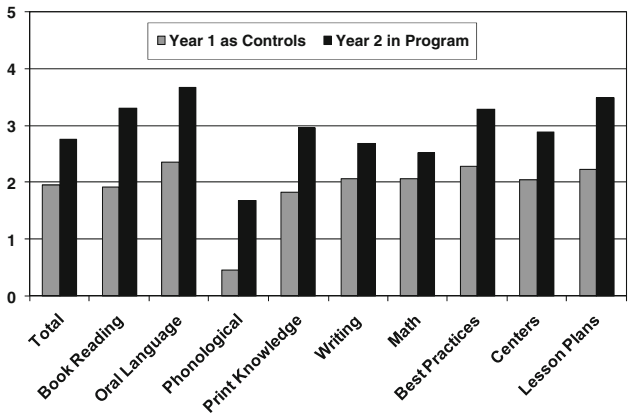

Fig. 5 Comparison of teaching behaviors for the same group of teachers when control teachers versus 1st year teachers (Objective 3)

Comparison of child print knowledge and phonological awareness

The main effect of teacher participation in the program was significant on children's Print knowledge total score, $F(1, 918) = 4.93$; $p < .03$, effect size .11. The results indicated that the children tested while their teachers were in the control condition scored significantly lower than children tested when their teachers were participating in the program. A similar model resulted when only the letter sounds score was analyzed, $F(1, 918) = 4.06$; $p < .05$; effect size = .10. Again, the children had higher scores when their teachers were participating in the program versus when they were controls (see Fig. 6). The program effects were even larger for naming letters, $F(1, 916) = 14.31$; $p = .0002$; effect size = .20 (see Fig. 6). No significant differences were found for child phonological awareness skills.

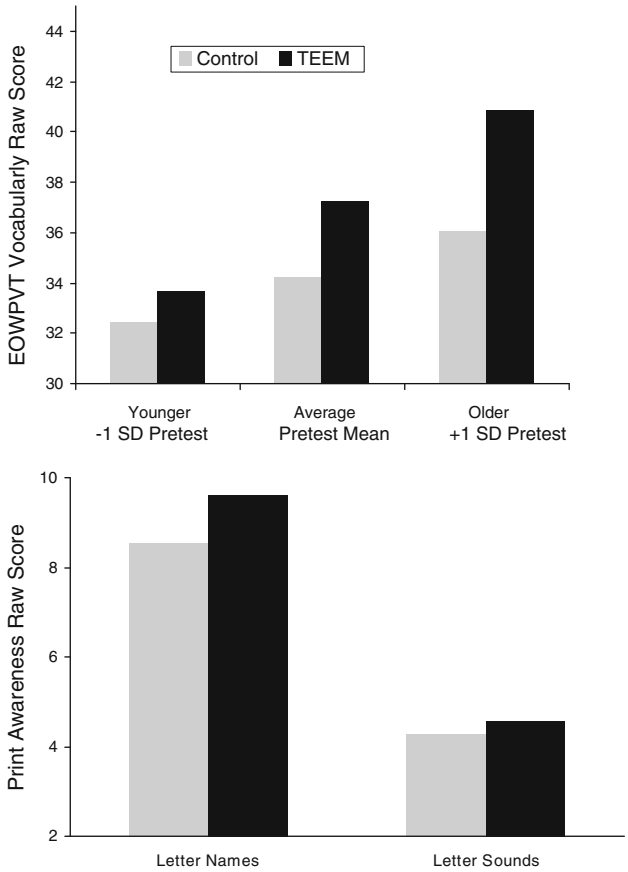

Fig. 6 Comparion of children's vocabulary skills (*top*) and print knowledge (*bottom*) for children with teachers in control classrooms versus 1st year of the program (Objective 3)

Discussion

The need to find effective solutions for providing quality early childhood programs for children from low income backgrounds is great. The challenge of implementing effective programs to meet this need is even greater. This study evaluated a comprehensive set of professional development supports to determine if they could be effective in promoting greater gains in early childhood teachers' instructional practices in language and early literacy as well as responsive teaching practices. Based on the results of a recently completed, federally-funded, study across communities in four states, an educational model was adopted that included four key components (Landry et al., 2009). In this previous study, professional development using an on-line facilitated, intensive set of pre-kindergarten courses was found to support strong changes in pre-kindergarten teachers' instructional practices, particularly when it was paired with a classroom mentor, and a PDA progress monitoring system that provided immediate feedback describing children's progress in key language and literacy skills and information about appropriate instructional activities. In this previous study, curriculum could not be a controlled aspect of the design. However, a research based language and literacy curriculum was included as a key component in the program described in this report. Support for the decision to include the use of a state approved research based curriculum came from a recent experimental study where curriculum was a design feature and found to be an important factor in understanding gains in children's language and literacy skills (Assel et al., 2006; PCER, 2008).

Objective 1: Comparison of Year 1 Effects for Program versus Control Teachers

Results show evidence that the educational components are effective in promoting greater change in the program teachers' instructional practices when compared to the control teachers. Greater gains with moderate to large effect sizes were found for the program teachers in the initial 4-month training period across most of the subscales of the TBRS. Evidence of the program's effectiveness was found in the quality of classroom practices such as responsive teaching techniques, organizing the classroom into learning centers and in the development of lesson plans to include key language and literacy activities that showed an understanding of scope and sequence. Some of the greatest gains were found in school readiness emergent literacy instructional activities. For example, program teachers were observed to implement more activities that supported children's development of early literacy skills such as print and letter knowledge. Another key predictor of early reading success, oral language development, also showed differences where program teachers outperformed control teachers. While the changes in instructional practices related to language building activities were smaller than the change in emergent literacy practices, this is an instructional area that previously has been found to be more resistant to change in early childhood teachers' practices. It is, therefore, encouraging that in a 4-month period small to moderate effects could be achieved. A previous study showed that the mentoring component was particularly helpful in

supporting teachers' use a greater amount of language scaffolding techniques and richer vocabulary (Landry et al., 2009).

Objective 2: Effects of Amount of Time Teachers Participated in the Program

Change in teaching behaviors

Although the amount of time a teacher participated in the program was expected to result in differences in instructional practices, no differences were found. The teacher observation measure (TBRS) used in this study attempted to capture both quantity and quality of teaching instruction with a single score. A more recent version of this measure discriminates these two important aspects of teaching by having a quantity and a quality score for each item. Results of a recent study using this revised version documented differences across the two aspects. For example, differences were sometimes found across groups of teachers' behaviors for quantity but not quality (Landry et al., 2009). It might be expected that teachers in the second year of the program were similar in the amount of activities used with children across the different skill areas compared to those in their first year of training. However, the manner in which activities were implemented may have been at a different level of quality. This would help explain why some differences were found in the children's language and literacy outcomes related to the amount of program participation the children's teachers had received.

Change in child skills

Differences in the amount of teachers' exposure to the program were apparent when examining the children's development of language and early literacy skills. While a positive effect of additional teacher participation was seen for all skills evaluated, these often were dependent upon the child's age and language of assessment. For example, there were stronger language skills, both for vocabulary and complex language, for children whose teachers were in their second year of the program. However, gains in vocabulary were significant for children who were younger at the beginning of the school year and, for both vocabulary and complex language, for those evaluated in Spanish. As children tested in Spanish would be learning English as a second language and had a limited amount of English at the beginning of the school year, they might be considered as children who needed the most support from teachers to develop language skills. This could be expected to be true for younger children as well. Thus, the results suggest that the teachers who had more mentoring and more exposure to the on-line facilitated courses were better prepared to assist those children who typically require more specialized support.

The two aspects of emergent literacy that have been found to be unique predictors of reading from the recently released National Early Literacy Panel

report (2008), also showed greater increases if children's teachers were in their second year of the program. For letter-sound correspondence this finding was strongest for children who were lower at the pretest (i.e., beginning of the school year) while gains in print discrimination skills were larger for English language learners (ELL). The effect of amount of teacher participation also was seen for phonological awareness skills where age at pretest and language of assessment moderated the effects. Again, effects were found for younger children and for ELL. This may occur because of the complexity of phonological awareness such that a more experienced teacher is better able to implement the type of activities needed to support younger and ELL children's learning of this skill. These findings suggest that although changes in teachers' instructional practices may occur within the first year of implementing a professional development program, the effect of the programmatic change on children's development of new skills may not be apparent until the teachers have enough exposure to the fully integrated program that will have the potential to support learning for the children of greatest need.

Objective 3: Effect of Program on Teaching Behaviors and Child Skills—Comparison of the Same Teachers across Two Years and Different Classrooms of Children

The design of this experimental evaluation allowed for comparison of a small group of teachers who had been randomly selected for evaluation in year 1 as control teachers and again in year 2 as program teachers. The differences in these teachers' school readiness instructional practices before and after the program were found in almost all areas of teaching and the improvements were strong after teachers had support from the program. The different groups of children in these teachers' classrooms across the two years also showed differences in their language and emergent literacy gains across the school year. Gains in naming letters were greater for those children who were in classrooms with the teachers who had the program. Also, vocabulary development was greater for children whose teachers had the program compared to children when the teachers were controls. Children who were older at the beginning of their pre-kindergarten school year and their teachers had the program showed the biggest advantage on vocabulary growth. It may be that the older children within 3 and 4 year old classrooms are ready to benefit more than younger children from exposure to quality language and literacy instructional activities. However, this does not appear to be the case for children with more experienced teachers. As the benefit of a second year of the program (Objective 2) often showed effects, particularly for children who were younger and for ELL, it may be that the older age effect and absence of ELL seen for Objective 3 is related to teachers being in their first year of the program.

Study limitations

There are limitations to this experimental evaluation of a state funded, pre-kindergarten demonstration program. For example, the flow of funding allowed for only 4 months, rather than the full school year for the evaluation of the Year 1 program. Thus, while there were strong teacher findings across this period, we were not able to detect significant differences in children's early academic competencies during the first year of implementation. Also, as the state required that by Year 2 all teachers receive the program, it was not possible to evaluate over the second year effects for program versus control teachers and children. While a high percentage of teachers who were initially enrolled remained in the project (i.e., 91%), one potential limitation of this work surrounds the fact that the large scope of the project did not allow for exit interviews to be conducted with those teachers who left early. However, a 9% attrition rate in a sample that includes a majority of childcare and Head Start classrooms would appear to indicate that, at the minimum, the professional development program did not lead to attrition rates that were greater than what is typically expected in Head Start and child care classes across an academic year. The attrition within the study can be put into perspective given that the National Center for Education Statistics reports an attrition rate of 17% for teachers working in elementary and secondary schools across the academic year ending in 2004 (National Center for Education Statistics, 2008). It also must be noted that this study may not generalize to other pre-kindergarten populations because of the high proportion of Spanish-speaking children enrolled. Another limitation is that the study only follows children through the end of pre-kindergarten. A future objective will be to examine longer term effects of the program as children move into formal schooling. All of the 11 community partnerships had Head Start, public school, and subsidized childcare classrooms. However, the scope of this study did not allow for examination of differential effectiveness of the program across these three types of service delivery within communities. Thus, it will be important for future research to evaluate the extent to which the comprehensive set of professional development supports are equally effective for different types of early childhood programs. In spite of this, given the effectiveness of the program on teacher and child outcomes with each type of service delivery program represented, the results do suggest that within integrated partnerships this type of professional development approach has promise.

Acknowledgments This work would not have been possible without the efforts of our trainers, mentors, teachers, and research associates.

Appendix A

See Table 6.

Table 6 Description of TBRS content areas and sample question

Subscale	# of items	Sample question
Book reading	9	Vocabulary words are combined with pictures or objects when preparing to and/or reading books aloud
Centers	7	Materials, activities, and objectives follow the current theme and are linked to learning goals (exciting and obvious theme = high; look for appropriate rotation of seasonal items, and refreshing of materials)
Dynamic assessment	3	Recent dated documentation of children's developmental progress across all emergent literacy areas through the use of cognitive checklists/ assessments
Responsive teaching	9	Uses encouragement and positive feedback that provides children specific information regarding what they are doing well
Lesson plans Portfolios	2	Lesson plan shows strong thematic connection in written lesson plans (detailed information that ties theme related material to learning objectives
Oral language	7	Uses "thinking" questions (open-ended, "why", "how") or comments to support children's thinking or activity of interest
Phonological awareness	2	Overall quality of PA instruction is evaluated within the first PA item. The second item allows classroom observers to indicate the specific type of PA activity that was observed (e.g., Listening, Rhyming, Alliteration, Sentence Segmenting, Syllable Blending and Segmenting, Onset-Rime, and Phoneme Blending)
Print knowledge	7	Discusses concepts about print (text contains letters, words, sentences, reading progresses left to right, top to bottom, etc.)
Team teaching (if applicable)	5	Teacher and assistant work together so that small groups of children receive ongoing instruction in center activities, small group activities, and read-alouds
Written expression	3	Provides children with a variety of opportunities and materials to engage in writing (e.g., journals, response to literature)

Appendix B

See Table 7.

Table 7 Tests of teacher condition difference on TBRS scales at pretest in Years 1 and 2

TBRS subscale	Control teachers			Target teachers			*df*	*F*	*p*
	M	SD	*n*	*M*	SD	*n*			
Year 1									
Book reading	2.28	.80	37	2.57	.93	46	(1, 81)	2.24	.14
Centers	2.34	.82	38	2.57	.69	47	(1, 83)	1.98	.16
Dynamic assessment	.47	.49	38	.52	.47	47	(1, 83)	.21	.65
Responsive teaching	2.37	.78	38	2.58	.64	47	(1, 83)	1.79	.19
Lesson plans	2.16	.91	37	2.35	1.00	46	(1, 81)	.79	.38
Oral language	2.59	.92	38	2.80	.96	47	(1, 83)	1.01	.32

Table 7 continued

TBRS subscale	Control teachers			Target teachers			*df*	*F*	*p*
	M	SD	*n*	*M*	SD	*n*			
Phonological awareness	.82	.84	38	.96	.70	47	(1, 83)	.69	.41
Print	2.01	.78	38	2.22	.70	47	(1, 83)	1.65	.20
Team teaching	2.93	.88	27	2.75	1.06	35	(1, 60)	.43	.51
Written expression	1.99	.92	37	2.50	1.02	47	(1, 82)	5.13	.03
Total score	2.01	.58	38	2.15	.54	47	(1, 83)	1.63	.21
TBRS subscale	1st year teachers			2nd year teachers			*df*	*F*	*p*
	M	SD	*n*	*M*	SD	*n*			
Year 2									
Book reading	2.73	.69	43	3.17	.67	36	(1, 77)	8.27	.005
Centers	2.38	.55	43	2.66	.65	36	(1, 77)	4.32	.04
Dynamic assessment	.38	.38	43	.35	.35	36	(1, 77)	.19	.66
Responsive teaching	2.89	.57	43	2.95	.49	36	(1, 77)	.25	.62
Lesson plans	2.94	.88	43	3.01	.97	36	(1, 77)	.09	.76
Oral language	3.25	.63	43	3.36	.57	36	(1, 77)	.67	.42
Phonological awareness	1.55	.55	43	1.58	.64	36	(1, 77)	.05	.82
Print	2.68	.53	43	2.84	.64	36	(1, 77)	1.50	.23
Team teaching	2.87	.95	30	2.69	.83	28	(1, 56)	.61	.44
Written expression	2.29	.54	43	2.42	.58	36	(1, 77)	1.03	.31
Total score	2.38	.35	43	2.50	.44	36	(1, 77)	1.72	.19

Appendix C

See Table 8.

Table 8 Model parameters from the prediction of TBRS scores in year, control teachers versus 1st year teachers (Objective 1)

Effect	Estimate	SE	*df*	*t* value	*p* value
Book reading					
Intercept	1.8040	.2592	79	6.96	<.0001
Pretest	.3206	.0919	79	3.49	.0008
Group = Control	−.4986	.1638	79	−3.05	.0032
Centers					
Intercept	1.6514	.3020	81	5.47	<.0001
Pretest	.4928	.1095	81	4.50	<.0001
Group = Control	−.4838	.1662	81	−2.91	.0046

Table 8 continued

Effect	Estimate	SE	*df*	*t* value	*p* value
Responsive teaching practices					
Intercept	1.9420	.2386	82	8.14	<.0001
Pretest	.3514	.0869	82	4.04	.0001
Group = Control	−.3856	.1233	82	−3.13	.0024
Lesson plans					
Intercept	1.7475	.3170	79	5.51	<.0001
Pretest	.4279	.1187	79	3.60	.0005
Group = Control	−.5661	.2283	79	−2.48	.0153
Math					
Intercept	1.9725	.2641	81	7.47	<.0001
Pretest	.4051	.1082	81	3.74	.0003
Group = Control	−.6273	.2135	81	−2.94	.0043
Oral language					
Intercept	1.8644	.2495	82	7.47	<.0001
Pretest	.3535	.0813	82	4.35	<.0001
Group = Control	−.3729	.1535	82	−2.43	.0173
Phonological awareness					
Intercept	1.0067	.1483	82	6.79	<.0001
Pretest	.1118	.1061	82	1.05	.2952
Group = Control	−.4871	.1615	82	−3.02	.0034
Print knowledge					
Intercept	1.8804	.2364	82	7.95	<.0001
Pretest	.3862	.0976	82	3.96	.0002
Group = Control	−.7256	.1447	82	−5.02	<.0001
Total score					
Intercept	1.3168	.2090	82	6.30	<.0001
Pretest	.5221	.0920	82	5.68	<.0001
Group = Control	−.4595	.1034	82	−4.44	<.0001
Written expression					
Intercept	1.6196	.2920	81	5.55	<.0001
Pretest	.4117	.1038	81	3.97	.0002
Group = Control	−.3811	.2080	81	−1.83	.0706

Appendix D

See Table 9.

Table 9 Tests of group differences on children's scores at pretest in Year 2

	1st year teachers			2nd year teachers			*df*	*F*	*p*
	$\bar{X}$	SD	*n*	$\bar{X}$	SD	*n*			
Year 2									
Print knowledge total	10.1	7.37	800	10.6	7.98	527	(1, 1325)	1.31	.25
PLS-IV Aud. Comp. RS	44.0	7.46	800	43.9	7.41	527	(1, 1325)	.05	.83
PLS-IV Aud. Comp. SS	85.8	13.6	770	85.0	13.6	507	(1, 1275)	1.09	.30
EOWPVT RS	28.4	12.2	772	28.9	12.8	507	(1, 1277)	.51	.48
EOWPVT SS	80.6	16.5	759	79.8	16.6	500	(1, 1257)	.75	.39
DSC auditory raw score	5.94	3.75	800	6.07	3.72	528	(1, 1326)	.40	.53
DSC auditory—percentiles	32.9	13.3	667	33.1	13.6	461	(1, 1126)	.02	.88

Aud. Comp auditory comprehension, *RS* raw score, *SS* standard score

Appendix E

See Table 10.

Table 10 Model parameters from the prediction of Year 2 children's outcomes comparing 1st year and 2nd year program teachers (Objective 2)

Effect	Estimate	SE	*df*	*t* value	*p* value
Complex language					
Intercept	51.5872	.6423	203	80.32	<.0001
Pretest	.6057	.0568	1107	10.66	<.0001
Age	1.9878	.8205	1107	2.42	.0156
Pretest × Age	−.1433	.0506	1107	−2.83	.0047
Group = T1	−3.0128	.7655	1107	−3.94	<.0001
Pretest × Group = T1	−.0013	.0332	1107	−.04	.9682
Age × Group = T1	.1785	.5821	1107	.31	.7592
Pretest × Age × Group = T1	.2744	.0621	1107	4.42	<.0001
Test_Language = English	−1.7712	.6883	1107	−2.57	.0102
Pretest × Test_Language = English	−.1727	.0547	1107	−3.16	.0016
Age × Test_Language = English	1.6983	.7863	1107	2.16	.0310
Group = T1 × Test_Language = English	2.8130	.8328	1107	3.38	.0008
Time	.0163	.0176	1107	.93	.3527
Pretest × Time	−.0046	.0028	1107	−1.67	.0955
Time × Group = T1	.0106	.0234	1107	.45	.6516
Pretest × Time × Group = T1	.0075	.0032	1107	2.32	.0204
Phonological awareness					
Intercept	9.5883	.5197	203	18.45	<.0001
Age	2.6169	.9488	1116	2.76	.0059
Group = T1	−.5189	.6215	1116	−.83	.4040
Age × Group = T1	−2.0796	1.1834	1116	−1.76	.0791

Table 10 continued

Effect	Estimate	SE	*df*	*t* value	*p* value
Test_Language = English	−.2607	.5573	1116	−.47	.6400
Age × Test_Language = English	−1.7475	1.0206	1116	−1.71	.0871
Group = T1 × Test_Language = English	.1800	.6749	1116	.27	.7898
Age × Group = T1 × Test_Language = English	3.1840	1.2858	1116	2.48	.0134
Pretest	.2066	.0269	1116	7.70	<.0001
Print knowledge					
Intercept	21.9127	.5024	203	43.62	<.0001
Pretest	.6321	.0432	1118	14.62	<.0001
Age	3.4210	.5342	1118	6.40	<.0001
Pretest × Age	−.3480	.0703	1118	−4.95	<.0001
Group = T1	−.7836	.6371	1118	−1.23	.2190
Pretest × Group = T1	.1682	.0552	1118	3.05	.0024
Vocabulary					
Intercept	37.7239	1.1708	202	32.22	<.0001
Time	.0429	.0203	1061	2.12	.0343
Age	1.3015	.7943	1061	1.64	.1016
Group = T1	−2.5967	1.3985	1061	−1.86	.0636
Age × Group = T1	2.2740	1.0460	1061	2.17	.0299
Pretest	.8241	.0973	1061	8.47	<.0001
Pretest × Group = T1	−.2219	.1174	1061	−1.89	.0590
Test_Language = English	−.0423	1.2484	1061	−.03	.9730
Pretest × Test_Language = English	−.0241	.1008	1061	−.24	.8111
Group = T1 × Test_Language = English	2.5383	1.5060	1061	1.69	.0922
Pretest × Group = T1 × Test_Language = English	.2527	.1221	1061	2.07	.0386

Appendix F

See Table 11.

Table 11 Model parameters from the prediction of TBRS scores for the same teachers who were controls versus 1st year program teachers (Objective 3)

Effect	Estimate	SE	*df*	*t* value	*p* value
Book reading					
Intercept	3.3065	.1591	13	20.78	<.0001
Year 1 control teachers	−1.3828	.2198	13	−6.29	<.0001
Centers					
Intercept	2.8878	.0997	13	28.98	<.0001
Year 1 control teachers	−.8521	.1935	13	−4.40	.0007
Responsive teaching practices					
Intercept	3.2910	.1384	13	23.79	<.0001

Table 11 continued

Effect	Estimate	SE	*df*	*t* value	*p* value
Year 1 control teachers	−1.0053	.1583	13	−6.35	<.0001
Lesson plans					
Intercept	3.4921	.1938	13	18.02	<.0001
Year 1 control teachers	−1.2630	.2881	13	−4.38	.0007
Math					
Intercept	2.5238	.2257	13	11.18	<.0001
Year 1 control teachers	−.4524	.3123	13	−1.45	.1711
Oral language					
Intercept	3.6735	.1020	13	36.00	<.0001
Year 1 control teachers	−1.3163	.1735	13	−7.59	<.0001
Phonological awareness					
Intercept	1.6786	.1538	13	10.92	<.0001
Year 1 control teachers	−1.2143	.2294	13	−5.29	.0001
Print knowledge					
Intercept	2.9603	.1517	13	19.52	<.0001
Year 1 control teachers	−1.1270	.2233	13	−5.05	.0002
Total score					
Intercept	2.7564	.0836	13	32.99	<.0001
Year 1 control teachers	−.7963	.1394	13	−5.71	<.0001
Written expression					
Intercept	2.6825	.1800	13	14.90	<.0001
Year 1 control teachers	−.6111	.3209	13	−1.90	.0793

Appendix G

See Table 12.

Table 12 Model parameters from the prediction of children's outcomes for the same teachers who were controls versus 1st year program teachers (Objective 3)

Effect	Estimate	SE	*df*	*t* value	*p* value
Letter names					
Intercept	9.0022	.5694	76	15.81	<.0001
Test_Language = English	1.2132	.5843	916	2.08	.0381
Age	1.4827	.8172	916	1.81	.0699
Age × Test_Language = English	1.8919	.9152	916	2.07	.0390
Group = Control	−1.0669	.2820	916	−3.78	.0002
Letter sounds					
Intercept	4.5852	.1882	76	24.36	<.0001
Group = Control	−.3013	.1496	918	−2.01	.0443

Table 12 continued

Effect	Estimate	SE	*df*	*t* value	*p* value
Age	1.5907	.1960	918	8.11	<.0001
Print knowledge					
Intercept	21.4219	.6658	76	32.18	<.0001
Age	6.5231	.6912	918	9.44	<.0001
Group = Control	−1.1701	.5272	918	−2.22	.0267
Vocabulary					
Intercept	36.5639	1.5258	76	23.96	<.0001
Group = Control	−3.0278	.7157	904	−4.23	<.0001
Age	5.5247	2.2397	904	2.47	.0138
Age × Group = Control	−4.0464	1.7056	904	−2.37	.0179
Test_Language = English	1.3837	1.5488	904	.89	.3719
Age × Test_Language = English	5.1823	2.3369	904	2.22	.0268

Subset of teachers were the same in control and 1st year program teacher conditions but teachers had two sets of children across the study years

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Tricia A. Zucker
Pediatrics, University of Texas Health Science Center at Houston

Emily J. Solari
School of Education at University of California Davis

Susan H. Landry and Paul R. Swank
Pediatrics, University of Texas Health Science Center at Houston

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Research Findings: Multitiered instructional frameworks are becoming a recommended approach for enhancing prevention and intervention efforts targeting early literacy and language skills. However, few studies to date have studied the feasibility of tiered oral language interventions before kindergarten; therefore, this pilot study explored the effectiveness of such an approach in prekindergarten. Teachers in 39 classrooms were randomly assigned to an experimental or comparison condition that contrasted the implementation of an intervention that had both Tier 1 (whole group) and Tier 2 (small group for at-risk children) components. The pilot study included only 4 weeks of teacher-administered intervention. Despite this short duration, a significant and large effect size ($d = .81$) was observed for the experimental group on a receptive target vocabulary assessment. No significant changes were found on measures of vocabulary fluency, expressive target vocabulary, or listening comprehension. It is important to note that teachers' fidelity in implementing the intervention as designed was a significant predictor of children's learning. *Practice or Policy:* These findings suggest the potential promise of the multitiered instructional framework, especially when teachers can be supported in ways that ensure adequate fidelity of implementation. Implications for use in prekindergarten response-to-intervention models are discussed.

Despite recent U.S. reform efforts exemplified in No Child Left Behind and Reading First, 2008 National Assessment of Educational Progress data show that most Grade 4 students cannot fully comprehend lengthier reading passages dealing with literature, science, and social studies topics. Specifically, almost all 9-year-olds (96%) can complete simple, discrete reading tasks, but most (73%) demonstrate ''partially developed'' skills for inferring and synthesizing information, leaving only 21% who have ''intermediate'' skills for making inferences, generalizations, and understanding the author's purpose (Rampey, Dion, & Donahue, 2009). Moreover, the achievement gap between White students and Black or Hispanic students has not narrowed in recent years. Such troubling national statistics lead many experts to conclude that waiting to intervene

Correspondence regarding this article should be addressed to Tricia A. Zucker, Pediatrics, University of Texas Health Science Center at Houston, 7000 Fannin Street, 2300, Houston, TX 77030. E-mail: tricia.zucker@uth.tmc.edu

until children demonstrate reading comprehension difficulties in third or fourth grade is inappropriate (Dickinson, Golinkoff, & Hirsh-Pasek, 2010; van Kleeck, 2008). This article describes recent research that builds a case for preventing later reading comprehension difficulties by intervening early to address weakness in vocabulary knowledge and listening comprehension, skills that are critical for later reading comprehension.

PRESCHOOL FOUNDATIONS FOR LATER READING COMPREHENSION

Successful reading requires skills that fall into two broad categories: first, those relating to translating written code into a meaningful linguistic units; and second, those involving integrating those units into a coherent mental representation (Hoover & Gough, 1990). For young children, many existing interventions demonstrate evidence of improving prereading skills that lay a foundation for later decoding (National Early Literacy Panel, 2008), whereas a smaller number of interventions are developed to promote linguistic comprehension and support later reading comprehension. The What Works Clearinghouse, for example, currently lists at least 13 potentially effective code-related programs for preschool-age students but only 5 such programs that address language-related goals. Various profiles of young children indicate substantial risk for later reading comprehension difficulties due to weak oral language skills (Cabell, Justice, Konold, & McGinty, 2011; Storch & Whitehurst, 2002), suggesting that early identification and prevention efforts are important if viable interventions are available. In the next sections, we review research that guided our development of a tiered vocabulary and listening comprehension intervention delivered through shared reading and extension activities.

Vocabulary Learning and Reading Achievement

Vocabulary knowledge is critical because readers only understand decoded words that are in their oral vocabulary (Biemiller & Boote, 2006; National Institute of Child Health and Human Development [NICHD], 2000). Yet little direct vocabulary instruction occurs in early grades that might prevent comprehension difficulties due to vocabulary deficits (NICHD, 2000). A typical kindergarten classroom, for example, includes an average of only 8.14 episodes of word explanations during an entire school day (Wright & Neuman, 2010), and normal preschool read-alouds contain an average of 0.94 vocabulary explanations (Zucker, Cabell, Justice, Pentimonti, & Kaderavek, 2011).

Children begin developing vocabulary knowledge long before they enter preschool, and there are staggering differences in vocabulary between low- and middle-income children that are associated ($r = .77$) with the range of vocabulary parents use (Hart & Risley, 1995, 2003; see also Schechter & Bye, 2007). When children in Hart and Risley's seminal preschool study were followed longitudinally, socioeconomic status and the number of different words parents used explained up to 32% of the variance in children's elementary reading achievement (Walker, Greenwood, Hart, & Carta, 1994). Without early intervention, these differences at school entry persist as children move through elementary and high school (Biemiller, 2003; Hirsch, 2003). Furthermore, emerging evidence points to a critical age hypothesis that posits that if early language difficulties are resolved by age 3 or 4, this reduces the likelihood of reading difficulties,

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whereas if language problems persist to ages 5 or 6, beginning reading skills are often affected (Bishop & Adams, 1990; Justice, Bowles, Pence Turnbull, & Skibbe, 2009).

Children learn vocabulary in at least three ways: *incidentally* in linguistic interactions, or with direct instruction that ranges from brief *embedded* instruction during meaningful activities to more *extended* instructional activities. In the case of a shared book reading, young children can learn novel words through incidental exposure within the meaningful context of the text (Elley, 1989; Robbins & Ehri, 1994), but children do not consistently learn words incidentally (Coyne, McCoach, & Kapp, 2007). To further advance vocabulary learning, embedded instruction in which brief, child-friendly definitions of words are inserted within the book reading is superior to incidental exposure alone (Biemiller & Boote, 2006; Justice, Meier, & Walpole, 2005; Penno, Wilkinson, & Moore, 2002). Additional benefit is derived when young children receive more extended instruction that includes varied opportunities after reading to discuss and practice using the word (Beck & McKeown, 2007; Coyne et al., 2007; Coyne, McCoach, Loftus, Zipoli, & Kapp, 2009; Neuman & Dwyer, 2011; Pollard-Durodola et al., 2011). Yet effective extended instruction requires substantial instructional time, making it impossible to provide this level of instruction for all words children need to know (Anderson & Nagy, 1992).

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Inferential Comprehension Processes

Both written and oral language requires adequate inferring skills and prior knowledge because language in texts and conversation often includes meanings that are not explicitly expressed by the words themselves. Preschool-age children can engage in comprehension processes such as making inferences and constructing integrated mental representations (van den Broek et al., 2005), but they need support to make causal, informational, and evaluative inferences. An apprenticeship model in which adults embed analytic questions within shared reading is effective because questions encourage inferring without explicitly teaching comprehension strategies, as occurs with older children (Dickinson & Porche, 2011; van Kleeck, 2008; van Kleeck, Vander Woude, & Hammett, 2006). Experts argue that inferential comprehension processes should be taught during shared reading of narrative as well as informational texts, which provide the additional benefit of building content knowledge in science and social studies topics (Duke, 2000; Hirsch, 2003; Pollard-Durodola et al., 2011).

There are theoretical and practical advantages to carefully preparing inferential questions and scaffolds to support children who cannot adequately answer questions before sharing books with children. Both literal and inferential questions are important to preschoolers' language development (Blank, Rose, & Berlin, 1978), but adults tend to focus on simpler, literal questions (e.g., Danis, Bernard, & Leproux, 2000; Hindman, Connor, Jewkes, & Morrison, 2008). This pattern suggests that adults may need support to move conversation with young children to the inferential level. Inferential or decontextualized extratextual talk can be readily accomplished by scripting inferential questions and scaffolding prompts using language that is similar in phrasing but more systematic than the questions adults ask during typical shared reading with preschoolers (Reese & Cox, 1999; van Kleeck et al., 2006). Literal or contextualized questions adults ask during reading might include ''Where is the bird?'' (noticing), ''What's that called?'' (labeling), or ''What color/size/shape is this?'' (describing). Inferential questions focus on decontextualized topics beyond the words and pictures and might include ''How is Harry feeling?'' (inferring

feelings, point of view, etc.), ''How is this similar to . . . ?'' (comparing events within the text or comparing events to children's own experiences), ''Why did they think he was a monster?'' (explaining causes of events), or ''What does this mean?'' (explaining word meanings).

One such evidence-based approach to inferential questioning involves posing an important *guiding question* before reading that sets a purpose for listening and then discussing this question after reading (based on Denton, Solari, Ciancio, Hecht, & Swank, 2010; Solari & Gerber, 2008). Scaffolding around this question can occur in various ways. First, easier questions are posed during the initial reading and more challenging questions are posed in subsequent readings when the text is familiar (Blewitt, Rump, Shealy, & Cook, 2009). Second, scaffolds for incorrect responses can be scripted to elicit meaningful language production (Arnon & Clark, 2011; van Kleeck et al., 2006). A recent experiment showed that scaffolded questioning during reading is effective for 4-year-old children with specific language impairment (van Kleeck et al., 2006).

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MULTITIERED ORAL LANGUAGE INSTRUCTION IN PREKINDERGARTEN (PRE-K)

Teachers need to provide explicit instruction for children at risk for later reading comprehension difficulties due to vocabulary deficits or poor inferential language skills (Foorman & Torgesen, 2001; Snow, Burns, & Griffin, 1998). But in the case of vocabulary instruction, which occurs within limited instructional time, more explicit extended instruction requires a tradeoff in that fewer words can be taught in great detail. Yet at-risk students have difficulties with both how well they understand word meanings (depth) as well as the number of words known (breadth), suggesting that a below-average elementary student would need to learn approximately 7,000 words in a given year to catch up to the average vocabulary level (Nagy & Herman, 1987). No vocabulary curriculum can accomplish this task, but a multitiered approach to vocabulary instruction might more systematically address the needs of both breadth and depth for at-risk students (Catts, 2009; Coyne et al., 2009). For example, brief vocabulary explanations during shared reading can address the breadth of vocabulary knowledge for all students (primary or Tier 1 instruction), but more extended instruction can be delivered to children most at risk to achieve greater depth of word knowledge (secondary or Tier 2 instruction).

We explored the efficacy of two-tiered vocabulary instruction in preschool in part because this type of multitiered instruction, which has the potential to be useful in response-to-intervention (RTI) frameworks, is increasingly being recommended as a method for educators to more systematically support pre-K children's school readiness (for a review, see Coleman, Buysse, & Neitzel, 2006). Like RTI models in elementary school (Fuchs & Fuchs, 2006), pre-K RTI includes increasingly explicit instruction delivered to students who do not respond adequately to primary/core instruction at Tier 1 by implementing more targeted, small-group interventions at Tier 2. (Individualized Tier 3 interventions are beyond the scope of the present study.) Preschool students' response to Tier 1 instruction is typically assessed with a universal screening/progress-monitoring assessment, and response to Tier 2 instruction is measured with curriculum-based measurement (CBM) that aligns with the skills taught in small-group intervention (Deno, 2003). Progress-monitoring measures are typically brief benchmark assessments administered at regular intervals (e.g., beginning, middle, and end of year) that probe important academic indicators. CBM provides teachers with more frequent data regarding individual

students' progress or response to instruction. This formative evaluation assists teachers in modifying and improving intervention strategies to match individual needs (Deno, 1985). Recent studies have shown the promise of multitiered instruction for improving at-risk preschoolers' code-related literacy skills (e.g., Koutsoftas, Harmon, & Gray, 2009; VanDerHeyden, Snyder, Broussard, & Ramsdell, 2008). But no known studies have used multitiered approaches to target language skills, although similar research appears promising with older kindergarten students (Catts, Bridges, Nielsen, & Chan, 2011; Loftus, Coyne, McCoach, Zipoli, & Pullen, 2010; Pullen, Tuckwiller, Konold, Maynard, & Coyne, 2010).

A FRAMEWORK FOR TIER 1 AND 2 VOCABULARY AND COMPREHENSION INSTRUCTION

Social interactionist theories of language development guided the development of our vocabulary and comprehension curriculum supplement, called Developing Talkers: Pre-K, because it emphasizes the important role of the teacher in supporting young children's language development (Girolametto, Weitzman, Wiigs, & Pearce, 1999; Vygotsky, 1978). According to Vygotsky (1978), language modeled by the adult plays a critical role in helping the novice child construct mental representations of the world and in providing linguistic scaffolding that is one step above the child's language abilities but within the child's zone of proximal development. This might take the role of teachers recasting and extending the child's words or carefully using simplified questions or prompts to advance the child's thinking and language. A responsive linguistic style that is fine-tuned to the child's level of development is essential (Chapman, 2000), but without planned scaffolds it can be difficult to achieve in whole-group contexts in which the teacher's talk simultaneously addresses multiple children. Key instructional implications that follow from this theory, as well as the extensive literature on shared book reading (e.g., Mol, Bus, & de Jong, 2009; National Early Literacy Panel, 2008), were considered in developing a Tier 1 and Tier 2 instructional framework for the curriculum supplement piloted in this study.

PURPOSE OF PRESENT STUDY

The context for the present study was a subset of classrooms participating in their second year of a larger statewide professional development (PD) project. Offering two years of direct training and a third year of remote technical assistance, this PD program represents a comprehensive training approach that includes coursework, in-class coaching, and assistance using a progress-monitoring measure three times per year. A subset of teachers participating in this PD program worked with us to develop and pilot an initial 4-week version of this curriculum supplement. This pilot study was the first step in designing and empirically testing what we anticipated would be a longer curriculum supplement once we better understood the components and training that might make the program effective for at-risk students.

Our first research question asked the following: To what extent does teachers' use of embedded vocabulary instruction and questioning during whole-group shared reading increase the vocabulary skills of all students in the classroom, as measured by a progress-monitoring measure? We were doubtful that this brief (4-week) whole-group Tier 1 intervention would be of sufficient intensity to affect students' distal vocabulary outcomes because (a) it was a project of very short

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duration delivered by classroom teachers, who are typically less likely to implement book-reading interventions with the same effectiveness as trained researchers (Mol et al., 2009); (b) there is a lack of research demonstrating vocabulary growth outside of highly controlled and sustained instructional contexts (NICHD, 2000); and (c) students in comparison classrooms were exposed to shared reading of the same books by highly trained teachers who had received almost two years of PD but did not receive this curriculum supplement training and materials. Nonetheless, we explored the efficacy of this Tier 1 component because of its relative ease of implementation and given evidence of the promise of similar programs with kindergarten students, albeit in studies administered by researchers to small groups but also over relatively short durations of time (20 sessions in Justice et al., 2005; 6 sessions in Penno et al., 2002). As part of this research question, we asked whether effects were moderated by initial language skills, because some previous book-reading research has shown differential effects such that children with higher level entry skills make greater vocabulary gains, thereby indicating that the instruction is not closing the vocabulary gap (Coyne et al., 2007, 2009; Penno et al., 2002; Reese & Cox, 1999).

Next we asked the following: To what extent does teachers' use of embedded instruction plus extended small-group instruction increase the language skills of at-risk students who qualify for Tier 2 instruction? To address this question we examined vocabulary skills as measured with a progress-monitoring measure as well as a set of researcher-developed proximal assessments that directly linked to the supplemental curriculum. We assumed that it would be unlikely that the distal progress-monitoring assessment would be sensitive enough to capture gains in vocabulary learning, whereas the proximal assessments would be more likely to detect effects (NICHD, 2000). We expected the intervention to have the greatest impact on proximal vocabulary assessments for the children who received Tier 2 relative to a similar group of at-risk students in comparison classrooms because the daily small-group instruction focused on providing increased opportunities to use and discuss vocabulary words in various contexts, whereas for listening comprehension only a brief review of the guiding question occurred in Tier 2 small groups. Again, we looked for differential effects of the intervention or whether Tier 2 instruction led to similar growth for all at-risk students regardless of whether they had relatively high or low initial skills.

Finally, for teachers randomly assigned to the experimental condition, we examined possible relations between teachers' fidelity of implementing the curriculum supplement and children's language development. As part of this research question, we examined whether teachers espoused evidence-based beliefs regarding oral language instruction and whether these beliefs were associated with teachers' fidelity of implementation. We expected teachers in both conditions to hold beliefs consistent with research evidence because they had all participated in almost two years of PD. To summarize, the following research questions were addressed:

1. Does participation in a 4-week shared book reading intervention at Tier 1 or at Tier 1 + Tier 2 increase students' vocabulary skills as measured with a progress-monitoring measure? Does the impact vary by children's pretest skill level?
2. Does participation in a 4-week shared book reading intervention at Tier 1 + Tier 2 increase at-risk students' language skills as assessed with proximal measures of vocabulary and listening comprehension? Does the impact vary by pretest skill?
3. Is there a relationship between teachers espousing evidence-based instructional beliefs and their fidelity of implementation of the shared book reading intervention? What is the relationship between fidelity of implementation and children's outcomes?

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METHODS

Participants

This study was conducted in a large urban area in Texas in 39 pre-K programs that served children at risk for learning difficulties because of the effects of poverty. Criteria for inclusion in the study were (a) teacher participation in a larger statewide PD project called the Texas School Ready! program and (b) English as the primary language of classroom instruction. Most teachers were enrolled in the second year of the PD program, but three teachers were in their first year of the PD program. Following the provision of informed consent according to approved procedures, teachers were randomly assigned at the center/school level to either the experimental group ($n = 19$) or a comparison group ($n = 20$). To ensure equal randomization, assignment was stratified by the three types of pre-K programs involved: (a) Head Start (17 classrooms), (b) private child care programs that accepted welfare-to-work subsidies (15 classrooms), and (c) programs affiliated with school districts (27 classrooms). The average class size was 19.66 students ($SD = 2.94$, range = 14–31). Most classrooms used a full-day schedule, but four were half-day programs.

All teachers were female; of the teachers, 56.4% were African American ($n = 22$), 17.9% Hispanic ($n = 7$), 17.9% Caucasian ($n = 7$), and 2.6% Asian ($n = 1$). Two teachers did not return demographic surveys. All teachers had at least some prior teaching experience, but years of experience ranged from 2 to 32 ($M = 13.23$, $SD = 8.71$); average years of experience in pre-K was 7.83 ($SD = 7.09$). Teachers' highest level of education was as follows: 9 had some college coursework, 9 had associate's degrees, 16 had bachelor's degrees, and 3 had master's degrees. Only seven teachers reported majoring in education, early childhood education, or related fields. Approximately one third of teachers ($n = 11$) held a teaching certification from the state. Sixteen teachers reported having a Child Development Associate certification.

At the start of the pilot study in March 2010, most students enrolled in participating classrooms ($n = 699$) were 4 years old ($M = 57.83$ months, $SD = 5.83$, range = 38–72). Classrooms were balanced between girls and boys (50.2%). Teacher-reported ethnicity for 98% of enrolled students was as follows: 42.2% African American ($n = 289$), 30.8% Hispanic ($n = 211$), 22.6% Caucasian ($n = 155$), 2.8% Asian ($n = 19$), and 1.6% other ethnicities ($n = 11$). Most students spoke English as their first language, but approximately 5% of students spoke another first language, usually Spanish. Three students were identified as receiving special education services for language (one was in a comparison classroom and two in intervention classrooms); they were allowed to participate in the study and were included in the analyses.

Study Procedures

This 4-week intervention study used a pre-/posttest design. Before the study began, several trial lessons were conducted by the research team to field test the Developing Talkers: Pre-K curriculum supplement and to pilot the assessment procedures. As stated, all teachers were enrolled in a larger PD program (i.e., Texas School Ready!). This included coursework, in-class coaching, supplemental classroom materials, and provision of a progress-monitoring tool. The PD program followed a model tested in previous studies (Landry, Anthony, Swank, & Monsegue-Bailey, 2009; Landry, Swank, Smith, Assel, & Gunnewig, 2006). During the intervention period, as part

of the PD program, all teachers received 2 hr of in-class coaching from their existing coach and attended 4 hr of training on supporting oral language. Prior to the intervention, teachers in both conditions received 61 hr of coursework and 40 hr of in-class coaching during the first year of the PD program (4 hr per month) and 32 hr of coursework and 18 hr of in-class coaching (2 hr per month) during the second year, addressing topics such as classroom management, early literacy and mathematics instruction, and effective book reading. All teachers received classroom management materials, basic school readiness activities, and a manual of supplemental activities (CIRCLE Teacher Manual, 2010).

All students in classrooms assigned to the experimental condition participated in daily Tier 1 (whole-group) book-reading activities, but only students at risk for language difficulties, as determined by scoring below a predetermined benchmark on a vocabulary fluency screener, were eligible to receive the Tier 2 (small-group) book review and extended vocabulary instruction. Figure 1 illustrates the study design and instruction each group received. As shown in the figure, teachers in the comparison condition followed the same schedule as experimental teachers for whole-group read-alouds (i.e., Tier 1). At-risk Tier 2 (ART2) students in experimental classrooms received approximately 20 small-group sessions of 15 min each, whereas at-risk comparison (ARC) students may or may not have received small-group sessions that were designed by the teacher.

Detailed Comparison Condition Procedures

The 20 teachers randomly assigned to the comparison condition met with their existing coach, who explained that the purpose of the study was to better understand teachers' typical style of

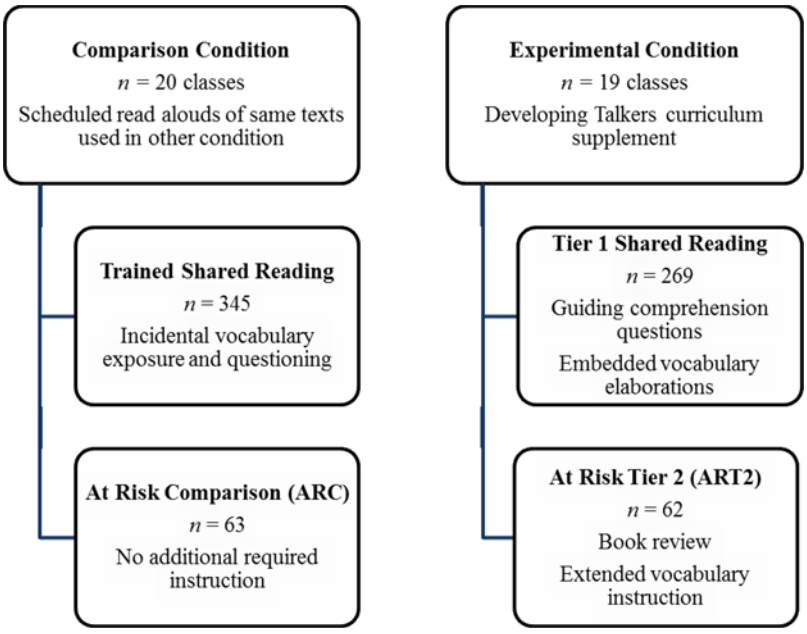

FIGURE 1 Group assignment and instructional conditions. (Color figure available online.)

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reading aloud and preferences for different types of books. To this end, teachers in this condition were asked to be videotaped and fill out surveys (including feedback about books) at pre- and post-test. Comparison teachers were asked to follow the same schedules for whole-group read-alouds as the intervention teachers and to read the researcher-provided books as they normally would. Their reading approach was likely influenced by the larger PD program's training on read-alouds, which demonstrated how to discuss important vocabulary, ask open-ended questions, and conduct story-extension activities. Thus, their normal reading style may have had similarities to the approach used in the experimental condition. These procedures for reading the same books as experimental teachers ensured, at a minimum, that children would receive incidental exposure to the target vocabulary words. Teachers were randomly assigned to either Reading Schedule A or Reading Schedule B to vary book reading within the conditions and to reduce the likelihood of familiarity with particular words due to proximity of instruction.

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Detailed Intervention Condition Procedures

All 19 teachers randomly assigned to the intervention condition attended an 8-hr Saturday training conducted by the first three authors and four other trainers. Coaches who already worked with these teachers also attended the training to ensure that they could support teachers' implementation of the intervention in their regularly scheduled 2-hr in-class coaching session and one additional 2-hr session. The topics included (a) an overview of the multitiered instruction framework for supporting language development, (b) an introduction to the Developing Talkers: Pre-K Tier 1 and Tier 2 instructional routines through video examples and trainer modeling, (c) opportunities to practice and role-play key curriculum components such as scaffolding language and rich vocabulary instruction, and (d) instructions for completing weekly CBM to monitor Tier 2 students' vocabulary learning. The teacher-administered CBM included asking individual children to explain the meaning of the target vocabulary words taught each week; this was not used as an outcome measure but was used by teachers to inform which vocabulary and activities to review on scheduled review days. A schedule (A or B) for implementing the intervention was provided, and teachers began using the curriculum supplement immediately following the training in April 2010. Teachers received a $50 stipend for attending the Saturday training. Teachers also agreed to be videotaped, fill out a teacher beliefs survey, and provide feedback related to the curriculum supplement.

Tier 1 instructional principles. In Developing Talkers: Pre-K, the daily 15-min whole-group, Tier 1 instruction taught target words by embedding vocabulary elaborations during reading and asking children literal and inferential questions to elicit their use of vocabulary. This direct vocabulary instruction was provided for six to nine words per book, including both sophisticated, high-utility words (these are words that Beck, McKeown, & Kucan, 2008, referred to as Tier II words) as well as more basic words. Embedded vocabulary instruction included two parts: (a) a *child-friendly definition* rather than dictionary definitions, and (b) a *supportive context sentence* to further elaborate on the word's meaning and use in the text (similar to Justice et al., 2005; Penno et al., 2000), and (c) a vocabulary-related comprehension question with a suggested scaffolding prompt for incorrect responses. In addition to vocabulary targets, the Tier 1 instruction included a listening comprehension target. Before reading, the teacher posed a decontextualized *guiding question* to set a purpose for listening (based on Denton et al., 2010; Solari & Gerber,

2008), and the question was answered after reading. All questions included suggested scripted scaffolds for children who answered incorrectly.

Questions and corresponding scaffolding prompts were written to simulate natural dialogue and were placed discretely as stickers inside texts to support fidelity of implementation. Suggested scaffolds for guiding questions moved from (a) minimal scaffolding (an either/or question: ''Did the children in this book stay the same or learn to do new things?'') to (b) moderate scaffolding (a lexically specific sentence frame or cloze prompt: ''These children learned new things like how to ride a *b*...'' [bike]) to (c) intensive scaffolding (giving the answer and asking the child to repeat it: ''These children learned to do new things like ride a bike. Say 'They learned new things.''). For vocabulary questions embedded during book reading, only the moderate/cloze scaffold was suggested to minimize disruptions to the story. Instead of selecting stand-alone books, we chose a set of conceptually related texts to provide a venue for building students' content knowledge to further support vocabulary and comprehension skills (Hirsch, 2003). Other researchers have successfully used similar sequencing of narrative and informational genres to create thematic units about high-priority topics in preschool standards such as living things, nature, and society (e.g., Pollard-Durodola et al., 2011; Wasik, Bond, & Hindman, 2006).

Tier 2 instructional principles. Daily 15-min, small-group Tier 2 instruction was delivered to students who did not respond adequately to Tier 1 instruction alone, as indicated by progress-monitoring data. Because this was a pilot project, only four students received teacher-implemented Tier 2 in each classroom, even if more students qualified for Tier 2 based on predetermined benchmark scores, as described below. A common characteristic of Tier 2 intervention is increased instructional time, because students most at risk may need additional time with the instructional content to make gains comparable to their peers (Justice, McGinty, Guo, & Moore, 2009). Group size should consist of three to six students for optimal intervention outcomes (Vaughn, Linan-Thompson, & Hickman, 2003). Finally, Tier 2 intervention should involve a change in how instructional content is delivered to include more explicit methods and interactive dialogue that increases teacher modeling and feedback (Denton & Vaughn, 2010); therefore, new vocabulary activities were used in Tier 2 to deepen vocabulary knowledge.

More specifically, the Tier 2 lesson comprised (a) brief review of the book and that day's guiding question, with scaffolding provided as needed; (b) review of three target vocabulary definitions through the use of a *vocabulary card* with a picture representing the word in a new context and student practice using the words; (c) explicit, *extended vocabulary teaching* activities (e.g., sort pictures of examples/nonexamples, act out word meanings, discuss multiple picture examples; based on Beck & McKeown, 2007; Beck et al., 2008; Coyne et al., 2007, 2009); and (d) a quick game-like shuffle and review of all target vocabulary cards. Three words were explicitly taught each day so that all six to nine vocabulary words per book received extended instruction. An example of the Tier 1 and Tier 2 instructional routine is shown in Appendix A.

Selected texts and vocabulary words. Seven texts representing narrative and informational narrative genres were provided to teachers in both conditions. Narrative genres follow a traditional story structure and may include fantasy, whereas informational narratives use a story format while delivering accurate information about the natural or social world (Donovan & Smolkin, 2001). Texts included topics related to oceans or sea animals. All titles were read at least two times, but some more complex texts were scheduled to be read aloud three times.

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In addition, four review days occurred so that teachers could select a text to reread at Tier 1 and select extended vocabulary activities to repeat when Tier 2 children had difficulty learning the particular target vocabulary, as indicated by CBM scores. Six to nine vocabulary words were selected from each text to ensure a combination of nouns, verbs, and modifiers. Given that our primary goal was to improve the vocabulary skills of students having difficulty with language skills, we chose a combination of more basic words (e.g., *upside-down, ship*) and more sophisticated, rare words (e.g., *annoyed, clumsy, worry*). Although some researchers focus exclusively on sophisticated words (Beck et al., 2008), our trial lessons indicated that at-risk students needed additional practice understanding basic words. Characteristics of the texts and a list of target vocabulary are provided in Table 1. Commensurate with other researchers (Biemiller, 2003), we used the Dale-Chall 3,000 common words list (Chall & Dale, 1995) and the Living Word Vocabulary list (Dale & O'Rourke, 1981) to characterize the types of words chosen. Of the 51 target words, 73% were listed on Dale and Chall's simple word list and 43 were identified on the Living Word list. For the Living Word list, which begins at Grade 2, the average age of mastery was Grade 2.82 ($SD = 1.55$), suggesting that preschoolers were likely to require instruction for these words.

Data Collection and Measures

This study included direct child assessments and teacher survey and observation measures. One child measure was administered by classroom teachers, and the others were administered by trained research assistants during a 2-week pretest and posttest window. All research assistants were blind to study condition and completed a systematic training with the first and second authors that required demonstrating mastery of test administration and scoring.

TABLE 1
Characteristics of Texts and Target Vocabulary

Text (Author)	*Genre*	*Times read aloud*[a]	*Target vocabulary*
Clumsy Crab (Galloway, 2005)	Narrative	2	*crab, clumsy, climb, shatter, catch, fins*
Fidgety Fish (Galloway, 2001)	Narrative	2	*cave, inside, fidgety, through, energy, trapped*
Harry by the Sea (Zion, 1965)	Narrative	2	*shade, crowded, annoy, beach, whistle, seaweed*
Is This a House for a Hermit Crab? (McDonald, 1996)	Informational narrative	3	*beneath, heavy, deep, round, net, claw, hide, tangled, skill*
Somewhere in the Ocean (Ward & Marsh, 2000)	Informational narrative	2	*nibble, safe, splash, different, prickly, clear, hunt, sway, squirt*
The Pout-Pout Fish (Diesen, 2008)	Narrative	3	*pout, spread, advice, upside-down, float, friend, joy, choice, tiny*
The Three Little Fish and the Big Bad Shark (Geist, 2008)	Narrative	2	*gather, tremble, worry, munch, ship, destroy*

[a]Each title was scheduled to be read aloud two or three times, but teachers were given a choice of which title to read aloud one additional time on the four review days.

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Child Measures

Vocabulary Fluency

As part of the larger PD program, both comparison and experimental teachers were already trained to use a progress-monitoring measure called the Center for Improving the Readiness of Children for Learning and Education (CIRCLE) Phonological Awareness, Language, and Literacy System (C-PALLS; Landry, Swank, Assel, & King, 2009), which is administered with software on a provided Netbook computer. The Rapid Vocabulary Naming subtest of this measure served as both a screener (to identify students who were not responding adequately to instruction and therefore needed Tier 2) and an outcome measure at the end of the 4-week pilot study. The vocabulary subtest measures expressive vocabulary fluency by requiring the child to name as many common objects (e.g., *apron, ball, finger*) as they can in 60 s. Teachers administer the test to individual students using a flipbook of pictures and flipping the page at least every 3 s. Two practice items are used to introduce the task and teach children the task. Teachers use a personal digital assistant or a Netbook computer to score children's responses as correct, incorrect, or sensible error. For example, if a picture of a potted plant is shown, correct responses include *plant* or *pot;* these responses receive 1 point. Incorrect responses (e.g., *ball*) and sensible errors (e.g., *tree*) receive no points, but the list of sensible errors can be reviewed qualitatively by the teacher after administering the task. If the child takes more than 3 s on any picture, the software alerts the teacher to move on. For many items, multiple correct responses are accepted (e.g., *running/run/man/jogging*). Unique picture sets are used at each testing window.

Children who qualified for Tier 2. We identified students as qualifying for Tier 2 if they scored below the C-PALLS Rapid Vocabulary Naming benchmark for their age (i.e., if a 3.5-year-old named $\leq$11 pictures, a 4-year-old named $\leq$14 pictures, or a 4.5-year-old named $\leq$16 pictures in 60 s). Teachers administered the middle-of-year or pretest progress-monitoring assessments during the 2 weeks prior to the intervention and administered the end-of-year or posttest assessments during the 2 weeks after the intervention. In a few cases in which pretest data were not available (e.g., because of student absence), teachers ranked their students' oral language skills using a checklist to identify the four lowest rank-ordered children as at risk and eligible for Tier 2.

Proximal Measures

To assess Tier 2 students' response to instruction, we developed three proximal measures, or measures closely aligned with the curriculum, that were administered by research assistants during the pre- and posttest windows. Proximal measures assessed students' receptive and expressive understanding of target vocabulary and listening comprehension. This battery of assessments was administered at children's schools in a quiet room; testing required one 20-min session, but children were given breaks if needed.

Receptive target vocabulary. The receptive target vocabulary measure assessed children's ability to identify the 51 target vocabulary words taught during the intervention. After two practice/training items, children were asked to point to a color photograph representing the target word from among four pictures. None of the photographs matched those used in the instruction

with vocabulary cards. Examiners said, ''Show me (target word),'' for each test plate, which included one picture of the target word (e.g., *beach*), one foil picture representing another word that was also taught during the intervention (e.g., *cave*), and two other photos (e.g., mountains, a park). If the child did not respond within 5 s, the examiner said, ''Try one. Point to the one you think it might be.'' If there was still no response, the examiner said, ''That was a difficult one. Let's try another.'' Children were praised for correct and incorrect choices. Correct responses received 1 point. Internal consistency was good: Cronbach's $\alpha = .86$.

Expressive target vocabulary definitions. Twelve of the 51 target vocabulary words were randomly selected to assess children's ability to define the word's meaning. The 12 randomly selected words were *friend, ship, safe, choice, splash, crowded, joy, squirt, claw, deep, round,* and *advice*. After two training/practice items of basic, familiar words (i.e., *pencil, run*) children were told a word, heard it used in a simple sentence, and were asked what the word means. For example, an examiner would say, ''*Friend*. Sally is my *friend*. What does *friend* mean?'' If the child did not respond, the examiner encouraged the child to tell him or her whatever he or she could about the word. The child's verbatim response was recorded and scored after the child returned to his or her classroom. Children's responses were given 2 points for adequate responses that provided information about the word or that gave a formal definition or synonym. Responses that were imprecise but described a topic semantically related to the target word received 1 point. Incorrect responses, no response, or gestures only received 0 points. A maximum of 24 points was possible. We piloted the measure with other students before starting the current study. These children's sample responses were coded by the lead authors and provided in a detailed appendix to facilitate reliable scoring by trained assessors. Testing was documented with a digital recorder to allow for assessor replay and to calculate interrater agreement for randomly selected assessments at pretest ($n = 42$) and posttest ($n = 47$) constituting more than 65% of the sample. Interrater reliability was good: Intraclass correlation coefficients (ICCs) were .89 at pretest and .97 at posttest. Internal consistency was acceptable: Cronbach's $\alpha = .78$.

Listening comprehension. Children's listening comprehension skills were assessed by rereading segments of three texts that had been read aloud by teachers in both conditions and asking children open-ended questions about the text. Specifically, meaningful sections of three texts were identified in which a major plot episode occurred and was described in approximately 80 words (range = 80–86 words). Children were told the title and author of the book and that they would answer questions about the book after the examiner read a selection from each book. Three types of questions were asked about each book. For example, in the book *Harry by the Sea* (Zion, 1965), the three questions were (a) a literal recall question (''What came from behind and crashed on top of Harry?''), (b) a decontextualized question that required inference or explanation (''How did Harry feel?''), and (c) a decontextualized question that matched a guiding question asked by teachers in the intervention condition (''Why did everyone think Harry was a sea monster?''). Children's responses were recorded verbatim and scored after they returned to their classroom. Fully adequate responses received 2 points, acceptable but imprecise responses received 1 point, and incorrect responses received no points; 18 points was possible. Interrater agreement for the same randomly selected 65% of assessments was good: ICCs = .95 at pretest and .96 at posttest. Internal consistency was acceptable: Cronbach's $\alpha = .83$.

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Teacher Measures

Teacher Beliefs about Language and Literacy Instruction

Teachers completed a modified version of the preschool Teachers Literacy Beliefs Questionnaire (Hindman & Wasik, 2008). We assessed teachers' language and literacy practice beliefs for descriptive purposes because few studies examining multitiered instruction have used classroom teachers as the interventionists for Tier 2 instruction. Although we expected intervention and comparison teachers to espouse evidence-based beliefs after almost two years in the larger PD program, we felt that it was important to confirm this before assuming that teachers had evidence-based beliefs that aligned with characteristics of the intervention. The questionnaire includes scales related to oral language and book-reading practices and requires teachers to use a 5-point Likert scale to indicate their agreement with evidence-based practices (e.g., ''As a teacher, I believe pre-K children . . . should learn new words by talking with their teachers about what they are doing at the time'' or '' . . . need to hear the same story more than once or twice to learn new words''). Some items are reverse-scored because they represent practices that are not supported by research evidence (e.g., ''Pre-K children should not ask questions or talk about stories when teachers read to them''). We did not include the code and writing subscales of the original measure because these were beyond the scope of our intervention; however, we added new intervention-related items addressing listening comprehension, answering decontextualized questioning about stories, providing scaffolding hints when children have difficulty answering questions, and reading informational genres. In total, the Teachers Literacy Beliefs Questionnaire included 18 items. Internal consistency was $\alpha = .73$.

Fidelity of Implementation

Videotapes of the 19 intervention teachers implementing a Tier 1 and a Tier 2 lesson were collected by research assistants at scheduled classroom observations and coded for fidelity of implementation. Two research assistants were trained to code the lessons for (a) *adherence* to the program methods and activities outlined in the lesson plan for the given day and (b) *quality* of the process for engaging students and scaffolding their learning and communication attempts. Coding for adherence involved scoring 15 Tier 1 items and 12 Tier 2 items as 3 (high fidelity: always follows procedures and suggested wording), 2 (moderate fidelity: follows some procedures and general wording), 1 (low fidelity: some procedures followed and wording differed from suggested script), or 0 (component not implemented). Coding for quality involved scoring 10 Tier 1 items and the same 10 Tier 2 items as 4 (high quality), 3 (somewhat high), 2 (somewhat low), or 1 (low quality). Interrater agreement was assessed on 20% of videos and ranged from an ICC of .86 for adherence codes to .77 for quality codes, which are considered satisfactory agreement levels (Fleiss, 1981). Sample fidelity items are shown in Appendix B.

RESULTS

Research questions addressed the influence of Tier 1 and Tier 2 instruction and fidelity of implementation ratings on child outcomes. Analyses were run using the following groups: (a) all

children who received Tier 1 shared reading versus all children exposed to comparison shared reading, and (b) the ART2 group versus the ARC group. Children in this sample were nested within classrooms, giving rise to issues of independence of observations within classrooms. For this reason a mixed (multilevel) models analysis was used. Because a pretest–posttest design was used, we selected an analysis of covariance (ANCOVA) statistical model in which the pretest was used as a covariate. All analyses were conducted using SAS PROC MIXED software (SAS Institute, 2010). We tested a model that allowed the relation of the covariate to vary by group and retained any Group × Covariate interactions when significant. Descriptive statistics for all child measures are listed in Table 2 by experimental and comparison group, and the ANCOVA summary and Cohen's *d* effect size are shown in Table 3.

Impact of the Intervention on Children's Vocabulary Fluency Benchmark

Only 44.3% of the total sample ($n = 614$) met the predetermined vocabulary benchmarks for their age at pretest; 44.9% met the benchmark at posttest ($n = 584$), suggesting that the majority of the sample was at risk for language difficulties. All students who received either the Tier 1 intervention or the comparison read-alouds ($n = 578$) were contrasted on their posttest vocabulary fluency (see Table 2). Multilevel ANCOVA showed that students in the comparison condition had significantly higher pretest scores, $t(612) = -2.02$, $p = .044$, and at posttest they continued to have significantly higher vocabulary scores than students in the experimental Tier 1 condition, $F(1, 541) = 5.20$, $p = .023$, $d = -0.32$ (see Table 3). In addition, a significant Pretest × Condition Condition interaction, $F(1, 541) = 6.41$, $p = .012$, showed that students in the experimental condition did better when they had higher initial vocabulary skills. Next, vocabulary fluency posttest scores were compared for at-risk students ($n = 104$) in Tier 2 (ART2) and the comparison students (ARC). Pretest scores did not differ significantly for these groups, $t(108) = -0.97$, $p = .332$. No condition effect was detected with this subset of students, but there was also no evidence of a Pretest × Condition interaction, as was observed in the full sample.

TABLE 2
Descriptive Statistics for Distal and Proximal Child Assessments

		Pretest				*Posttest*			
Measure	*Group*	*n*	*M*	*SD*	*Range*	*n*	*M*	*SD*	*Range*
Progress monitoring									
Vocabulary fluency	Experimental	269	18.23	6.97	0–50	268	19.08	6.41	0–34
	Comparison	345	19.41	7.30	3–64	316	21.51	10.84	0–72
	Experimental—ART2	52	13.87	6.36	0–41	50	15.64	5.29	3–26
	Comparison—ARC	58	14.91	4.90	6–29	56	19.91	6.06	9–39
Proximal outcomes qualify (Tier 2 groups only)									
Receptive vocabulary/51	Experimental—ART2	62	24.08	6.22	11–37	59	31.31	8.74	12–48
	Comparison—ARC	63	26.48	7.93	12–39	60	29.47	8.83	12–45
Expressive vocabulary/24	Experimental—ART2	62	5.37	4.41	0–17	59	6.10	4.13	0–15
	Comparison—ARC	63	5.57	3.93	0–14	60	6.78	4.83	0–19
Listening comprehension/18	Experimental—ART2	62	5.45	4.23	0–16	59	7.31	4.62	0–18
	Comparison—ARC	63	6.37	4.47	0–18	60	7.93	4.80	0–18

Note. ART2 = at-risk Tier 2group; ARC = at-risk comparison group.

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TABLE 3
Main Effects of Developing Talkers: Pre-K Intervention as a Function of Instruction Condition With Pretest Scores as a Covariate

Variable and Source	*F*	*df*	*p*	*d*
Vocabulary fluency				
Pretest	101.98	(1, 541)	<.001*	
Condition (experimental/comparison)	5.20		.023*	–0.32
Pretest × Condition	6.41		.012*	
Vocabulary fluency				
Pretest	13.75	(1, 67)	<.001*	
At-risk conditions (ART2/ARC)	0.05		.830	–0.90
Pretest × Condition	2.64		.109	
Receptive vocabulary				
Pretest	14.02	(1, 79)	<.001*	
At-risk conditions (ART2/ARC)	20.17		<.001*	0.81
Expressive vocabulary				
Pretest	86.49	(1, 78)	<.001*	
At-risk conditions (ART2/ARC)	2.21		.141	–0.23
Pretest × Condition	8.01		.006*	
Listening comprehension				
Pretest	123.53	(1, 79)	<.001*	
At-risk conditions (ART2/ARC)	0.01		.917	0.02

Note. ART2 = at-risk Tier 2group; ARC = at-risk comparison group.
*$p \leq .05$.

Impact of the Intervention on Children's Proximal Language Assessments

At-risk students' posttest scores on proximal assessments were examined; data for the expressive vocabulary and comprehension measures were positively skewed (see Table 2). Results from the multilevel ANCOVA (see Table 3) revealed a significant main effect of the intervention for ART2 students on the receptive vocabulary test, $F(1, 79) = 205.17$, $p < .001$, $d = 0.81$, and no interactions were found for initial skill level on this measure. For expressive vocabulary, there was no main effect of condition, but a significant Pretest × Condition interaction indicated that pretest scores were less predictive of posttest scores for the ART2 students than for the ARC students, $F(1, 78) = 8.01$, $p = .006$. There were no significant main effects or interactions for the listening comprehension measure. The large effect size for the receptive task was likely because this was the easiest of the three proximal measures because it only required a nonverbal pointing response, whereas the other two proximal measures required more difficult skills, namely inferential expressive language production to demonstrate reasoning and inferring.

Teacher Beliefs and Fidelity of Implementation

Finally, we examined the descriptive statistics and relations between teachers' beliefs and fidelity of implementation and student outcomes. Beliefs data were negatively skewed, and on average, both experimental and comparison teachers agreed with evidence-based practices (i.e., score ≥4, agree) for all items on the teacher belief questionnaire, except for three items: (a) At pretest

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teachers nearly agreed ($M = 3.77$, $SD = 0.96$) with the reverse-scored statement ''Pre-K children do not need to learn the meaning of a lot of words to become good readers''; (b) at pretest teachers nearly agreed ($M = 3.97$, $SD = 0.98$) with the reverse-scored statement about scaffolding ''Pre-K children should not be given hints when asked to answer a question''; and (c) at pre- and posttest, teachers were neutral ($M = 2.97$, $SD = 1.08$; $M = 2.93$, $SD = 1.04$, respectively) as to whether children should be asked challenging questions (e.g., decontextualized questions) for the statement ''Pre-K children learn to understand books by answering difficult questions about stories.'' Based on Hindman and Wasik (2008), who considered scores below 4 as not aligned with current evidence-based practices, these three items in which teachers varied in the extent to which they agreed with evidence-based practice were considered in relation to teachers' fidelity of implementation.

For fidelity, on average, experimental teachers' adherence to Tier 1 activities was moderate/high ($M = 2.42$, $SD = 0.60$), but adherence to Tier 2 activities was slightly lower and only in the moderate/low range ($M = 1.83$, $SD = 0.88$). Teachers' average quality of implementation was similar in Tier 1 ($M = 2.83$, $SD = 0.40$) and Tier 2 ($M = 2.73$, $SD = 0.73$), with both near the somewhat high range. None of these fidelity variables were significantly correlated with one another (range rs = .14–.43). However, fidelity of implementation was significantly related to experimental teacher beliefs for one of the three items in which teachers' beliefs deviated from evidence-based practice. Specifically, there were two significant positive relations between believing that children should answer difficult questions about stories at pretest and quality of Tier 1 implementation ($r = .55$, $p = .03$) and between this belief at posttest and adherence to Tier 1 implementation procedures ($r = .54$, $p = .03$). No other correlations between items in which teachers' beliefs deviated, even slightly, from evidence-based practice were significantly related to fidelity of implementation.

In our final set of analyses, we used four fidelity variables to predict children's posttest scores while controlling for pretest scores: (a) Tier 1 adherence, (b) Tier 1 quality, (c) Tier 2 adherence, and (d) Tier 2 quality. Adherence and quality of implementation did not predict children's vocabulary fluency. But for the proximal measures some fidelity variables approached significance at a more liberal alpha level of .10. Given that this was a pilot study, we felt it was appropriate to consider this less rigorous standard in order to identify potentially important predictors (Cohen, 1992). For receptive vocabulary, there was a trend for Tier 1 quality to predict ART2 students' posttest scores, $F(1, 38) = 3.60$, $p = .065$. On the expressive vocabulary test, there was a trend for Tier 2 adherence to positively predict at-risk students' learning, $F(1, 38) = 3.67$, $p = .063$. Because the Tier 2 small group is designed to be more intensive, we examined a second model that included only Tier 2 adherence and Tier 2 quality as predictors; in this model, Tier 2 adherence became a significant predictor of expressive vocabulary, $F(1, 38) = 5.91$, $p = .020$. Finally, for listening comprehension, no predictors approached significance when all four variables were in the model, but in the reduced model with only Tier 2 adherence and Tier 2 quality, adherence approached significance, $F(1, 38) = 3.40$, $p = .073$.

DISCUSSION

This pilot study sought to test the feasibility and effectiveness of an intervention implemented within a multitiered instructional framework that concentrated on oral language development

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in a pre-K setting. Specifically, our research questions addressed whether 4 weeks of teacher implementation of the Developing Talkers: Pre-K curriculum supplement improved student outcomes on a distal vocabulary fluency measure and proximal measures closely aligned with skills taught in the curriculum. In addition, we explored the relation between teacher beliefs and fidelity of implementation and whether fidelity predicted child outcomes. Our results suggest that at-risk students who received the intervention showed significant improvement on a proximal receptive vocabulary task; however, significant impacts of the intervention were not observed for the progress-monitoring measure or the proximal measures of expressive vocabulary and listening comprehension. Teacher fidelity of implementation showed important relations with student outcomes. Given the short duration of this pilot study, these results demonstrate the promise of the intervention to improve the vocabulary skills of at-risk pre-K children and suggest that more extended study is warranted. These findings are particularly promising given the extensive training of comparison condition teachers through an evidence-based program (Landry, Anthony et al., 2009) and given that comparison teachers read the same books as experimental teachers, ensuring at least incidental exposure to vocabulary in the comparison classrooms.

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Effects of the Intervention on Progress-Monitoring and Proximal Measures

We did not hypothesize that this brief intervention would be of sufficient intensity to improve students' vocabulary fluency on a progress-monitoring test that focused on words not directly taught in the curriculum supplement; our findings confirmed that there was not transfer to a distal vocabulary fluency measure. Vocabulary knowledge is unlikely to transfer to untrained words (Elleman, Lindo, Morphy, & Compton, 2009; NICHD, 2000), especially given that the progress-monitoring measure assessed breadth of vocabulary knowledge rather narrowly by asking students to name as many pictured objects as possible in 60 s. Findings for this measure also suggested that offering the whole-group Tier 1 intervention alone resulted in differential effects such that students with higher initial skills became more fluent in naming vocabulary at posttest. Many other researchers have found that students with smaller initial vocabularies are less likely to learn words from listening to stories (Coyne et al., 2007; Reese & Cox, 1999; Robbins & Ehri, 1994; Zucker, Justice, Piasta, & Kaderavek, 2010) or from the types of brief embedded vocabulary instruction that occurred in this Tier 1 shared reading (Coyne et al., 2007; Penno et al., 2002). When we compared only the at-risk students' vocabulary fluency scores (ART2 and ARC), there was no significant main effect or interaction with initial skill level. More extensive studies are needed to determine whether students with lower levels of vocabulary knowledge are more likely to benefit from this tiered approach to vocabulary instruction and whether these benefits can be detected with distal, standardized vocabulary measures.

Our findings for the proximal measure of receptive vocabulary words taught in the curriculum supplement showed that the at-risk students who received both the explicit Tier 1 and Tier 2 instruction (ART2) outperformed similar at-risk students in the comparison condition (ARC). This impact represented a large effect size ($d = 0.81$). Although no significant main effects were observed for the other proximal measures of expressive vocabulary and listening comprehension, there was a moderated effect on the expressive vocabulary measure, indicating that students' initial scores were less predictive of posttest scores for students in ART2 group compared to the ARC group. This moderation is promising because it suggests that the more explicit and

intensive Tier 2 instruction effectively interrupted this relation, because the ART2 students did better on their posttest than would be expected based on their pretest scores for explaining target vocabulary meanings. The direction of this effect, on a measure of depth of word knowledge, shows the potential promise of tiered instruction, and future studies should evaluate whether multitiered language instruction might help close the vocabulary gap that exists between students with high versus low entry skills, as has been reported in various other studies using only Tier 1 instruction (e.g., Coyne et al., 2007, 2009; Penno et al., 2002).

Questions remain about the appropriateness and sensitivity of some of our proximal researcher-developed measures because most students scored at the low range of the expressive vocabulary and listening comprehension measures. Although there were not floor effects for all students, these tasks were difficult for some children. Our expressive vocabulary task was more difficult than typical expressive vocabulary assessments used with preschool-age children. The children in this study were given a word, heard it in a neutral sentence, and then were asked to give a definition of the word. Other researchers have measured young children's expressive vocabulary with less challenging procedures, such as asking children to verbally name a pictured target vocabulary word (e.g., Neuman & Dwyer, 2011; Pollard-Durodola et al., 2009). Others have used two-part expressive vocabulary assessments that begin by asking for a definition of the word, but if the child cannot provide it the child is given three multiple choice answers from which to select the most appropriate response (Catts et al., 2011). These less demanding procedures or more comprehensive scoring procedures (Christ, 2011) may be more appropriate in future work with preschool-age students, especially because students are not required to define words within the intervention; rather, intervention teachers asked students to repeat the word, and they use varied opportunities to experience and discuss each vocabulary word. Furthermore, the listening comprehension measure required substantial expressive language skills to adequately answer the literal and inferential comprehension questions because the format was open-ended questions, not multiple choice. The low language abilities of the students we intervened with may have influenced children's abilities to answer these open-ended listening comprehension questions.

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The Importance of Teacher Beliefs and Fidelity of Implementation

All teachers, regardless of condition, tended to espouse instructional beliefs that aligned with current evidence-based practices (Hindman & Wasik, 2008), perhaps because these teachers were in the second year of a larger PD program with demonstrated efficacy for improving teacher and child outcomes (Landry et al., 2009). There were only three items on the teacher belief questionnaire for which the average score was slightly below agreement with evidence-based practice; the rather restricted range of these data made it difficult to assess whether teacher beliefs were reliably related to implementation. Nonetheless, the items that were less aligned with evidence-based practice suggested that teachers were less certain about whether preschool children (a) need to learn the meanings many of words to become good readers; (b) should be given hints or scaffolds when asked questions; and (c) should be asked difficult, cognitively challenging questions about books. It is interesting that teachers who believed that preschoolers should answer cognitively challenging questions during shared reading tended to implement the Tier 1 book-reading activities, which included several inferential or decontextualized questions,

with greater fidelity. These findings about specific items for which teacher beliefs deviated from the research base may be important areas to highlight and discuss when training teachers to use tiered vocabulary and listening comprehension instruction. Teachers may use more scaffolds and hints when they understand a social interactionist view of language development that requires adult modeling of language that is just one step above the child's current level (Chapman, 2000; Vygotsky, 1978). Likewise, if PD can explicitly show teachers the importance of asking both literal and inferential questions (e.g., Blewitt et al., 2009; van Kleeck et al., 2006), teachers may be more likely to push preschool conversations to a more challenging inferential level.

Overall, teachers implemented the Tier 1 activities well, scoring on average between moderate and high on the fidelity rating scale; however, Tier 2 implementation had lower fidelity of implementation. There may be a couple reasons why Tier 1 was easier for the teachers to implement. First, the Tier 1 protocol was a shared reading context, a teaching format that pre-K teachers are familiar with and are likely to use in their daily schedule (Dickinson & Porche, 2011) and that the teachers had received several hours of training on as part of their participation in the larger PD program (Landry et al., 2009). Second, a similar Tier 1 read-aloud protocol had been used with adequate fidelity in previous studies (see Denton et al., 2010; Solari & Gerber, 2008). Our Tier 1 shared reading was enhanced to include several embedded vocabulary discussions (i.e., child-friendly definitions, vocabulary-related questions) that go beyond typical pre-K read-aloud experiences (Hindman et al., 2008; Zucker et al., in press); nonetheless, the fact that teachers often conduct read-alouds is likely to have made it easier to implement Tier 1 as well as easier for students to engage in the activity and maintain appropriate classroom behavior. For at-risk students (ART2), there was a trend ($p = .065$) suggesting that the quality of Tier 1 curriculum implementation is an important factor for improving receptive target vocabulary. Because receptively identifying target vocabulary words requires only breadth of vocabulary knowledge (rather than depth), this might suggest that embedding vocabulary elaborations in Tier 1 shared reading supported this skill.

However, to improve ART2 students' depth of knowledge, as measured on the expressive vocabulary definitions measure, teachers' fidelity of implementing Tier 2 activities was a significant predictor ($p = .020$). There was also a trend suggesting that Tier 2 implementation was important to children's listening comprehension ($p = .073$). Yet the Tier 2 portion of the curriculum was more difficult for teachers to implement, with the average fidelity score between moderate and low. The small-group procedure was less familiar to teachers than the Tier 1 read-alouds because Tier 2 required engagement in extended, explicit vocabulary instruction through a series of book-related activities. This required not only an understanding of the curriculum but classroom management skills to manage a small-group activity with four students while all other students worked independently at learning centers. Even so, if the goal is to increase both breadth and depth of knowledge for at-risk students, it appears that explicit, intensive Tier 2 instruction is a critical factor to fully developing vocabulary knowledge.

Study Limitations

The design of this experimental study has limitations that must be taken into consideration. First, our sample was small given that randomization was done at the center level with only 39 teachers who were participating in a larger PD program. We do not know how these effects might generalize

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to other populations of teachers with less training or to other types of students (e.g., bilingual students, students with special needs). Although pre-K teachers enrolled in other state- or federally funded PD (e.g., Early Reading First) generally espouse evidence-based beliefs (Hindman & Wasik, 2008), it is possible that the beliefs and behaviors of the teachers in our comprehensive PD program differed substantially from those of other populations. Second, our pilot implementation was only 4 weeks long, so all results must be considered within the context of potential promise of evidence for the intervention. A longer implementation of the curriculum over an entire semester or academic year would allow for greater certainty of our findings. Third, lower fidelity to the Tier 2 curriculum indicates that in future studies further training and PD is needed to ensure that teachers are prepared to implement small-group activities, especially because the data indicate that Tier 2 curriculum adherence is a potentially important factor for child outcomes on the proximal measures of vocabulary and listening comprehension. Finally, we discussed previously several concerns about the appropriateness of some proximal assessments. Future studies should seek to develop more sensitive proximal outcome measures and should consider student learning outcomes in relation to other important student background variables (e.g., family income level) and teacher characteristics (e.g., global teaching quality).

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Practical Significance

The findings of this study have practical implications for pre-K tiered vocabulary instruction. First, through this pilot study we have demonstrated that it is possible for pre-K teachers to implement a tiered approach to explicit oral language instruction that includes intensive, daily Tier 2 small-group instruction. This is important given that recent preschool vocabulary research has focused predominantly on Tier 1 instruction (e.g., Neuman & Dwyer, 2011; Pollard-Durodola et al., 2011). As expected, teachers were more easily able to implement the Tier 1 read-aloud portion of the curriculum and had more difficulty with the Tier 2 small-group activities. Nonetheless, the promising relation between Tier 2 implementation and children's vocabulary and listening comprehension suggests that the promise of this explicit, small-group component warrants further improvements and study. For example, in future studies, or if used in RTI models, it may be important to concentrate in-class coaching on implementing and improving the quality of Tier 2 instruction while giving less training time to Tier 1 components that tended to be more readily implemented. Moreover, it will be important to study how this multitiered instruction could be situated within a larger RTI framework to ensure that children at risk for later language and reading difficulties are identified and provided with an appropriate duration of Tier 2 instruction before decisions are made regarding whether continued, modified, or additional, more intensive intervention (Tier 3) is needed.

The second finding regarding implications for practice is that we observed a large impact of the intervention on at-risk children's receptive target vocabulary skills, indicating that this type of tiered approach to vocabulary instruction may be an effective means of increasing vocabulary skills in students most at risk for later reading comprehension difficulties. It is possible that refinements to the Tier 2 instruction that included a more explicit, extended focus on comprehension would lead to immediate impacts in children's listening comprehension skills, an area that was not significantly improved with this intervention. Other curriculum refinements are likely to support implementation. For example, teacher feedback indicated that Tier 2 instruction might

have been easier to implement had the training first focused only on implementing Tier 1 instruction and then later added the Tier 2 small-group components. Likewise, teachers requested additional supports for English language learners to ensure that they could be given opportunities to catch up to their monolingual peers. Developing Talkers: Pre-K and other multitiered instructional models focused on oral language skills (e.g., Catts et al., 2011; Loftus et al., 2010; Pullen et al., 2010) deserve further study as potentially promising methods for tackling the vocabulary achievement gap in the earliest grades and for preventing reading comprehension difficulties before they arise in later elementary grades.

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APPENDIX A

Sample Developing
Talkers: Pre-K Lesson for the Text *The Pout-Pout Fish* (Diesen, 2008)

Tier 1: Read-Aloud		
	Before Reading	
Introduce book	This book is about Mr. Fish. He has a sad face all the time. So he calls himself a ''pout-pout fish.'' The other sea animals ask him why he is so sad and try to help Mr. Fish feel happier.	
Pose guiding question	After we finish reading we are going to talk about the book. There is one question I especially want you to think about as we read: *How do the other sea animals feel when Mr. Fish acts dreary and sad around them?*	
	During Reading	
Sample vocabulary elaboration and question	*Advice* means an idea of what to do. Ms. Clam gives pout-pout fish *advice* and tells him that he should be happy instead of sad. So, what did Ms. Clam give to pout-pout fish? → Scaffold if needed: Ms. Clam gave pout-pout fish some ad . . . (cloze)	
	After Reading	
Answer guiding question using scaffolding techniques	*How did the other sea animals feel when Mr. Fish acted dreary and sad around them?*	
Minimal Scaffold →Either/Or Question	*Moderate Scaffold →Cloze Prompt*	*Intense Scaffold Give Answer and Repeat*
Do you think they feel mad at Mr. Fish or do they want him to stop feeling sad?	Mr. Fish's friends don't like that he's always dreary and ss . . . (Child fills in ''sad.'') That's right, they want him to be happy and not be sad.	Mr. Fish's friends didn't want him to be sad. Say, ''They don't want him to be sad.'' (Child repeats simplified answer.)
Tier 2: Small-Group Activities		
Review book and guiding question	• What do you remember about this book? • *How did the other sea animals feel when Mr. Fish acted dreary and sad around them?*	
Sample vocabulary instruction using vocabulary picture card	• The word is *advice*. Say *advice* with me? (Children respond.) • This word was in our book. (Show page 4 and reread the sentence.) • Remember, *advice* means to give someone an idea of what to do. • (Show card.) Look at this picture of a teacher giving a student *advice*. • Tell me more about what the teacher in this picture might be doing. · Tell me more about what the teacher in this picture might be doing.	
Sample extended vocabulary activity	Discuss several picture cards of other people giving advice—child and mom mixing cake; mom talking with child about a book, mom or dad crossing street with child, teacher talking with 2–3 children about rules.	
Sample shuffle and review for all vocabulary	• (Shuffle all vocabulary cards.) What's the word that means to give an idea of what to do? (Children respond.) • (Show the front of vocabulary card.) Say *advice*. (Children respond.) · (Show the front of vocabulary card.) Say *advice*. (Children respond.)	

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APPENDIX B

Sample Fidelity Scoring

	Implementation of Curriculum Activities	*Procedures (3,2,1, 0)**	*Wording/ Script (3,2,1,0)**
Tier 1: Whole-Group Adherence	Before Reading Adherence		
	1. Introduce or review book (before reading)		
	2. Guiding comprehension question (before reading)		
	During Reading Adherence		
	3. Word 1: Vocabulary elaboration (definition and supportive sentence)		
	4. Word 1: Vocabulary questions (ask scripted question; scaffold as needed)		
	5. Word 2: Vocabulary elaboration (definition and supportive sentence)		
	6. Word 2: Vocabulary questions (ask scripted question; scaffold as needed)		
	7. Word 3: Vocabulary elaboration (definition and supportive sentence)		
	8. Word 3: Vocabulary questions (ask scripted question; scaffold as needed)		
	. . .		
	After Reading Adherence		
	15. Discuss guiding comprehension question (ask at least 2 students; scaffolding child's incorrect responses after reading)		
Tier 1: Global Teacher Quality Ratings	**16. The extent to which the teacher extended or elaborated on children's utterances** (e.g., C: *It's a dog*. T: *It's a dirty dog*.)**:** ☐ 4 = High; ☐ 3 = Somewhat high; ☐ 2 = Somewhat Low; ☐ 1 = Low		
	17. The extent which the teacher uses scaffolding anywhere in the lesson (minimal = either/or question to reduce choices; moderate = cloze procedure; elicit a response from child; intense = give answer, ask child to repeat)**:** ☐ 4 = High; ☐ 3 = Somewhat high; ☐ 2 = Somewhat Low; ☐ 1 = Low		
	18. Overall, the extent to which the teacher demonstrates sensitive, warm (caring, warm, listens to student, absence of harsh language or negativity) **interactions:** ☐ 4 = High; ☐ 3 = Somewhat high; ☐ 2 = Somewhat Low; ☐ 1 = Low		
	19. The extent to which the teacher maximized instructional time (i.e., all materials are ready for each activity; teacher appears organized and familiar with the lesson)**:** ☐ 4 = High; ☐ 3 = Somewhat high; ☐ 2 = Somewhat Low; ☐ 1 = Low		
	20. The extent to which the teacher used good expression, dramatic voicing or gestures (High) vs. (Low = monotone): ☐ 4 = High; ☐ 3 = Somewhat high; ☐ 2 = Somewhat Low; ☐ 1 = Low		

Note*. **3 = Always: All instructional components implemented with high fidelity (follows procedures for activity; closely follows wording in lesson and minimal changes or improvements are made); **2 = Some:** Some instructional components implemented with fidelity (follows some procedures; follows general wording or some changes or improvements are made); **1 = Rarely:** Several instructional components implemented with low fidelity (method was inconsistent with lesson procedures; wording differed greatly from scripted lesson or many changes or improvements are made); **0 = Not implemented.**

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Initial Validation of the Prekindergarten Classroom Observation Tool and Goal Setting System for Data-Based Coaching

April D. Crawford, Tricia A. Zucker, Jeffrey M. Williams, Vibhuti Bhavsar, and Susan H. Landry
University of Texas Health Science Center at Houston

Although coaching is a popular approach for enhancing the quality of Tier 1 instruction, limited research has addressed observational measures specifically designed to focus coaching on evidence-based practices. This study explains the development of the prekindergarten (pre-k) Classroom Observation Tool (COT) designed for use in a data-based coaching model. We examined psychometric characteristics of the COT and explored how coaches and teachers used the COT goal-setting system. The study included 193 coaches working with 3,909 pre-k teachers in a statewide professional development program. Classrooms served 3 and 4 year olds (n = 56,390) enrolled mostly in Title I, Head Start, and other need-based pre-k programs. Coaches used the COT during a 2-hr observation at the beginning of the academic year. Teachers collected progress-monitoring data on children's language, literacy, and math outcomes three times during the year. Results indicated a theoretically supported eight-factor structure of the COT across language, literacy, and math instructional domains. Overall interrater reliability among coaches was good (.75). Although correlations with an established teacher observation measure were small, significant positive relations between COT scores and children's literacy outcomes indicate promising predictive validity. Patterns of goal-setting behaviors indicate teachers and coaches set an average of 43.17 goals during the academic year, and coaches reported that 80.62% of goals were met. Both coaches and teachers reported the COT was a helpful measure for enhancing quality of Tier 1 instruction. Limitations of the current study and implications for research and data-based coaching efforts are discussed.

Keywords: coaching, instructional practices, preschool, professional development

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Accumulating evidence demonstrates that high-quality, Tier 1 preschool experiences lead to improved cognitive and academic preparedness for kindergarten (Burchinal, Vandergrift, Pianta, & Mashburn, 2010; Gormley & Phillips, 2003; Howes et al., 2008; Magnuson, Ruhm, & Waldfogel, 2007; Wong, Cook, Barnett, & Jung, 2008), with the benefits of quality programs extending well into adolescence and adulthood (Campbell, Ramey, Pungello, Sparling, & Miller-Johnson, 2002; Lazar, Darlington, Murray, Royce & Snipper, 1982; Nores, Belfield, & Barnett, 2005; Reynolds, Temple, Robertson, & Mann, 2002). Tier 1 instruction is the core curriculum delivered to all students within the general education classroom, rather than more specialized tiers of instruction delivered to targeted students within Response to Intervention (RTI) frameworks. Although these studies have prompted a consid-

April D. Crawford, Tricia A. Zucker, Jeffrey M. Williams, Vibhuti Bhavsar, and Susan H. Landry, Department of Pediatrics, Children's Learning Institute, University of Texas Health Science Center at Houston.

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Correspondence concerning this article should be addressed to April D. Crawford, Children's Learning Institute, University of Texas Health Science Center, 7000 Fannin Street, 1900, Houston, TX 77030. E-mail: april.crawford@uth.tmc.edu

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erable expansion in pre-k services (Barnett, Hustedt, Friedman, Boyd, & Ainsworth, 2007; Barnett et al., 2008), typical program quality is simply too low for children to realize the full benefits of early education experiences (Hamre & Pianta, 2005; Ramey, Landesman, & Stokes, 2009). More troubling is evidence showing that children with the greatest needs often attend schools of the lowest quality (Stipek & Hakuta, 2007).

Despite this evidence of the importance of high-quality preschool experiences for preventing later academic difficulties, limited research has focused on developing and validating teacher observation measures that identify teachers' use of evidence-based instructional and behavioral management practices. Moreover, most existing measures are designed for use by highly trained research staff, rather than coaches and other professionals who provide in-service professional development (PD). This article describes the development and validation of an observational assessment of evidence-based Tier 1 teaching practices, the Classroom Observation Tool (COT), designed for use by coaches working with prekindergarten (pre-k) teachers. For this initial validation study, 193 coaches working with 3,909 preschool teachers used the COT and its associated, technology-based, goal-setting system to observe teachers' classroom practices and set goals for improvement across 10 domains, including topics such as responsiveness, language input, literacy, and math instruction.

Conceptualizations of Quality Preschool Programs

Over time, conceptualizations of what counts as a high-quality preschool program has changed. Within the last decade, overly simplistic categorizations of instructional practices as either developmentally appropriate versus inappropriate have shifted to consider individual classroom characteristics and practices (Bracken & Fischel, 2006). Likewise, some researchers have moved from broadly conceptualizing global classroom quality (e.g., with tools such as the Early Childhood Environment Rating Scale–Revised [ECERS-R]; Harms, Clifford, & Cryer, 2005) to examine specific differences in instructional quality that are important for academic outcomes (e.g., the Early Language and Literacy Classroom Observation Toolkit [ELLCO]; Smith, Dickinson, Sangeorge, & Anastasopoulos, 2002). Recent studies show that the quality of teachers' interactions with students and instructional quality are the most important school-based influence on children's cognitive and academic skills (Frede, 1998; Nelson, 2003; Rivkin, Hanushek, & Kain, 2005; Rockoff, 2004), whereas structural or regulable program features such as degree requirements, smaller class sizes, and better adult–child ratios are not as closely linked to improved child outcomes (Early et al., 2007). Accumulated research on the quality of teacher–child interactions also allows researchers to identify minimum threshold levels for instructional quality necessary to ensure children arrive at kindergarten well prepared (Burchinal et al., 2010). These increasingly precise understandings of what constitutes a high-quality preschool experience have important implications for efforts to develop more effective pre-k teachers using coaching and other forms of in-service PD.

Shortcomings of Existing Assessments for Informing Professional Development

Many existing, validated approaches to evaluating and monitoring teachers' use of evidence-based instructional practices are not optimally designed for use within typical PD and coaching models. Using an assessment for a different purpose than it was originally designed is less effective because assessment findings are not easily translated into action plans (Earl, 2003; Wiliam, Lee, Harrison, & Black, 2004). More traditional PD approaches, such as principal or coach observation using field notes or local rubrics, are not validated and may be biased (Reddy, Fabiano, & Dudek, 2013). Other approaches ask teachers to report on their teaching practices using various questionnaires or other techniques; however, even well-conceived approaches to self-report have inconsistent relations with validated classroom observation measures (Bracken & Fischel, 2006). The few observational tools specifically designed for PD use in preschool classrooms (e.g., Shared Storybook Reading Innovation Configuration; Beauchat, Blamey, & Walpole, 2009) are not validated.

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This presents a great need to validate teacher observation measures designed specifically for use by coaches to increase teacher's use of evidence-based practices. Table A1 in Online Supplemental Materials describes several existing, recently used observational measures of Tier 1 pre-k classroom quality. Of these, the ECERS-R, ELLCO, and the Classroom Assessment and Scoring System (CLASS; Pianta, La Paro, & Hamre, 2008), are the most frequently used (Zaslow et al., 2009); in fact, the CLASS is now required in most Head Start programs (Cooper & Costsa, 2012). Some of these tools focus on the global classroom quality (ECERS-R, CLASS), whereas others listed in Supplemental Appendix Figure C1 target more specific instructional areas, but are restricted to language and literacy instruction (The Child/Home Environmental Language and Literacy Observation [CHELLO], Neuman, Koh, & Dwyer, 2008; ELLCO; Individualizing Student Instruction [ISI], Connor, Morrison, & Slominski, 2006; Observational Measure of Language and Literacy Instruction [OMLIT], Goodson, Layzer, Smith, & Rimdzius, 2006). A recent review by Kilday and Kinzie (2009) also identified observational measures that are restricted to mathematics instruction. The Teacher Behavior Rating Scales (TBRS; Landry, Crawford, Gunnewig, & Swank, 2001) is the only validated observational measure that has been used widely (e.g., Jackson et al., 2007) and that addresses both general classroom management and responsive teaching practices as well as a broad array of instructional practices including language, literacy, and mathematics instruction; however, the TBRS was designed for use by research staff.

The training time required for observational research measures is substantial and varies from 2 to 5 days, with additional reliability practice in classrooms or later coding of videotaped instruction (see Table A1 in Supplemental Online Appendix). When coaches or other education professionals with many leadership and training responsibilities use teacher observation tools, the instrument must be designed for ease of use and a reasonable training time while minimizing rater effects. Even in large-scale studies across 2,500 classrooms with stringent observational training procedures and trained research staff, rater effects are estimated to account for 4–14% of the variance in global observational rating scales (Pianta & Hamre, 2009). It is likely that rater effects are somewhat intensified when coaches are observers, given the inherent time limits on training these staff. Nonetheless, fair and unbiased teacher observation requires well-trained individuals to ensure reliability. In addition, observations should be collected multiple times and over several weeks to yield more reliable estimates (Hintze & Matthews, 2004).

There is consensus that the validity of teacher observation tools depends on whether the measure is centered on evidence-based instructional and behavior management practices that relate to a broad array of children's developmental and academic outcomes (National Association for the Education of Young Children [NAEYC] and National Association for the Early Childhood Specialists in State Departments of Education [NAECS/SDE], 2003; National Association of Secondary School Principals [NASSP], 2011). Designing valid observational measures requires recording the appropriate granularity of codes for the intended use. Observational assessments are typically operationalized as coding the frequency of individual behaviors or using a rating scale to derive a score (Bakeman & Quera, 2011). Some researchers also derive discrepancy scores that reveal the observed frequency compared with the ideal frequency of a behavior to help teachers understand which behaviors they should use relatively more and less often (Connor et al., 2006; Reddy et al., 2013). Each approach has advantages and disadvantages. Ratings are typically less time and labor intensive than behavioral codes because they rely on global judgments of important pedagogical dimensions, but behavioral codes may be easier to train observers to identify reliably because they are, by nature, tied to visible behaviors. Global ratings are less affected by the particular instructional activities observed on a given day than behavioral codes (Pianta & Hamre, 2009). Yet, a disadvantage of ratings scales is that they typically attend to several instructional or managerial components and may not precisely map on to specific instructional approaches in need of improvement.

To summarize, for observation tools to support instructional change they must yield reliable information that is explicit enough for teachers to understand precise evidence-based

practices they need to demonstrate in their classroom. In addition, valid measures for coaching must include a system for tracking progress over time so the effectiveness of coaching can be assessed and new coaching strategies can be used if teachers are not demonstrating these behaviors. The COT was designed to meet these requirements and to address the shortcomings identified by existing pre-k observational measures that were not designed for use within a data-based coaching framework.

Data-Based Coaching Within Professional Development Models

Although the growth of response to intervention (RTI) frameworks in early childhood is making universal child progress monitoring and individualized instruction more common (see Buysse & Peisner-Feinberg, 2009), the use of Tier 1 teacher-level observational assessments to individualize teacher trainings is less common. Yet the concept of individualized data-based coaching is the cornerstone of established coaching models (e.g., Denton, Swanson, & Mathes, 2007; Pianta, Mashburn, Downer, Hamre, & Justice, 2008). Data-based coaching is an approach that uses various sources of teacher- and child-level data to improve teaching quality and monitor teacher's progress in implementing new evidence-based practices. We conceptualize this type of coaching as ongoing, direct efforts by a trained expert (the coach) to support and reinforce classroom teachers' use of evidence-based instruction and behavior management practices that includes repeated cycles of (1) observation, (2) feedback and goal setting, (3) implementing teacher improvement plans alongside appropriate coaching strategies, and (4) reflection on goals met and adjustments needed. Evidence from experimental preschool studies validates the use of coaching as part of a larger PD approach to improve teaching quality, and in turn, children's achievements (e.g., Kontos, Howes, & Galinksy, 1996; Landry, Anthony, Swank, & Monseque-Bailey, 2009; Landry, Swank, Anthony, et al., 2006; Pianta, Mashburn, et al., 2008; Wasik, Bond, & Hindman, 2006).

Data Utilization Through Individualized Feedback and Support

Providing teachers with coaching is a potentially powerful method for instructional change because it is includes individualized feedback and support in teachers' own classrooms (Ball & Cohen, 1999). However, data utilization research shows that simply providing educators with observational data is not sufficient to change behavior; further steps must be taken to interpret the data and enact meaningful changes in response to data (Goren, 2012; Coburn & Turner, 2012). Coaching can be a mechanism for actually using the observational data that schools collect on evidence-based practices, rather than collecting data that is unused or underused. For example, coaches can help to establish stable organizational routines that include repeated cycles of observational data collection to assess needs, collaborative staff discussion and analysis of observations, and improvement planning (e.g., Sherer & Spillane, 2011).

Data Utilization Through Goal-Setting Systems

It is likely that coaches can more systematically collect and utilize observational data with technology-based observational data systems than traditional paper−pencil formats (cf. Landry, Anthony, et al., 2009). We use the term *goal-setting system* to refer to a technology-based approach for logging and tracking observational assessments of evidence-based instructional practices with features that can summarize observations of evidence-based practices over repeated visits, generate improvement plans/goal reports, organize action plans detailing how teachers will actually meet these goals, and track goals met over time. A synthesis of coaching studies indicates that coaching is generally less targeted on instructional change than desired (Sheridan, Edwards, Marvin, & Knoche, 2009), suggesting that a key component technology-based systems can require is an action plan that describes targeted, hands-on strategies the coach can use to support the teacher in reaching goals. For example, Neuman and Wright (2010) found their trained coaches spent a considerable amount of time engaged in observing, setting goals, providing feedback, and

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setting up the environment. Each of these coaching strategies fits within a model of data-driven coaching, but their coaches seldom used more direct, hands-on strategies such as modeling, coteaching, and lesson planning. They summarized: "Coaches appeared to guide rather than directly interact with teachers during lessons" (Neuman & Wright, 2010, p. 77). Technology-based goal-setting systems may encourage more "active" coaching that provides teachers contextualized support to implement new evidence-based practices.

Development of the Classroom Observation Tool for Coaches

Given the need for a classroom observational assessment that is specifically designed for coaches and integrated into a goal-setting system that encourages active coaching, we developed the Classroom Observation Tool (COT; Crawford et al., 2012). We used an iterative development process seeking feedback from coaches and teachers to design a tool that could (a) identify strengths and weaknesses in a broad array of specific instructional behaviors that research shows support children's outcomes, (b) minimize measurement challenges associated with observational research methods, and (c) be integrated into a technology-based system that can summarize and report observed teacher behaviors in ways that support specificity in feedback, goal setting, active coaching, and monitoring of growth. The COT was designed for use within a statewide PD program, the Texas School Ready (TSR!) program (for detailed description and history see Landry, Zucker, Solari, Crawford, & Williams, 2012).

The COT and goal-setting system comprise (a) a pre-COT 2-hr observation conducted by the coach at the beginning of the academic year; (b) technology that produces a COT report to provide teachers with feedback on observed evidence-based practices and to guide goal setting for improvement; and (c) technology that allows coaches to track progress (i.e., goals met), and to set new goals over time. Importantly, reports generated by the technology-based system link COT data and goals to relevant sections of state pre-k guidelines/standards, sample instructional activities for teachers, and descriptions of active coaching strategies to support specific goals.

Research Questions and Hypotheses

We explored two research questions in this study. First, is the COT a valid and reliable measure of teacher behaviors when used by coaches in a statewide pre-k PD program? Second, how do coaches and teachers utilize the COT data entry and reporting system to set goals and track progress during the academic year?

Regarding the first research question, we hypothesized that interrater reliability between coaches would be acceptable, although somewhat attenuated compared with levels in highly controlled research studies. We expected the structural validity of the COT (i.e., internal consistency and theorized factor structure) would be adequate because the COT was adapted from the most predictive items of validated research measure, the TBRS (Landry et al., 2001). We hypothesized that concurrent validity ratings by an independent observer using the TBRS would be positive, but potentially small because the observation occurred on a separate day. Nonetheless, one of the most important tests of the appropriateness of classroom observation tools is predictive validity when linked to child outcome data; we expected positive relations between COT scores and child progress-monitoring data assessing language, literacy, and math skills. For the second research question, we expected coaches and teachers would utilize the technology-based COT data system to set goals predominately in areas in which the teacher did not demonstrate these evidence-based behaviors at the baseline observation. Coaches were trained to use in-class coaching time to build teachers' skills in areas of relative weakness, but we also gave coaches discretion to target practices they had observed, yet needed improvement; therefore, it was possible that goal setting might focus on a combination of behaviors that had already been observed as well as new behaviors. We also hypothesized that coaches would report that teachers met the majority of goals set during the academic year because coaches were trained to continue supporting the teacher until the teacher demonstrated these evidence-based practices. Finally, we anticipated that coaches and teachers would report that the COT and goal-setting system is a useful observational tool because it was devel-

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oped with input from mentors, teachers, and experts in coaching.

Method

Participants

Data for this study comes from the TSR! Project, a statewide PD program administered by the State Center for Early Childhood Development at the Children's Learning Institute (CLI), a part of the University of Texas Health Science Center Houston. These data were collected primarily during the 2010–2011 school year and represent a broad range of urban and rural low-income preschool classrooms across 44 community partnerships. The primary sample used to explore the psychometric properties of the COT consists of data collected by 193 coaches working with 3,909 preschool teachers in Head Start (n = 689), center-based child care (n = 635), public school (n = 2,568), and unspecified programs (n = 17). There was diversity in language of instruction, with 62.84% classrooms providing instruction in English, 30.84% of classrooms using bilingual (Spanish/English) instruction, and 6.32% of classrooms unreported.

Using a gradual release approach, the full PD program includes 2 years of comprehensive PD, followed by a third year of reduced support. Teachers in this sample were enrolled in all stages of the program: 17% were in their first year of participation, 48% were in Year 2, and 35% were in Year 3. For the first 2 years of the project, teachers receive biweekly coursework featuring web-based content, child progress-monitoring assessments, a state approved curriculum for their classroom, supplemental curriculum resources, and 8 months of in-class coaching support. Year 1 teachers receive 4 hr per month of coaching, and this is reduced to 2 hr per month in Year 2 and 1 hr per month in Year 3. In the third year, teachers do not attend courses, but continue using child progress-monitoring assessments.

Child progress-monitoring data was available for approximately 66% of children (n = 58,903) in these classrooms. Routine child progress monitoring at Tier 1 is a requirement of the TSR! project, and the collection of these data, in this particular year, was contracted to three educational testing vendors. Absent a unique child identifier to link data between testing vendors and CLI, matching procedures requiring a common school name, teacher name, child first and last name, and child birth date were performed. Using these criteria we were able to positively identify 56,390 children. Children in this sample range in age from 2.5 to 5.5 years of age, with an average age of 4.4 years at the beginning of the school year. Children's ethnicity varied as follows: 10% White, 7% Black, 79% Hispanic/Latino, and 4% other. These data were collected by teachers three times during the year, with the majority of assessments occurring in October, January, and April.

Two subsamples were recruited from the larger PD program to examine COT psychometric properties that could not be collected on the full sample; see the subsample flowchart in the Supplemental Online Appendix B1). First, to examine interrater agreement in spring of 2010, a COT assessment was conducted in a subsample of 47 classrooms by the teacher's coach and another coach within their community. Second, to examine concurrent validity, a subsample of eight communities, representing diversity in population density and predominant spoken language, were chosen for additional observations using the TBRS. From these communities, a subsample of 168 teachers was randomly selected for observation in the 2010–2011 school year. Of these 168 teachers, three lacked the unique identifier required to link TBRS with our COT and participant data. The remaining 165 pre-k teachers were distributed across program type with 16% (n = 27) of teachers in Head Start, 18% (n = 29) in center-based child care, 57% (n = 94) in public school classrooms, and 9% unreported (n = 15). The majority of teachers in this subsample were in their second year of participation in the program (n = 96), followed by Year 1 teachers (n = 44), some in Year 3 (n = 10), and 15 unreported. Observers recorded the balance of English and Spanish spoken by teachers during the observation period indicating that 45% of teachers spoke only English, 23% spoke mostly English and some Spanish, 28% spoke Spanish more than half the time, and 4% of these data were missing.

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Measures and Data Collection Procedures

COT. The COT indicates the presence/absence of 131 specific teacher behaviors representing evidence-based instructional and behavior management practices. Each item includes a short statement about evidence-based teacher behaviors and strategies that, when combined, are expected to produce a high-quality, comprehensive learning experience for preschoolers. The COT is divided into 10 domains described in Table 1, with an emphasis on language, literacy, and early math. Within most domains, the COT contains subdomains such as core concepts (i.e., behaviors to support child skills), strategies and activities (e.g., instructional methods), and instructional contexts (e.g., small- or whole-group); see sample items in Online Appendix, Figure C1). Each item is marked as observed or not observed. The presence of the behavior is marked regardless of the quality or consistency of the behavior.

As stated, the COT was designed for use within a data-based coaching model that relies on multiple data sources including: the COT, classroom environment quality ratings, videotaped instructional playback and reflection, and

Table 1
Classroom Observation Tool Domains, Description, and Subdomains

Domains	Domains description	Subdomains (items)
Classroom management	Sets clear expectations through established rules and routines and encourages children to participate in classroom management activities.	None (2)
Social and emotional	Responds promptly and sensitively to children's needs and provides guidance for children to regulate their behavior in problem-solving situations.	None (6)
Centers	Encourages children to follow routines for independent center activities, models activities before transitioning to centers, and provides scaffolding during centers.	Routines (3); Language Facilitation (2); Theme (1)
Oral language	Provides rich language input in everyday activities, directly teaches vocabulary words, and uses a variety of strategies to elicit language from children.	Builds Understanding (7); Eliciting (6); Vocabulary (11)
Read alouds	Uses a variety of strategies to support comprehension (literal and inferential) and encourage discussion about a book read aloud.	Before (7); During (7); After (6); Extension (3)
Phonological awareness	Engages children in phonological awareness activities (e.g., rhyming, alliteration sentence segmenting) using a variety of approaches (e.g., manipulatives, songs).	Core Concepts (7); Strategies (3); Instructional Context (3)
Letter knowledge	Promotes print and letter knowledge (e.g., letter names, sounds, capitalization) using a variety of approaches (e.g., environmental print, letter manipulatives, name games).	Core Concepts (4); Activities (4); Strategies (5); Instructional Context (4)
Print concepts	Teachers print concepts (e.g., text contains letters and words, directionality, punctuation) using various texts and approaches.	Core Concepts (4); Strategies (2); Instructional Context (3)
Writing	Models the writing process (e.g., sharing ideas to compose a message) and supports children's early writing attempts (e.g., journals for drawing and writing, recording child's dictation).	Core Concepts (5); Activities (4); Strategies (6); Instructional Context (4)
Mathematics	Uses a variety of activities and strategies (e.g., manipulatives, games) to build understanding of mathematical concepts (e.g., counting, patterning).	Core Concepts (5); Strategies (4); Instructional Context (3)

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individual child progress-monitoring data. This version of the COT intentionally devoted less attention to quality of classroom management and environmental supports for two reasons. First, like Neuman and Wright (2010), in previous years we observed that our coaches were inclined to focus on improving the classroom environment and classroom management rather than on instructional practices. Second, our coaches utilize another instrument three times per year, the Classroom Environment Checklist, to assess these foundational aspects of classroom practice.

COT development process. Several steps were taken to develop the COT including a review of the literature on evidence-based teaching practices and an examination of the most discriminant items from the TBRS. More specifically, we looked at data from a previous study (Landry, Swank, Anthony, & Assel, 2011) to identify teacher behaviors from the TBRS with two or more significant correlations $> .20$ with standardized child language and literacy measures; these behaviors were translated into COT items that coaches and teachers could put into action as goals. After developing and field testing the COT items with a small convenience sample, we created a larger COT system for coaches to upload data and track goals over time. The online monitoring system includes (1) a system to enter baseline COT scores; (2) a printable COT report tool that produces a summary of the teacher's observed behaviors; (3) fields to select COT items set as goals (i.e., Goal Set) and to write "action plans" that identify specific steps the teacher will take to improve on his or her own and steps that the coach will take to support the teacher (e.g., modeling, coteaching); (4) a printable Short Term Goal Report (STGR) that summarizes the action plan and automatically links the specific goal to relevant pre-k guidelines, suggested activities, and coaching strategies; and (5) a system to continually track and revise goal setting throughout the academic year, including tracking progress by selecting Goals Met and writing new action plans for new goals or goals that were retained. Screenshots of the goal-setting system user interface are provided in Supplemental Online Appendix, Figures C1–C3. Once goals are agreed to, they are recorded as "Goal Set" in the online system. Then, after the next coaching session, the teacher and coach reflect on progress and record whether each goal was met (i.e., observed by coach) or if it should be retained as a current goal. At the conclusion of the academic year, all teachers and coaches were e-mailed an anonymous web-based survey to give research staff feedback on the usability and utility of the COT. All survey items were rated on a 5-point Likert scale (e.g., "How useful was the initial COT observation for helping you establish goals with your teachers?" 1, *not helpful at all* to *5,* very helpful). One e-mail attempt was sent resulting in response rates of 80% and 24% for coaches and teachers, respectively.

COT training. Coaches received face-to-face training on scoring the COT and using the online goal setting system approximately two weeks before collecting baseline data. Training occurred in large-groups including approximately 65 coaches and three trainers. Because of demands of other training topics, only about 4 hr of training was spent explaining the domains of the COT and the meaning of specific items. Training on scoring included viewing and discussing brief video exemplars representing a portion of COT indicators, followed by viewing and coding additional video segments as independent practice. After independent practice, trainers revealed the master codes for that video and provided feedback to the group on discrepancies. We did not require coaches to demonstrate reliability during this initial utilization of the COT.

Approximately 14 hr of training was devoted in subsequent days to the process of using COT data to inform coaching. This training included demonstration and practice using the online goal-setting system, practice generating STGRs, practice tracking and reporting progress toward goals over time, and role play on providing teachers with feedback on COT observation data. Although coaches were free to individualize their support to teachers in the manner they deemed most appropriate, they were given these guidelines (a) select a manageable number of goals (e.g., 3–7 per session); (b) prioritize coaching supports for items/behaviors not observed at the COT baseline observation; (c) choose groups of items that work well together (e.g., increase children's letter knowledge item with a context/activity item such as shared writing); (d) consider aligning

goals with current PD coursework topics; (e) match goal setting with needs indicated by child progress-monitoring data, and (f) provide more goals to teachers in their second and third years of the program because of the longer time between coaching visits compared with first year teachers, who are coached twice a month.

In addition to face-to-face COT training, coaches received ongoing support from a site coordinator and regional project manager during the year. Coordinators held monthly supervision meetings with the coaching staff to discuss COT system challenges as well as those related to child progress monitoring, course facilitation, and mentoring strategies. Coaches also received individualized in-class support by their site coordinator on a monthly basis to support fidelity of implementation.

COT system data collection. Coaches collected baseline COT data in September for Year 1 teachers and in October for Year 2 and Year 3 teachers. Observations were between 2 and 2.5 hr long and occurred during the period of the day when cognitive instruction was most likely to occur. Approximately 4% of the original 3,909 teachers exited the PD program sometime after their baseline COT observation; therefore, goal-setting behaviors were only examined for 3,757 teachers. The data on goals set and goals met was collected over an 8-month period during routine in-class coaching visits using the STGR web-based forms. Coaches worked collaboratively with teachers for approximately 15 min at the end of each coaching visit to reevaluate COT goals set during the previous visit and select new goals, as needed. Goals are generally considered met once the coach observes the target behavior, although occasionally coaches based completion on artifacts in the classroom coupled with supporting discussion (e.g., teacher reflects with coach on writing instruction by critiquing an interactive writing sample). All coaches were provided with netbook computers. Coaches had the option to record COT data electronically while in the classroom if Internet access was available or to use a paper-and-pencil version of the COT in class and then update the database when they returned to the office.

TBRS. The TBRS (Landry et al., 2001) is a validated observation tool comprised of eight behavioral rating subscales that capture the quantity and quality of instructional practice and teaching behaviors in the following areas: General Teaching and Management, Centers, Oral Language, Read Alouds, Phonological Awareness, Print and Letter Knowledge, Writing, and Mathematics. Most TBRS items consist of independent ratings of quantity and quality, with quantity scored on a 3-point scale (*rare, sometimes, often*), and quality scored on a 4-point scale (*low, medium low, medium high, high*). In previous studies, generalizability coefficients are high across scales, ranging from .80 to .98, indicating good interrater agreement. Internal consistency for the TBRS is also high, .96 for the total score. Evidence of validity has also been seen when examining relations between TBRS scores and children's scores on standardized assessments with significant correlations ranging from .60 to .63 with the Preschool Language Scale-4 (Zimmerman, Steiner, & Pond, 2002), from .25 to .63 with the Expressive Vocabulary Test (Brownell, 2000), and from .36 to .62 with the Woodcock–Johnson III (Woodcock, McGrew, & Mather, 2001; see also Assel, Landry, & Swank, 2008).

TBRS procedures. TBRS data was collected by research staff who received approximately 35–40 hr of training by doctoral-level staff and expert coders. Training consisted of a 2-day overview of the instrument along with discussion, video demonstration, and guided practice to ensure rating calibration. Trainees independently scored four video-recorded classroom observations and received feedback from expert coders. Observers were considered reliable when agreement within one rank of master coders was achieved across all subscales. To minimize coder drift, observers completed at least one reliability observation each month and attended bimonthly meetings to address questions. A majority of the fall TBRS observations were conducted in October. Spring observations occurred across a longer time frame, with most conducted in March. TBRS observations were 2 to 2.5 hr, occurring during times when cognitive readiness activities were scheduled and typically including whole-group instruction and center time.

Child progress-monitoring measure. As part of the larger PD program, teachers were trained to use a Tier 1 progress-monitoring measure called the CIRCLE- Phonological Awareness Language and Literacy Screener plus Math (CPALLS+; Landry, Swank, Assel, & King,

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2009), which is available in English and Spanish. The measure and integrated online data entry system is designed to quickly (20–30 min per child) screen children across important skills in language, literacy, and math. Subtests include rapid vocabulary naming (i.e., raw number of correctly named pictures in 60 s), rapid letter naming (i.e., raw number of uppercase and lowercase correct in random sequence in 60 s), phonological awareness (43 untimed items measuring listening, rhyming, alliteration, sentence segmenting, and syllabication), and math (26 untimed items including counting, number and shape identification, and operations). Reliability and validity of CPALLS+ has been examined with several thousand preschoolers (Landry, Swank, et al., 2009) and demonstrates sensitivity to change over time and concurrent validity with standardized measures: $r = .76$ for letter naming and Test of Preschool Early Literacy (TOPEL; Lonigan, Wagner, Torgesen & Rashotte, 2007); $r = .59$ for vocabulary and Expressive One Word Picture Vocabulary Test (EOWPVT; Brownell, 2001); and rs = .24–.47 for phonological awareness and TOPEL.

CPALLS+ procedures. All teachers received a netbook and license for the CPALLS+ assessment software through one of three vendors. Training and technical support was available to teachers through their vendor. Online data reports are immediately available to teachers with suggested ability groupings and sample instructional activities. Coaches were trained to assist teachers with data interpretation and lesson planning linked to progress-monitoring results. Data was collected by teachers at the beginning, middle, and end of year—approximately October, January, and April.

Results

The results section first examines the psychometric properties of this pilot version of the COT, including the extent to which variability in COT scores are a function of coach and teacher level characteristics and the extent to which the underlying factor structure conforms to our theoretically constructed domains of instruction. Next, we examine how baseline teaching skills relate to child outcomes. Finally, we describe coaches' and teacher's goal-setting practices to better understand how COT data was utilized at a more applied level.

Psychometric Properties of the COT

Reliability of the COT. To assess reliability, we examined both interrater reliability and internal consistency. For interrater reliability, we used data from a subsample (see Supplemental Online Appendix B, Figure B1) in which 47 teachers were rated by multiple coaches. We conducted a generalizability analysis (Brennan, 1983; Cronbach, Ikeda, & Avner, 1964), in which variability in the COT was partitioned into teacher variability and error[1] in order to estimate the intraclass correlation coefficient (ICC) related to teacher variability. The interrater reliability across all COT domains was good (.75; Cicchetti, 1994), but examination of the reliabilities within domains revealed a more complex picture. Interrater reliability was poor for Social and Emotional Development (.24) and Classroom Management (.34), which is likely because these domains had as few as two items. For the rest of the domains with more items, interrater reliabilities were higher and ranged from fair to good (.45–.81). We also examined internal consistency in the data from the present study for all domains except Social and Emotional Development and Classroom Management, for which there were too few items. Cronbach alphas were good (.80–.85; Cicchetti, 1994), except for Centers and Oral Language Use, with fair alphas (.72 and .76, respectively).

Dimensionality of the COT. We first examined dimensionality of the items both within and across the 10 theoretical COT domains; descriptive statistics are shown in Table 2. Correlations among COT subdomains ranged from .13 to .64 (see Supplemental Online Table D1). ICCs of the 29 COT subdomain scores ranged from .21 to .37 ($M = .29$), indicating that coaches accounted for 22% to 37% of the variance in teacher ratings. Therefore, a multilevel exploratory factor analysis (EFA) was conducted to examine the dimensionality of the COT domain scores at the level of both coaches and teachers. Factor analyses were conducted using Mplus v. 7 (Muthén & Muthén, 2012).

We first examined the within-level eigenvalues to determine how many factors should

[1] An error in data collection resulted in the loss of the rater identification so variance due to the rater could not be modeled directly.

Table 2
*Descriptive Statistics for COT Initial Observation Domains (*n *= 3,876)*

Domain	Subdomain	*M* (*SD*)	Range
1. Classroom management		1.47 (0.68)	0–2
2. Social and emotional development		4.03 (1.75)	0–6
3. Centers	Center routines	1.47 (1.1)	0–3
	Language development	0.52 (0.69)	0–2
	Theme connections	0.41 (0.49)	0–1
4. Oral language use	Builds understanding and meaning	2.21 (2.06)	0–7
	Elicits language	2.8 (1.84)	0–6
	Planned vocabulary instruction	1.79 (2.25)	0–11
5. Read alouds	After reading	1.12 (1.57)	0–6
	Before reading	1.95 (2)	0–7
	During reading	2.45 (2.19)	0–7
	Read alouds extensions	0.32 (0.65)	0–3
6. Phonological awareness	Core concepts	1.33 (1.44)	0–7
	Context	0.41 (0.76)	0–3
	Strategies and supports	0.46 (0.8)	0–3
7. Letter knowledge	Activities	0.88 (1.12)	0–4
	Core concepts	1.89 (1.53)	0–4
	Context	0.81 (1.04)	0–4
	Strategies	0.7 (1.27)	0–5
8. Print concepts	Core concepts	0.48 (1.02)	0–4
	Context	0.42 (0.76)	0–3
	Strategies and supports	0.46 (0.68)	0–2
9. Written expression	Activities	0.79 (1.02)	0–4
	Context	0.79 (1.04)	0–4
	Concepts about print	1.03 (1.52)	0–5
	Strategies	1.14 (1.56)	0–6
10. Mathematics	Core concepts	1.21 (1.18)	0–5
	Context	0.49 (0.83)	0–3
	Strategies and supports	1 (1.19)	0–4

Note. COT = Classroom Observation Tool.

be retained. There were eight eigenvalues greater than 1.0 (6.7, 2.2, 2.0, 4.6, 1.5, 1.3, 1.2, 1.2), and an examination of the scree plot suggested an eight-factor solution, which corresponded to the number of content-specific or instructional domains measured by the COT. More specifically, examination of the factor loadings revealed that although all of the content-specific variables (i.e., Domains 3–10 of COT for language, literacy, and math) loaded clearly on the factor of their specific instructional domain (within-domain loadings = .41–.86; cross-domain loadings = .00–.16), the loadings for the first two more global domains (Classroom Management and Social-Emotional) were generally low, with only two that exceeded .30. In addition, these variables had multiple cross-loadings, which was expected because behaviors such as organized routines and a responsive style should apply to any instructional domain. Therefore, in the interest of parsimony and ease of interpretation, we removed the Classroom Management and Social-Emotional variables from the analysis and reran the EFA with only the content-specific variables.

The EFA with only the instructional or content-specific variables (language, literacy, and math) similarly indicated a within-level solution with eight factors (eigenvalues $> 1.0 =$ 6.4, 2.2, 1.9, 1.6, 1.5, 1.3, 1.2, 1.2). Examination of the factor loadings was consistent with the previous analysis, with moderate-to-high within-domain loadings (.40–.86; $M = .65$) and low cross-domain loadings (.00–.16). Correlations between the eight factor scores ranged from small to moderate (.16–.48). The fit of the model at the within level was very good ($SRMR_{within} = .018$), given that standardized root mean square residual (SRMR) values less than .08 indicate a good-fitting model (Hu & Bentler, 1999).

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The EFA of the of the between-level variability in the content-specific variables demonstrated clear unidimensionality (eigenvalues > 1.0 = 20.5, 1.2). Factor loadings on the first factor ranged from .60 to .92, whereas loadings on the second factor were generally small to moderate (.00–.93; M = .26) and formed no consistent pattern. In addition, the fit of the one-factor between-level model was good ($SRMR_{between}$ = .077). Therefore, in the interest of interpretability and parsimony, the one-factor solution was deemed the most appropriate for the data.

Concurrent validity of the COT. Correlations between the pretest COT global scores and the COT content-specific factor scores (hereafter, COT scores) with TBRS scores (descriptives in Supplemental Online Appendix B, Figure B1) were small but generally in the positive direction (rs = −0.07 to .21; see Online Appendix, Figure C3), even when observations for COT and TBRS were conducted on separate dates. Several expected relations between oral language (r = .17), literacy (e.g., phonological awareness r = .23), and math (r = .19) constructs across the two measures were significant (p < .05).

Predictive validity of the COT. To examine the predictive validity of the COT domains, we used latent growth models to assess the relation between the COT scores and children's growth on the teacher-administered, progress-monitoring measures. Because our focus was on the classroom-level COT variables, we created classroom averages for each of the four progress-monitoring measures (i.e., letter knowledge, phonological awareness, vocabulary, and math) at each wave of assessment (see means in Table 3). Growth was modeled as a function of wave (beginning-, middle-, and end-of-year), centered at the last wave of assessment.

Results for the moderation of growth rates by COT scores revealed several findings (see Table 4 for a summary). For children assessed in English, growth in CPALLS+ letter knowledge was positively related to teachers' COT scores on the Letter Knowledge, Print Concepts, Writing, and Phonological Awareness domains. In other words, higher scores on these domains, as rated by a coach at the beginning of the year, were associated with increased growth on the classroom average of children's letter knowledge. In addition, growth in classrooms' phonological awareness scores was moderated by teachers' COT scores on Phonological Awareness, Centers, Print Concepts, Oral Language Use, Letter Knowledge, Writing, Read Alouds, and Mathematics. There was no significant moderation of classroom growth for CPALLS+ vocabulary or math outcomes assessed in English.

For children assessed in Spanish (enrolled in bilingual instructional programs), classrooms' average growth on CPALLS+ letter knowledge was moderated by the COT Letter Knowledge and Phonological Awareness, and Read Alouds scores. Growth in Spanish vocabulary was moderated by teachers' score on COT Read Alouds, but there was not significant moderation of classroom growth for phonological or math outcomes assessed in Spanish. Finally, most estimates were positive, indicating increased growth relating to higher scores on the COT.

COT Data Utilization by Coaches

General COT goal-setting patterns. Across the 3,752 teachers who had both a baseline COT observation and at least one goal set, coaches set an average of 43.17 goals (SD = 30.0) per year for a given teacher. Yet there was considerable variability in the volume of goal setting as shown by large standard deviations; see descriptive statistics in the left side of Table 5. On average coaches set more goals with teachers who had participated in the professional development program for a longer period of time, with 38.22 (SD = 30.87), 44.48 (SD = 29.17), and 47.13 (SD = 31.29) goals having been set for teachers in Year 1, 2, and 3, respectively. The goals set included all global and instructional domains on the COT with the highest number of goals set for Read Alouds (M = 9.54) and Oral Language (M = 8.02), two areas that also had the largest number of items available for goal setting. Relatively fewer content-specific goals were set for Print Concepts (M = 2.12) and Mathematics (M = 3.24).

Because there were different numbers of items across domains, we also wanted to examine the relative focus by the coaches after accounting for the number of opportunities for goal setting. To that end, we divided the total number of goals set (total of "Yes" columns in Table 5) for each domain by the number of items within that domain to get an index of

Table 3
Descriptive Statistics for Instructional Behaviors and Child Progress Monitoring

	Instructional behaviors		
	Pretest (n = 168)		
	M	*SD*	Range
TBRS			
General teaching/mngmt.	2.49	0.42	1.6–3.4
Centers	2.58	0.54	1.6–4.0
Oral language	2.67	0.54	1.6–3.9
Read alouds	2.31	0.63	1.0–3.9
Phonological awareness	1.32	0.36	1.0–3.1
Print and letter	2.42	0.61	1.1–4.0
Writing	2.24	0.70	1.0–4.0
Mathematics	2.21	0.69	1.0–3.7

	Progress monitoring					
	Pretest (n = 41,337)		Midyear (n = 44,036)		Posttest (n = 43,702)	
	M	*SD*	*M*	*SD*	*M*	*SD*
English CPALLS+						
Vocabulary fluency	15.48	7.66	18.10	7.74	20.84	8.35
Letter knowledge	10.82	12.09	17.67	14.42	24.28	14.92
Phonological awareness	20.84	9.23	27.33	9.48	32.23	9.23
Early mathematics	16.21	6.49	20.10	6.02	22.77	5.27

	Progress monitoring					
	Pretest (n = 13,839)		Midyear (n = 14,867)		Posttest (n = 14,673)	
	M	*SD*	*M*	*SD*	*M*	*SD*
Spanish CPALLS+						
Vocabulary fluency	9.39	6.00	15.44	6.91	17.84	9.07
Letter knowledge	5.16	7.18	14.26	12.02	23.66	14.18
Phonological awareness	16.63	7.24	23.70	7.48	28.86	7.21
Early mathematics	14.28	6.37	19.71	5.91	23.06	4.94

Note. TBRS = Teacher Behavior Rating Scale; Mngmt. = Classroom Management; C-PALLS+ = CIRCLE Phonological Awareness Language and Literacy Screening Tool.

goals set per item. We then divided these values by the total of these adjusted totals (11,831), which showed that goals were set at an approximately equal rate across domains (7.0% and 13.1%, on Social Emotional and Read Aloud goals, respectively).

Relation between baseline COT and goals set. To examine coaches' goal setting in relation to the behaviors that they did/did not observe during the baseline COT observation, we merged the initial observations (observed: Yes/No) with the goal-setting behavior for every item (goal set: Yes/No), which resulted a 2 × 2 matrix for each item. Our primary interest was the differences in goal setting when the baseline COT was observed versus not-observed (see right side of Table 5). As stated, coaches were trained to primarily set goals around COT behaviors that were not observed at baseline, which was reflected in the data: if a COT behavior was observed at baseline (observed = Yes), goals were set around this behavior relatively infrequently (range = 10.15%–16.24%; M = 13.54%). In contrast, if the COT behavior was not observed (observed = No), a goal was set around this behavior 37.83% of the time. Similarly, 86.46% of goals set (Goal set = Yes) were on behaviors that had not been observed at baseline.

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Table 4
Estimates for Moderated Growth by COT Score

Dependent variable CPALLS+ average score	Independent variable factor score	English			Spanish		
		Estimate	*df*	*t* value	Estimate	*df*	*t* value
Vocabulary fluency	Classroom management	0.03	4163	0.41	0.04	1033	0.35
	Social and emotional	0.01	2167	0.18	0.09	701	0.69
	Centers	−0.01	4678	−0.17	−0.01	1198	−0.12
	Oral language	0.06	3795	0.85	0.21	1408	1.73
	Read alouds	0.13	3886	1.71	0.37	776	3.00*
	Phonological awareness	0.13	6815	1.80	0.02	2102	0.13
	Letter knowledge	0.12	6652	1.61	0.01	2151	0.07
	Print concepts	0.13	6211	1.79	0.19	1927	1.57
	Writing	0.05	6416	0.70	0.19	1603	1.58
	Mathematics	0.02	6188	0.24	−0.13	1834	−1.11
Letter knowledge	Classroom management	0.08	4357	0.70	−0.13	2950	−0.80
	Social and emotional	0.09	2389	0.80	0.19	2961	1.19
	Centers	0.03	4873	0.30	0.07	2950	0.43
	Oral language	0.21	4079	1.85	0.25	2959	1.57
	Read alouds	0.19	4228	1.71	0.21	2948	1.35
	Phonological awareness	0.39	7008	3.65*	0.40	2956	2.53*
	Letter knowledge	0.32	6841	2.96*	0.32	2959	2.02*
	Print concepts	0.43	6413	3.99*	0.29	2957	1.80
	Writing	0.21	6593	1.96*	0.25	2953	1.60
	Mathematics	0.12	6425	1.11	−0.08	2953	−0.53
Phonological awareness	Classroom management	0.01	5080	0.16	−0.08	1062	−0.64
	Social and emotional	0.15	2829	1.64	0.24	655	1.87
	Centers	0.18	5649	2.03*	0.13	1265	1.10
	Oral language	0.30	4742	3.39*	0.11	1369	0.91
	Read alouds	0.18	4915	2.06*	0.13	989	1.02
	Phonological awareness	0.27	7277	3.12*	0.05	2098	0.46
	Letter knowledge	0.36	7137	4.16*	0.08	2233	0.69
	Print concepts	0.27	6779	3.16*	0.10	1906	0.89
	Writing	0.19	7012	2.16*	0.09	1679	0.78
	Mathematics	0.22	6850	2.60*	−0.06	1945	−0.50
Early mathematics	Classroom management	−0.06	4000	−1.28	−0.17	454	−1.50
	Social and emotional	−0.03	2322	−0.54	0.08	280	0.69
	Centers	−0.00	4494	−0.04	−0.07	508	−0.60
	Oral language	0.02	3837	0.33	−0.11	404	−0.93
	Read alouds	0.02	3871	0.50	−0.04	314	−0.33
	Phonological awareness	0.08	6749	1.73	−0.07	738	−0.59
	Letter knowledge	0.06	6623	1.32	−0.17	914	−1.48
	Print concepts	0.04	6216	0.89	−0.03	776	−0.23
	Writing	0.03	6249	0.58	−0.11	584	−0.99
	Mathematics	0.00	6040	0.03	−0.20	842	−1.84

Note. COT = Classroom Observation Tool; *df* = degrees of freedom; CPALLS+ = CIRCLE Phonological Awareness Language and Literacy Screening Tool.
* $p \leq .05$.

However, there was considerable variability across domains in how goals were set. If every behavior that was not observed at baseline presented an opportunity for the coach, then coaches took advantage of those opportunities differentially by domain (see Table 5). For example, although the Classroom Management domain had only two items associated with it, coaches set a goal around these items 62.36% of the time that they were not observed during the baseline observation. By contrast, coaches took advantage of only 24.59% of the opportunities in the Print Concepts domain and only 29.52% of the opportunities in the Mathematics domain.

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Table 5
Descriptive Statistics for Goals Set on the COT

Goals set				Pre-COT observed: Yes					Pre-COT observed: No				
				Goal set					Goal set				
				Total	Yes		No		Total	Yes		No	
COT domain	Number possible	*M* (*SD*)	Range	*N*	*N*	%	*N*	%	*N*	*N*	%	*N*	%
1. Classroom management goal	2	0.59 (0.80)	0–2	5,708	860	15.07	4,848	84.93	2,152	1,342	62.36	810	37.64
2. Social and emotional	6	1.33 (2.00)	0–6	15,611	1,805	11.56	13,806	88.44	7,969	3,192	40.06	4,777	59.94
3. Centers goal	6	2.34 (2.12)	0–6	9,329	1,333	14.29	7,996	85.71	14,251	7,463	52.37	6,788	47.63
4. Oral language goal	24	8.02 (6.85)	0–24	26,368	3,456	13.11	22,912	86.89	67,952	26,642	39.21	41,310	60.79
5. Read alouds goal	23	9.54 (7.12)	0–23	22,660	3,468	15.30	19,192	84.70	67,730	32,310	47.70	35,420	52.30
6. Phonological awareness goal	13	4.65 (4.10)	0–13	8,540	1,387	16.24	7,153	83.76	42,550	16,062	37.75	26,488	62.25
7. Letter knowledge goal	17	4.78 (5.15)	0–17	16,563	2,050	12.38	14,513	87.62	50,247	15,893	31.63	34,354	68.37
8. Print concepts goal	0	2.12 (2.96)	0–9	5,242	532	10.15	4,710	89.85	30,128	7,407	24.59	22,721	75.41
9. Writing goal	19	6.56 (5.99)	0–19	14,527	2,066	14.22	12,461	85.78	60,143	22,548	37.49	37,595	62.51
10. Mathematics goal	12	3.24 (3.59)	0–12	10,461	1,323	12.65	9,138	87.35	36,699	10,832	29.52	25,867	70.48
Total		43.17 (30.02)	1–131	135,009	18,280	13.54	116,729	86.46	379,821	143,691	37.83	236,130	62.17
Total % of goals set						11.29					88.71		

Note. $N = 3{,}752$. COT = Classroom Observation Tool.

Table 6
Descriptive Statistics for Goals Met on the COT

Goals met				Goal set: Yes				
				Goal met				
				Yes		No		Total
COT domain	Number possible	*M* (*SD*)	Range	*N*	%	*N*	%	*N*
1. Classroom management goal	2	0.48 (0.75)	0–2	1,807	82.06	395	17.94	2,202
2. Social and emotional	6	1.14 (1.88)	0–6	4,278	85.61	719	14.39	4,997
3. Centers goal	6	1.85 (2.05)	0–6	6,939	78.89	1,857	21.11	8,796
4. Oral language goal	24	6.42 (6.69)	0–24	24,082	80.01	6,016	19.99	30,098
5. Read alouds goal	23	7.77 (7.14)	0–23	29,164	81.51	6,614	18.49	35,778
6. Phonological awareness goal	13	3.65 (3.92)	0–13	13,697	78.50	3,752	21.50	17,449
7. Letter knowledge goal	17	3.82 (4.92)	0–17	14,335	79.89	3,608	20.11	17,943
8. Print concepts goal	9	1.74 (2.78)	0–9	6,545	82.44	1,394	17.56	7,939
9. Writing goal	19	5.35 (5.88)	0–19	20,083	81.59	4,531	18.41	24,614
10. Mathematics goal	12	2.57 (3.38)	0–12	9,650	79.39	2,505	20.61	12,155
Total		34.80 (30.87)	0–131	130,580	80.62	31,391	19.38	161,971

Note. $N = 3{,}752$. COT = Classroom Observation Tool.

Goals met. After a goal had been set by the coach, they could later use the technology-based, goal-setting system to indicate that the goal had been met when the teacher demonstrated the target behavior during a subsequent classroom coaching visit. Coaches reported overall, that 80.62% of set goals were met, and this was largely consistent across domains (see Table 6). The highest percentage of goals met occurred in the Social and Emotional domain (85.6%), and the lowest occurred in the Phonological Awareness domain (78.5%). Goal-setting practices and attainment were reported by the coach rather than assessed independently by research staff.

Utility of COT goal-setting system. After a single e-mail attempt at the end of the school year, 80% of coaches and 24% of teachers provided feedback about the COT through surveys. According to survey responses, 88.96% of coaches felt that the COT was helpful or very helpful for establishing goals with teachers, and 76.60% felt the technology-based, goal-setting and tracking system was helpful or very helpful for improving teacher implementation of evidence-based practices. Likewise, 76.66% of teachers reported that the goal setting with a STGR was helpful or very helpful. In terms of fidelity of implementation, teachers reported that coaches consistently shared COT observations (85.48%) and completed STG reports (83.76%).

Discussion

This study examined the initial version of statewide assessment system designed for coaches to monitor pre-k teachers' use of evidence-based, Tier 1 instructional and behavioral management practices. Our examination of the psychometric qualities of the COT indicate that the eight language, literacy, and math domains have promising evidence of reliability and validity; however, further improvement and study is required to validate the classroom management and social and emotional domains of the COT. These findings represent the first large-scale attempt to validate and examine the utility of an observational measure used by coaches who received a rather moderate amount of training (18 hr) compared with other observational measures that require up to 5 days of training. Importantly, we found that baseline COT observations were predictive of children's growth in language and literacy skills. The online COT goal-setting system allowed coaches and teachers to set goals to increase use of specific evidence-based practices and track teachers' progress toward meeting these goals over time. Coaches reported that teachers met a large proportion of the goals (80.62%). Coaches' and teachers' feedback indicated that the COT and associated goal-

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setting system was helpful for setting goals for instructional change.

Evidence of Reliability

Measures with adequate reliability demonstrate consistency across similar sets of test items and across observers. We found evidence of acceptable internal consistency with alphas ranging from .73 to .87 (Cicchetti, 1994). Consistency in our subdomain and domain structure suggests that, even across our relatively large number of items, coaches are able to make meaningful distinctions among closely linked domains of instruction and, by extension, set highly targeted goals for improvement. When we assessed reliability between two coaches using the COT during the same observation visit, in advance of our statewide scale-up, overall interrater agreement was good (generalizability coefficient of .75) (Cicchetti, 1994). However, interrater reliability for two domains was poor: Social and Emotional Development (.24) and Classroom Management (.34). It is possible these reliabilities were poor because the dichotomous scoring on the COT was difficult for these domains that reflect a more global style. These two domains in the present version of the COT were deemphasized given pragmatic concerns that coaches would devote too little attention to other instructional domains (see also Neuman & Wright, 2010). However, this decision resulted in too few items, which is known to reduce the reliability of any scale (Brennan, 1983). Thus, it is also possible that coaches were "forcing" any observation about these domains into the existing items in order to document their use in the classroom. Subsequent versions of the COT added items to these two domains in order to increase precision of the raters' observations and to ensure a well-defined theoretical construct.

In addition, the high proportion of variance in baseline teacher observations attributable to coaches in our state-wide sample (ranging from 22% to 37%) suggests that some fidelity is lost at scale and that more rigorous training and certification procedures are needed. Rater effects are an issue in any observational research, accounting for 4–14% of variance even in tightly controlled research studies (Pianta & Hamre, 2009). It is likely that COT reliability can be improved by increasing observer accuracy through more systematic training and by extending training time on the actual meaning of items from 4 hr to a longer, yet still reasonable amount. The number and durations of observations needed to obtain a reliable estimate of observational behaviors may be impractical to achieve at scale (Hintze & Matthews, 2004), but it may be possible to achieve acceptable reliability for the type of low-stakes decisions in a teacher-coach partnership by simply adding another 1–2-hr observation (David Ferguson, Briesch, Volpe, & Daniels, 2012).

Construct Validity Evidence

We found promising evidence of construct validity for the COT in that the factor structure for eight domains across language, literacy, and math instruction conformed to our theoretical conceptions. Unfortunately, two key domains, social and emotional development and classroom management were underdeveloped in this initial version of the instrument and consisted of too few items to be meaningfully included in our subdomain factor analytic approach. Although this precludes us from drawing conclusions about the factor structure of the full COT, these findings suggest that our approach to scale construction for language, literacy, and math is a good guide for further COT item development (i.e., targeted behaviors, rather than broad ratings) to produce a comprehensive observational measure for coaches. Many existing observation tools are developed to assess a narrow set of instructional domains (e.g., ECERS-R focuses on environment; ELLCO focuses on language and literacy), often requiring educators and evaluators to use two or three assessment tools with different domains of emphasis to arrive at a comprehensive assessment of the quality of teacher–child interactions and instruction (Zaslow et al., 2009). This patchwork approach results in inefficiencies in training and difficulties in aligning disparate approaches for identifying and tracking teachers' needs over time. In contrast, the COT delineates evidence-based activities and support strategies across a comprehensive set of school readiness domains in one tool. This reduces the burden of synthesizing data across multiple instruments because all of the items are written in a uniform style and scored with a simple presence/absence format that can be updated over time in monitoring

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technology-based, goal-setting system to track growth.

Criterion-Related Validity Evidence

A new instrument should show positive relations with previously published measures that assess the same construct(s) to provide evidence of concurrent validity. We used the TBRS as our measure of concurrent validity because (a) multiple previous studies demonstrate the sensitivity of the TBRS to teacher change and predictive relations with children's school readiness outcomes, and (b) the COT was adapted from the TBRS to comprise a more simple scoring approach for coaches while retaining attention to highly specific instructional techniques. Though design limitations required the COT and TBRS observations to occur several weeks apart, we found generally positive, albeit small, relations (-.07–.23) between the two measures. Measures that use behavioral codes (rather than global rating scales) are heavily impacted by the situation and specific lessons underway at the time of the observation (Pianta & Hamre, 2009), making instruments like the COT or TBRS less stable over time than rating scales, even when the distance between measurements is short. In addition, the COT and TBRS use distinct scoring approaches—dichotomous choice of presence/absence versus rating scales of both quantity and quality, respectively. Our evidence of concurrent validity is weaker than what is reported in other classroom observation studies; however, all previous studies used the two observational assessments on the same day. For example, correlations among two widely used tools, the ECERS and CLASS, show numerous moderate relations among subdomains; with a correlation of .40 for CLASS instructional support and the ECERS total score (La Paro, Pianta, & Stuhlman, 2004). Similarly, the Classroom Strategies Scale for Elementary School shows numerous significant relations with CLASS domains and dimensions ranging from .20 to .35 (Reddy et al., 2013). The time lag between observations and the inherit instability of behavioral codes across different lessons and days likely both contributed to the modest relations between the COT and TBRS. Nonetheless, the presence of some small but significant relations suggest some promise of concurrent validity and that coaches can obtain information about evidence-based instructional practices.

Predictive Validity for Child Outcomes

A second feature of criterion validity is evidence of predictive validity. If a measure purports to measure important instructional practices, it should relate to indicators of children's school readiness measured at a later time. We found promising evidence that several COT language and literacy domains relate significantly to growth in children's literacy outcomes for letter knowledge in English (.21–.43) and Spanish (.32–.40), as well as phonological awareness in English (.18–.36). This demonstrates predictive validity between theoretically related teacher behaviors and child skills. We did not find evidence of predictive validity for the English vocabulary fluency subtest, but there was some evidence of predictive validity for this measure in Spanish, with classroom vocabulary fluency gain significantly moderated by the COT Read Alouds domain (.37).

With one exception, COT domains with theoretically weaker content connections (e.g., centers, classroom management) were not correlated with growth in child outcomes, providing some evidence of discriminant validity. Unfortunately, teacher behaviors that focus on math instruction did not relate to child math outcomes, and there was one unexpected significant relation between COT Mathematics and growth in children's phonological awareness. One explanation is that this relation may be attributable to conceptual overlap involving counting during sentence segmenting and syllabication activities.

Growth in Spanish skills was more weakly related to COT scores than growth in English skills, which may in part be explained by a mismatch between language of instruction in a particular domain (e.g., mathematics instruction delivered in English) and language of testing (e.g., Spanish math assessment given) for some bilingual instructional models. Schools providing bilingual instruction vary considerably both in the proportion of the day committed to instruction in a particular language (e.g., 90% Spanish and 10% English, or 50% English and 50% Spanish), and assignment of language requirements to specific instructional domains (e.g., Spanish-speaking language arts and Eng-

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lish-speaking social studies). Schools participating in this statewide project made their own designations for language of testing, and we lack information about how language of instruction in specific domains aligns with our child outcome subtests. It is also possible that coaches' Spanish oral fluency may have been weaker than English, thereby reducing the reliability of COT scores for bilingual classrooms.

Data Utilization Indicates Appropriate Goal Setting

Given the inextricable connection between the COT data and the online goal-setting system, we also examined how coaches utilized COT data to set goals with teachers, provide targeted coaching, and track teachers' progress. Coaches in this sample were trained to use a data-based coaching model that relied on several data sources including the COT, children's CPALLS+ progress-monitoring data, ratings of the classroom environment quality, and videotaped segments of instruction. Within this larger framework, baseline COT data are designed to play a prominent role in goal-setting decisions as coaches and teachers decide which of the unobserved behaviors to target and in what order. Coaches and teachers set an average of 43.17 goals per year, and coaches reported that 80.62% of these goals were met. Coaches were also granted discretion to set goals for COT items even if the behavior was observed at baseline, but the coach felt improvements to quality or consistency were necessary; this occurred for 11.29% of goals set. Coaches rarely chose to work on behaviors or strategies observed at baseline, focusing 88.71% of their goals on helping teachers expand their repertoire of behaviors that were not observed at baseline.

It is interesting that coaches set a fairly high number of goals per teacher ($M = 43.17$) across the year and that coaches set fewer goals with teachers who were new to the professional development program. More study is needed to determine if this pattern is attributable to coaches' sensitivity to teacher capacity early and late in the intervention, increasing comfort with teachers over time, or simply an artifact of training. It is also interesting that goals were distributed across COT domains and items, suggesting that coaches used the full set of COT items rather than focusing on narrow set of behaviors. Even with a high volume and diversity of goals, coaches indicated that a high proportion of established goals were met (80.62%), suggesting that our rather microlevel approach of measuring targeted, instructional behaviors yielded actionable goals that were readily adopted and tracked over time. This estimate may be upwardly biased; we could not confirm actual goals met with independent assessment of goal attainment by research staff. In terms of the usability of the COT and associated goal-setting system, coaches and teachers largely reported that the STGR and linked resources were helpful.

Appropriateness of COT Goals

By considering other teacher- and child-level data sources available within this study, it is possible to make some inferences about whether the domains coaches focused their goal setting on were indeed high-priority areas. First, independent TBRS observer's ratings of quantity and quality of teaching (see Table 3) indicated that Phonological Awareness instruction was typically in the "Low" quality range both at pre- and posttest ($M = 1.32$ and $M = 1.58$, respectively). This suggests that Phonological Awareness goals should have been a more dominant focus than they were, given that they only about four goals ($M = 4.65$) were set in this area for the average teacher. Yet, when looking at child-level data from the CPALLS+ progress monitoring, children consistently scored well above the typical benchmarks for 4 year olds at all three time points. This suggests that although coaches may have devoted less attention to improving the quality of Phonological Awareness instruction, it was sufficient to produce learning.

In contrast, children's CPALLS+ vocabulary scores for all three time points and in both languages was consistently below typical benchmarks, indicating children started and ended the school year with relatively poor vocabulary skills. Interestingly, independent TBRS ratings show that Oral Language and Read Alouds were Moderate High at both pre- and posttest ($M = 2.31$ to 2.81). Despite what would seem to be decent levels of language input, this was not of sufficient intensity or

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sufficiently fine tuned to children's linguistic needs to ensure that most children achieved vocabulary expectations. The pattern of goal-setting behaviors suggests that coaches and teachers were aware of this shortcoming and were directing a good deal of attention toward improving language input through the attention to Oral Language and Read Alouds goals on the COT, many of which were specifically focused on providing definitions and encouraging children to repeat new vocabulary words. Taken together, this pattern of goal setting and other data sources indicates good alignment between children's most salient instructional needs and the individualized coaching supports.

Implications for Practice

The findings of this study have important implications for data-based coaching models and other PD approaches that use classroom observation data to individualize teacher trainings. First, this provides tentative evidence that large numbers of coaches can be trained to use a Tier 1 observational tool to appropriately support teacher goal setting. Second, it suggests that administrators, school psychologists, and other education professionals responsible for instructional change and reform efforts at other grades should consider how observational data and associated technology-based tracking systems can be used to more systematically increase use of Tier 1 evidence-based practices. The COT goal-setting system may also have the potential to improve communication among actors across the school system by creating a shared language and common understanding of program-wide instructional capacity. Furthermore, understanding a teacher's baseline repertoire of evidence-based practices can assist school psychologists in their efforts to plan appropriate individualized instruction for specific children in their care.

Limitations and Future Research

It is important to review limitations of this study and consider how future research might address these issues. A key limitation in this first version of COT was the large amount of variance attributable to raters and our inability to train coaches to demonstrated reliability before using the COT goal-setting system. We have solicited coach's feedback through surveys and focus groups to improve the COT, and these data indicate that coaches require extended item-level training and more specified examples of items to ensure their understanding of item content. We have adjusted our training model to include more review and discussion of video exemplars across each instructional content domain and have instituted requirements for completing independent practice videos and receiving reliability feedback prior to independent use. Coaches' feedback data also revealed that the large rater effects may have been due to the exclusive focus on the presence or absence of behaviors with dichotomous scoring because some coaches were less likely than others to mark behaviors as observed when the quality of implementation was low or less consistent than desired. Therefore, we have retained the simple dichotomous scoring (i.e., observed or not observed) but also added a separate priority indicator that allows coaches to mark a behavior as observed, but "needs support." This may improve reliability of scoring observed behaviors by allowing coaches greater flexibility in tracking items to possibly address in coaching sessions.

Another limitation is that although our theoretical factor structure was largely supported, two underemphasized domains could not be fully examined: the Classroom Management and Social and Emotional domains. In future research with the COT we are also collecting progress-monitoring data on children's social and emotional skills that will allow us to better evaluate the predictive validity of these scales. Although our COT items for Math did show internal consistency, the scale did not show good predictive relations to child progress-monitoring data in mathematics. This domain tended to rely on broad categories of instruction (e.g., counting) that have been further delineated during our revision process (e.g., one-to-one correspondence, naming numbers, sequence of numbers, cardinality), which may improve the predictive validity of the Math domain. Finally, in a current study, we are exploring concurrent validity of the COT with other published measures of teacher quality collected during the same observation period to reconsider the limited evidence of concurrent validity.

Observational data are likely to be unstable unless considered over a sustained period of

time (e.g., Hintze & Mathews, 2004). Indeed, the 2-hr pre-COT observation window is insufficient to represent the whole of a teacher's instructional skills, and future research should examine use of more observations. Nonetheless, a wide range of instructional skills are required to ensure high quality experiences for children, and coaching resources are often limited, which makes these COT snapshot observations a useful source of information coaches can use to narrow their focus with a given teacher. In other words, these highly specific data on demonstrated skills help the coach know what *not* to focus on during their limited time with a given teacher. In order to gain a more complete picture of a teacher's instructional repertoire, coaches continue updating the COT throughout the school year as new behaviors are observed. By combing pre-COT observations, ongoing COT updates, and goals met, coaches are able to identify a more comprehensive range of strengths and weaknesses.

Goal-setting patterns user feedback suggests the basic framework for the COT goal-setting system is useful for encouraging collaboration around instructional change, yet many questions remain about how coaches' prioritize goals for improvement. For example, it would be informative to assess coaches' knowledge about each COT area to determine if coaches set goals more frequently in areas of greater knowledge. In future research, it is also important to further investigate optimal, technology-enhanced data utilization processes and the practical implications of developing comprehensive observational tools for data-based coaching models. Encouraging teachers to change too many instructional practices at one time may be overwhelming and could suppress effects in one or more target domains as teachers consciously or unconsciously, set more manageable priorities (Landry et al., 2012; Kaiser et al., 2011). We have attempted to mitigate this problem in the second version of the COT by organizing the COT report according to levels of coaching priority, with items in Level 1 being categorized as foundational supports for instructional change, Level 2 representing increasingly advanced instructional strategies, and Level 3 priorities centering on highly differentiated instruction. These priority levels are intended to help coaches set manageable and achievable goals with teachers across the school year. Early childhood educators and researchers have long been interested in studying and improving the quality of evidence-based, Tier 1 instructional and behavioral management practices because of the known benefits of high-quality preschool experiences for later outcomes (e.g., Burchinal et al., 2010; Howes et al., 2008; Lazar et al., 1982). This study demonstrates that observational tools can be specifically designed for use by coaches, rather than simply adapting those for research staff, to ensure high-quality, Tier 1 pre-k experiences for all children.

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Chapter 13

SCALING UP DATA-BASED MENTORING IN PRE-KINDERGARTEN CLASSROOMS

Tricia A. Zucker*, April Crawford and Susan H. Landry
University of Texas Health Science Center at Houston,
Houston, Texas,US

ABSTRACT

This chapter explains the conceptual framework and evidence base supporting a comprehensive professional development and mentoring program. The program has been implemented at a large scale over a 15 year period and sustained by investing key stakeholders at all levels of the education system in the goal of ensuring children's school readiness. We outline how the program components are implemented together including: data-based in-class mentoring, two years of coursework, a teacher-administered progress-monitoring assessment to track children's learning, and provision of curriculum and learning resources. The data-based mentoring model is described in this chapter to demonstrate how teacher- and child-level data are collected and analyzed by the teacher and their mentor to prioritize goals for mentoring and instructional improvement. Detailed information about the observational tools and goal-setting system mentors use to monitor teacher's progress are included. Finally, we examine specific goals set by teachers and mentors during a recent academic year to consider high-priority training targets for early childhood mentors.

Keywords: pre-kindergarten, data-based mentoring, classroom observation, school readiness

INTRODUCTION

Providing young children with the preschool learning experiences they need to be successful in kindergarten is an international priority (Bowman, Donovan & Burns, 2001;

* Corresponding author address: Department of Pediatrics 7000 Fannin St., 2300 Houston, TX 77030, Email: tricia.zucker@uth.tmc.edu

Burger, 2010; National Early Literacy Panel, 2008). To ensure children enter school ready to learn, the field needs research-proven models of professional development (PD) for pre-kindergarten (pre-k) teachers to implement high-quality instructional experiences within a warm, responsive climate (Early et al., 2007; Howes, 1997; Howes et al., 2008; LoCasale-Crouch et al., 2007). Although factors such as teacher's level of education or structural features of the pre-k environment may be easier to mandate, it appears that the quality of teacher-child interactions is the most influential feature of the pre-k experiences for children's learning (e.g., Blau & Mocan, 2000; Early et al., 2007; Mashburn et al., 2008). Thus, PD that trains pre-k teachers to successfully implement evidence-based instructional strategies for foundational early language, literacy, mathematics and higher-order thinking skills is of paramount importance (e.g., Bierman et al., 2008; Girolametto, Weitzman, Lefebvre, & Greenberg, 2007; Kontos, Howes, & Galinksy, 1996; Pianta, Mashburn, Downer, Hamre, & Justice, 2008; Neuman & Cunningham, 2009; Starkey, Klein & Wakeley, 2004; Wasik, Bond, & Hindman, 2006; Whitehurst & Lonigan, 1998).

In addition to needing effective models of PD, the early childhood field also needs models that can be implemented at a large scale while maintaining good fidelity of implementation. This chapter describes the conceptual framework and evidence base for a comprehensive pre-k PD program called Texas School Ready! (TSR!) that has been scaled up across a large state in the United States (U.S.) The TSR! program is unique in that it combines a data-based approach to mentoring along with provision of coursework, progress-monitoring assessments and curriculum resources. In this chapter, we first explain the comprehensive PD program, including the evidence base supporting the model. Next, we detail the data-based mentoring approach. This includes explanation of how several types of teacher- and child-level data are collected and analyzed during the academic year to set mentoring goals and priorities. We provide examples of the tools mentors use to assess and track teachers' use of evidence-based practices. We conclude by examining data collected by mentors during a recent academic year to understand the goals teachers and mentors commonly set together as they prioritize areas for teacher growth.

HISTORY OF DEVELOPMENT, EVALUATION AND SCALE UP OF AN EFFECTIVE PD PROGRAM

Over the last 15 years, the comprehensive PD approach within TSR! has been developed, evaluated and scaled up to serve more than 400,000 children historically, and to currently serve 38 communities and approximately 2,500 classrooms and 43,000 children each school year. Development of the PD program began in 1998, at the Center for Improving the Readiness of Children for Learning and Education (CIRCLE) that is now within the Children's Learning Institute (CLI) at the University of Texas Health Science Center at Houston. At the time of its inception, many early childhood educators were concerned that too much cognitive instruction in preschool was developmentally inappropriate, despite accumulated evidence that oral language and pre-literacy skills are essential for school readiness (International Reading Association and National Association for the Education of Young Children, 1998; Snow, Burns, & Griffin, 1998) and that early experiences shape brain development in ways that lay the foundation for long-term academic success (e.g., Dawson,

Klinger, Panagiotides, Hill, & Spieker, 1992; Fox, Levitt, & Nelson, 2010). Thus, the PD program philosophy was to provide pre-k cognitive instruction in ways that were "*playful*, *planful* and *purposeful*," meaning that cognitive, school readiness instruction is achieved in responsive ways that support the whole child.

This philosophy was further elaborated in five key pedagogical principles (detailed in Table 1), that include: (1) a responsive style to scaffold learning; (2) intentional instructional planning combining social-emotional and cognitive skills (e.g. early literacy, math, language); (3) concept and knowledge building over time using thematic units; (4) a balance of teacher- and child-directed activities; and (5) flexible student activity groupings of various sizes (one-on-one, small group, large group) as determined by progress-monitoring assessments. We expected that improvement in child outcomes would require consistent use of a responsive style that observes and responds to children's current level of understanding with warm, contingent teacher behaviors. This responsive style combined with cognitive instruction that pushes for higher-order thinking was anticipated to produce optimal growth for students' social and academic skills.

Table 1. Key Teaching Principles to Ensure High Quality Teacher-Child Interactions

Key Principles	Definition	Example
Responsive style	A responsive interaction style includes consistent teacher use of warm, sensitive, and contingent responses to children's signals.	The teacher attends to a child's nonverbal facial expression that they are nervous by responding warmly and labeling the emotion. Then, the teacher suggests two positive choices for the child as they cope with their feeling.
Intentional instruction	An intentional instructional plan combines learning in various social/emotional and cognitive, school readiness domains within one activity or context.	The teacher conducts a simple science experiment that includes rich language input, open-ended questions, and requires early mathematics (e.g., measuring with non-standard units). Children practice self-regulation skills as they follow directions and take turns measuring.
Build concepts	Teachers build students' content knowledge using thematic units and experiences that create rich memories when conceptually related activities occur in close proximity.	The teacher develops a long-term plan for teaching skills using several thematic units to ensure that playful activities provide the context for content and skills instruction and that conceptually linked vocabulary and experiences occur in proximity.
Balance control	A balance of teacher-directed and child-directed activities provides a fluid daily schedule and uses a gradual release model for scaffolding learning.	The teacher leads a large group circle time activity. Then, she models a new center activity and asks a student to demonstrate the activity for the group so she can offer supported practice. Next, children choose learning centers where they gain independent practice with the new and previously learned activities.
Flexible groupings	Learning activities occur in a variety of groupings (one-on-one, small group, large group) and children move between groups according to children's assessed learning needs.	The teacher's daily schedule includes large group activities, small group teaching during center times, and intentional use of one-on-one conversations and teaching throughout the day. Progress-monitoring assessment data helps teachers identify small groups of children with similar needs.

To train teachers to provide high-quality pre-k experiences and implement these pedagogical principles, a comprehensive teacher training program was developed. The program includes five components: (a) in-service PD via coursework and data-based mentoring; (b) data-driven instructional planning decisions based on ongoing, child progress-monitoring assessments; (c) provision of teaching resources; (d) ongoing, effective communication amongst all stakeholders; and (e) technical assistance to improve sustainability. These components are depicted in Figure 1 with the top PD section highlighted to emphasize our belief that effective coursework and mentoring are the most essential mechanism for achieving high-quality pre-k programs, but that these PD components are most effective when combined with important resources, such as child progress-monitoring assessments used at beginning-, middle-, and end-of-year.

Figure 1. The comprehensive program includes five components to ensure responsive instruction: (a) professional development courses and mentoring, (b) teaching and learning resources, (c) data-driven decisions using child- and teacher-level progress-monitoring measures, (d) effective communication, and (e) technical assistance to promote sustainability of effective instructional practices.

Based on adult learning theory (Bransford, Brown, & Cocking, 2000; Putnam & Borko, 2000), the PD coursework and mentoring encourages teachers to reflect on and improve their teaching by: (a) acknowledging teachers' philosophies to assimilate new information about evidence-based practices within existing belief systems; (b) assuring intellectual engagement in the subject matter through active learning and discussion; (c) situating teacher learning and opportunities to practice new skills in the authentic context of their own classroom; and (d) extending learning over time, including two years of coursework and mentoring followed by a third year of reduced technical assistance. In order to allow for successful scaling, web-based courses addressing all school readiness domains were designed for use in face-to-face, small-group settings in which trained mentors facilitated teachers' discussion and analysis of evidence-based practices using exemplary classroom videos, expert commentary and other activities. Coursework and mentoring was sequenced over two academic years to support transfer of goals into the classroom.

Evaluation studies. Several experimental studies have evaluated the impact of the comprehensive PD program or particular components within the program. The first study was a quasi-experimental design including 750 Head Start teachers in 20 communities across Texas. Teachers were assigned to receive the first iteration of the PD program (n = 500) and other teachers served as control (n = 250; Landry, Swank, Smith, Assel, & Gunnewig, 2006). Child data (n = 5,728) indicated that early literacy and oral language skills improved significantly, with greater increase in language skills after teachers were in the PD program for two years.

A second study scaled up the model from a single intervention to a more widely used program by evaluating impacts when implemented in 262 classrooms (n = 1,786 children) across four states (Landry, Anthony, Swank, & Monsegue-Bailey, 2009). In this randomized control trial, the web-based courses were expanded to include checks for understanding and other interactive features such as online discussion forums that are moderated by the mentor. The mentoring approach was further specified via trainings on supporting teacher use of evidence-based practices in their own classroom with mentor observation, mentoring, and feedback. The design of the study included a control condition and four other conditions that all received coursework, but the provision of in-class mentoring and of a progress-monitoring tool was manipulated in these four experimental conditions. The progress-monitoring tool (Landry, Swank, Assel & King, 2009) was a brief, teacher-administered test of children's growth in language and literacy skills used three times during the school year. Findings demonstrated the comprehensive condition that received the web-based PD courses combined with in-classroom mentoring and instructional planning feedback from a technology-based progress-monitoring tool showed the greatest improvements in teaching behaviors and children's language and literacy outcomes compared to the control condition and to the other conditions that received other components.

The next study was designed to more closely examine the effectiveness of the comprehensive, integrated PD program across 11 regional community partnerships across Texas when implemented over a one- or two-year period (Landry, Swank, Anthony, & Assel, 2011). Teachers were randomly assigned to a control condition or to the comprehensive PD program including coursework, mentoring, a technology-based progress-monitoring assessment, and provision of learning resources/curriculum. Increased technical assistance and oversight was provided by key state agencies (e.g., the Head Start Collaboration Office, State Department of Family and Protective Services). Of the 1,220 classrooms randomized

into the comprehensive PD program or business-as-usual control, pre- and posttest data was collected on 213 teachers and 1,265 children during year 1 of their PD and 209 teachers and 527 children in year 2 of their PD. Findings showed that teachers who received the PD showed greater gains in use of a responsive style, oral language use, book reading, and literacy instruction with a portion of the year 1 PD, but children's skills did not change during this 4.6 month period. However, in teachers' second year of the PD, their teaching practices continued to improve and children's language and literacy skills also increased significantly ($p < .05$).

A recent study examined the impact of additional curriculum resources that support vocabulary instruction and conversations about decontextualized topics (Zucker, Solari, Landry & Swank, 2013). Teachers ($n = 39$) in year 2 of the PD program were randomized to read provided texts as they normally would or they were trained to systematically address oral language skills during book reading activities with all students (Tier 1) and during small-group lessons with students who scored below vocabulary benchmarks on the progress-monitoring measure (Tier 2). Compared to classrooms where teachers read these books using practices gleaned by the original PD program, at-risk students' ($n = 125$) receptive vocabulary understanding, as measured by a researcher-developed target vocabulary test, grew significantly ($p < .001$) more when their teachers were trained to use this tiered instructional approach. However, students' responses to comprehension questions after listening to these texts did not differ significantly ($p > .05$) between groups after this brief, 4-week study. Future studies will examine an extended version of these curriculum resources as well as the impacts of improving other components within the PD program.

Scaling up the PD program. Given the promising findings of these evaluation studies, including studies in which the program was successfully implemented across several communities and states, we have demonstrated the comprehensive PD program achieved the primary aims of: (a) increasing pre-k teachers' use of evidence-based practices including the responsive style and intentional instruction, and (b) increasing pre-k children's school readiness skills, particularly in the areas of language and literacy. As the program has been implemented across a large state, we have identified factors that promote scale-up and sustainability within several levels of the education system. The operating environments of schools involve complex systems consisting of multiple, changing factors (such as federal and state policies, district- and school-level initiatives, standards, curriculum, and testing requirements) that require developers of scalable programs to continuously fine-tune the program design in response to changes and demands of the environment (Glennan, Bodilly, Galegher, & Kerr, 2004). Too often, innovative programs that are taken to scale fail to affect change in meaningful, sustained ways because the design unsuccessfully fit the realities of educational practices and the complex environments of schools (Cohen & Ball, 2007).

To successfully implement the PD program within the realities of communities and classrooms, we engage key constituents at various levels of the education system including teachers, mentors, school leaders, regional project coordinators, and state level staff. To participate in the PD program, these stakeholders build formal partnerships focused on the goal of ensuring that pre-k teachers can readily prepare their students for entering kindergarten. Figure 2 illustrates how children's school readiness skills are impacted by bringing together stakeholders within several levels of the education system. According to ecological theory (Bronfenbrenner & Morris, 2006), the primary mechanism of change is the interactions between the pre-k teacher and his/her mentor during coursework and in-class

mentoring and feedback. Nonetheless, these changes are not possible without regional partnerships that include school leaders working with TSR! Project Coordinators and Technical Assistance Specialists to ensure that each region has resources to facilitate teachers' coursework and use of resources. Other essential partners influence children's learning more indirectly, such as the State Center staff and project managers at CLI who develop and update PD courses, classroom materials, and train project mentors and staff at each level. In addition, factors such as the current funding climate and policies of the Texas Education Agency impact pre-k children's learning.

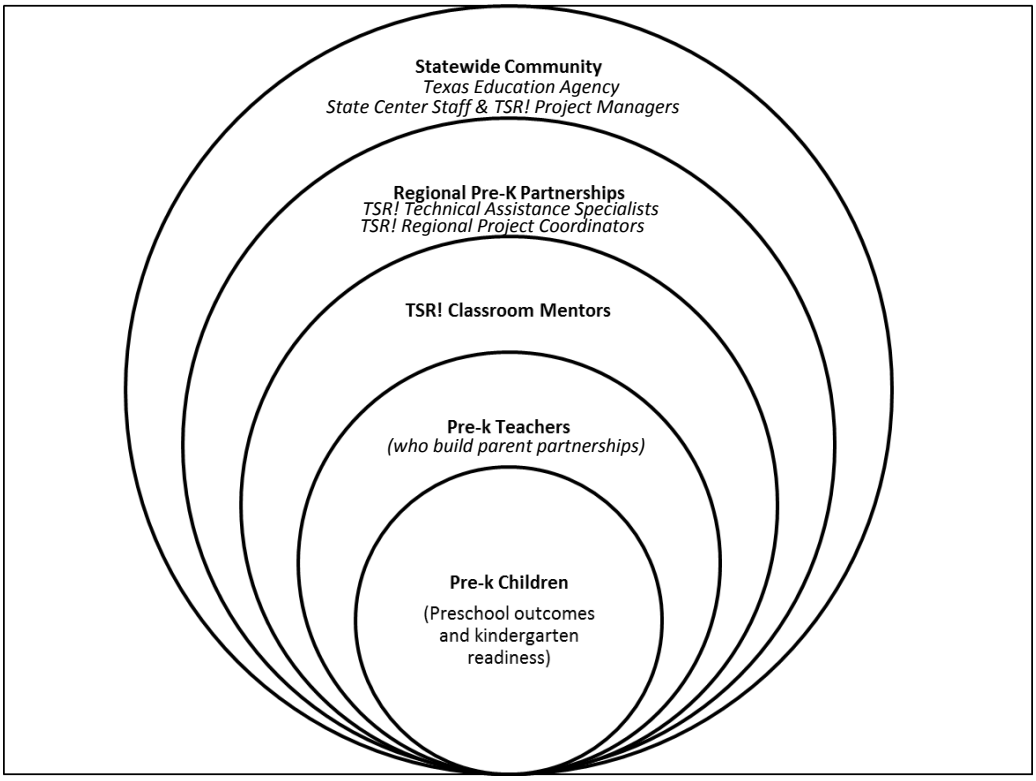

Figure 2. Scaling up a PD program within an ecological framework requires a partnership between key stakeholders that range from the microsystem level (child, teacher, classroom mentor), mesosystem level (regional partnership stakeholders, regional project coordinators, technical assistance specialists), to exosystem level (State Center staff and project managers, Texas Education Agency).

A critical feature of a PD program operating at this scale is effective communication with all stakeholders. We use several methods to exchange ideas for effective practice including a monthly newsletter (called the *TSR! Beat*), a quarterly research update (*The Learning Leader*) and annual trainings including: a summer conference featuring nationally recognized early childhood experts and a fall training institute conducted by State Center staff. In addition, the suite of web-based courses is regularly updated with new research findings and has been expanded to include 15 courses across topics such as language development, literacy development, early mathematics, science instruction, social-emotional development, children with special needs, English language learners, and using data to drive instruction within a response to intervention framework.

A DATA-BASED MENTORING MODEL TO INCREASE REFLECTIVE TEACHING

The goals of our mentoring model are twofold: to increase teachers' use of evidence-based practices and to facilitate teachers in reflecting on their teaching practice in sustainable ways (Snow, Griffin, & Burns, 2005). Evidence is growing that mentoring is a PD activity that can significantly improve teaching quality by providing early childhood educators sustained opportunities for individualized practice and feedback with an expert and/or mentor (e.g., Domitrovich et al., 2009; Kontos et al., 1996; Landry et al., 2006, 2009; Neuman & Cunningham, 2009; Pianta et al., 2008; Powell, Diamond, Burchinal & Koehler, 2010; Wasik et al., 2006). In fact, a recent study suggests that providing PD coursework alone is not sufficient for improving instructional quality unless it is paired with rather intensive mentoring (Neuman & Cunningham, 2009). We use the term *mentor* to refer to an individual with expert knowledge who: (a) demonstrates effective instructional approaches using a variety of strategies within classrooms, (b) observes teacher-child interactions and provides immediate feedback to improve instructional quality, (c) supports need and problem identification through data collection and analysis, and (d) promotes reflective practice using techniques such as probing questions and paraphrasing during reflective debrief sessions. Mentoring models that encourage reflective, problem-solving help educators become aware of patterns in teacher-child interactions and support teachers in improving practice within a non-evaluative context.

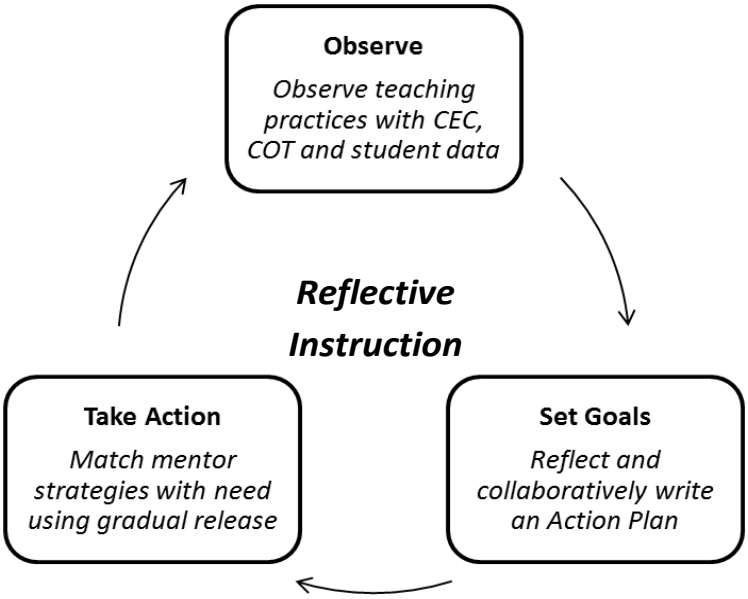

Figure 3. The data-based mentoring cycle is designed to facilitate teachers' reflection on their instructional practices by repeatedly observing and collecting data, setting actionable goals, and taking action with specific steps the teacher can do on his/her own and with the mentor's support.

A more specific term to characterize our mentoring model is *data-based mentoring* because this emphasizes the importance of using teacher- and child-level data to identify

mentoring priorities and set specific goals for improving teaching quality. Data-based mentoring is the cornerstone of other established mentoring models (e.g., Denton, Swanson & Mathes, 2007; Pianta et al., 2008). Data-based mentoring requires repeated cycles of: (1) observation and data collection, (2) feedback and goal setting, and (3) implementing teacher improvement plans alongside appropriate mentoring strategies. This cycle is illustrated in Figure 3, showing how the goal is to facilitate teachers' reflection on their instructional practices to motivate change. In the subsequent sections, we provide examples of the tools mentors use to observe teacher-child interactions and track teacher improvement as well as the specific strategies mentors use within this data-based mentoring model.

Step 1: Mentors use observational tools and progress-monitoring data. Our approach to data-based mentoring relies on multiple data sources including: observations of evidence-based teaching practices, classroom environment quality ratings, videotaped instructional playback and reflection, and teacher-administered child progress-monitoring data. The most extensive mentor observational tool is the Classroom Observation Tool (COT; Crawford et al., 2012) that provides a systematic tool for documenting teaching behaviors that research shows support children's learning. The Classroom Environment Checklist (CEC; Aston, Tuynman, Crawford & Zucker, 2012) is a second systematic observation tool used to identify mentoring priorities related to classroom layout and use of materials. The instructional domains addressed by the COT and CEC are described in Table 2 and sample items are shown in Appendix A. Recent research shows the value of repeated opportunities to reflect and receive feedback on one's own practices through video recordings of adult-child interactions (e.g., Landry, Smith, Swank, & Guttentag, 2008; Mendelsohn et al., 2011; Pianta et al., 2008). Therefore, the third type of data is videotaped teacher-child interactions that the mentor records using a pocket-size HD video camera. Together with the fourth type of data, child progress-monitoring scores on early literacy, language, and mathematics skills (for more information on child progress monitoring with the CIRCLE Phonological Awareness, Language, and Literacy System + Math see Landry et al., 2009), these tools help mentors select an appropriate path for supporting each teacher.

Step 2: Mentors use a goal-setting system. Our mentors use a technology-based *goal-setting system* for logging and tracking observational assessments of evidence-based instructional practices. Both COT and CEC data are entered in this goal-setting system; however, greater emphasis is placed on COT data given evidence that high-quality teacher-child interactions are more important for children's learning than aspects of the environment (Early et al., 2007; Mashburn et al., 2008). It is likely that mentors can more systematically collect and utilize observational data with technology-based observational data systems than traditional paper-pencil formats (cf. Landry et al., 2009). Therefore, our goal-setting system includes software features to: (1) quickly navigate and enter observations for each COT domain; (2) create summary reports of evidence-based practices over repeated visits; (3) interface with summary reports to select indicators and develop reports of individualized teacher improvement goals; (4) write goal-based action plans detailing how teachers will actually meet these goals on their own and with their mentor's support; (5) share printable goal reports and action plans that link specific goals to relevant resources (i.e., state pre-k guidelines, suggested activities, and mentoring strategies); and (6) track and update goal setting throughout the academic year as prior goals are met or retained and new goals are selected. Screenshots of the goal setting system user interface are provided in Appendix B.

Table 2. Instructional Domains and Descriptions in Mentor Observation Tools

COT Domains		Description of Effective Teacher Behaviors
1.	Classroom management	Sets clear expectations through established rules and routines and encourages children to participate in classroom management activities.
2.	Social & emotional	Responds promptly and sensitively to children's needs and provides guidance for children to regulate their behavior in problem-solving situations.
3.	Centers	Encourages children to follow routines for independent center activities, models activities before transitioning to centers, and provides scaffolding during centers.
4.	Oral language	Provides rich language input in everyday activities, directly teaches vocabulary words, and uses a variety of strategies to elicit language from children.
5.	Read alouds	Uses a variety of strategies to support comprehension (literal and inferential) and encourage discussion about a book read aloud.
6.	Phonological awareness	Engages children in phonological awareness activities (e.g., rhyming, alliteration, sentence segmenting) using a variety of approaches (e.g., manipulatives, songs).
7.	Letter knowledge	Promotes print and letter knowledge (e.g., letter names, sounds, capitalization) using a variety of approaches (e.g., environmental print, letter manipulatives, name games).
8.	Print concepts	Teaches print concepts (e.g., text contains letters and words, directionality, punctuation) using various texts and approaches.
9.	Writing	Models the writing process (e.g., sharing ideas to compose a message) and supports children's early writing attempts (e.g., journals for drawing and writing, recording child's dictation).
10.	Mathematics	Uses a variety of activities and strategies (e.g., manipulatives, games) to build understanding of mathematical concepts (e.g., counting, patterning).
11.	English language learners	Supports second language learners using strategies such as using visual representations, teaching cognates, and explaining idioms.
CEC Domains		**Description of Classroom Environment Qualities**
1.	Center Areas	Classroom contains well-defined, organized centers with sufficient materials and a management system.
2.	Literacy Materials	Ample materials are available for book reading, group and individual writing, and alphabet activities.
3.	Meaningful Print	Authentic print is visible throughout the classroom such as children's names, letter wall, helper chart.
4.	Instructional Planning	Lesson plans and unit of study are intentional. Various assessment techniques used to monitor children's learning.

By fully integrating COT observational data into goal-setting routines we ensure teachers are provided with clear expectations for change, focused on targeted and observable behaviors. Mentors and teachers work together, reviewing observational data and prior goal/action plan reports, to ensure goal setting is collaborative and that teachers feel empowered to change their behavior. The comprehensiveness of the COT (i.e., covering many key areas of practice, and behaviors ranging from basic to advanced) affords mentors flexibility to tailor goal selection to the needs of individual teachers. Effective goal selection is further encouraged through: (a) alignment with established early learning standards and recent child assessment data; (b) COT data review and reflective conversation with teachers

to identify possible goals for improvement; (c) selection of a manageable number of goals so as not to overwhelm the teacher with too many goals or slow progress with too few; (d) selection of goals that complement each other to deepen a teacher's understanding in a particular area rather establishing goals across too many areas at once; and (d) alignment of goals with current professional development coursework to help teachers bridge knowledge and practice more effectively.

Step 3: Mentors take action using mentoring strategies. Once goals have been established, mentors determine which mentoring strategies can best support a teacher during classroom instruction and document their planned use in an "action plan." Mentors utilize a variety of strategies in their daily work with teachers. A synthesis of early childhood professional development research indicates that mentoring is generally less targeted on instructional change than desired (Sheridan, Edwards, Marvin & Knoche, 2009). For example, Neuman and Wright (2010) found their trained mentors mostly chose to "guide rather than directly interact with teachers during lessons" (Neuman & Wright, 2010, p. 77). These mentors spent a considerable amount of time observing, setting goals, providing feedback, and setting up the environment. However, their mentors seldom used more direct, hands-on strategies such as modeling, co-teaching, and lesson planning. This tendency has also been a challenge in scaling up our data-based mentoring model. Although our mentoring model values observation and feedback, it emphasizes more intensive, hands-on mentoring strategies (e.g., modeling, side-by-side teaching, and co-teaching) because we hypothesize these strategies are most critical to instructional improvement. Through mentor training, we encourage use of more active mentoring strategies to provide teachers contextualized support in implementing new evidence-based practices. Mentors complete a web-based training course that introduces both active mentoring strategies and observational tools used within our model. Additional training is provided through a one week face-to-face Institute, monthly meetings providing mentors feedback about their own video-recorded mentoring practices, and ongoing supervision by regional technical assistance specialists.

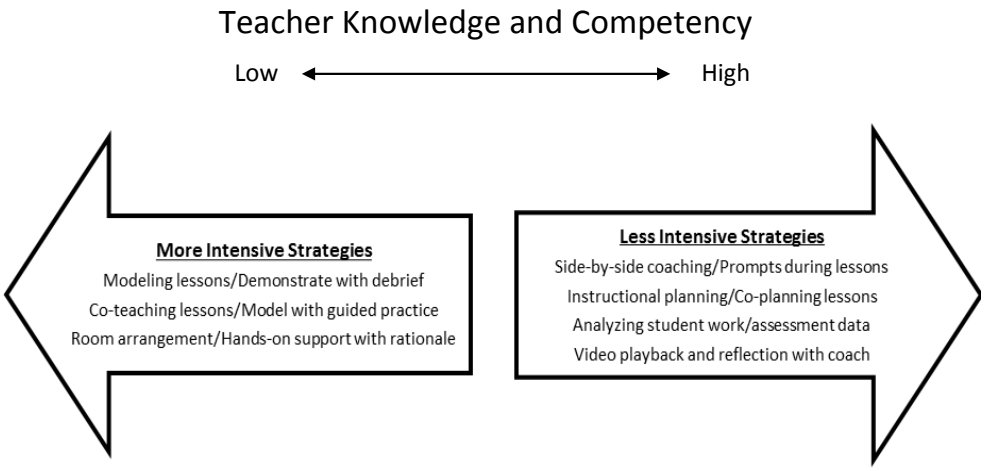

Figure 4. Mentor strategies can be conceptualized on a continuum of intensity. The gradual release approach suggests that teachers with lower instructional skills and competencies require more intensive strategies, whereas teachers with higher skills and competencies are likely to benefit with less intensive strategies.

Understanding what a teacher knows and is already able to do guides the selection of appropriate mentoring strategies because a mentor needs to use more intensive activities with an emerging teacher than with a teacher at an advanced level of practice. The continuum of mentoring strategies in Figure 4 shows the types of mentoring strategies mentors are expected to use with *all* teachers, but teachers with lower initial skills and competency will need their mentor to do more "heavy lifting" by using proportionally more of the higher intensity strategies. This is akin to a continuum of scaffolding supports teachers use with children to gradually release responsibility for the task as skills develop. The matching of more versus less intensive mentoring strategies is important for mentoring teachers across several different regions and with different skill levels. Teachers requiring support around basic instructional behaviors need to experience an accelerated rate of teaching improvement to meet minimal thresholds of instructional quality by the end of the year. Therefore, mentors are trained to provide a more specific set of high support mentoring strategies (i.e., modeling, co-teaching) are recommended for key lessons and procedures that teachers need to put in place immediately. Mentoring strategies for teachers with more advanced skills are less prescribed (i.e., side-by-side, video reflection) to allow for greater teacher input into collaborative goal setting and generally greater flexibility to take advantage of "teachable moments" as they arise.

CLASSROOM OBSERVATION TOOL (COT) FOR IDENTIFYING EFFECTIVE TEACHER BEHAVIORS

The data-based mentoring model can be further detailed by more closely examining one of the four sources of data mentors use to facilitate teachers' reflection on their instructional practices. In the remaining sections, we consider more specifically how the COT is designed to identify effective teaching behaviors during two dedicated observation visits and updated during routine mentoring visits. The tool contains approximately 180 "indicators" which are short statements about evidence-based teaching behaviors and strategies that the TSR! project targets through professional development and curricular supports. As stated, the behaviors and strategies in the COT relate directly to the Texas Prekindergarten Guidelines and are based on research. There are two values or responses to consider for each indicator. First, "observed" is marked when the mentor sees a behavior that fits the description for an indicator, regardless of the quality or consistency of the behavior. Second, a "needs support" flag is marked when the mentor sees a behavior or strategy being used (i.e., marked as observed) but some improvement is needed (e.g., increase consistency or quality). If an indicator is not observed at all it is left blank (see screenshots in Appendix B).

The COT is divided into 11 domains (Table 2) with an emphasis on language, literacy, and early math instruction. Within most domains, the COT contains subdomains such as: core concepts (i.e., behaviors to support child skills), strategies and activities (e.g., instructional methods), and instructional contexts (e.g., small- or whole-group), see sample items in Appendix A. The COT is analogous to a menu of healthy foods at a restaurant; it is full of good things that should be present in pre-k classrooms; however, it is unrealistic to master everything on the COT at once, just as it would be unrealistic to order everything on a restaurant's menu. There is no set number of indicators that need to be checked off during the

year. The objective is to make significant improvements over the course of the school year and document this growth for teacher's reflection. A dedicated 2 hour COT observation occurs at the beginning- and middle-of-year to establish a starting point or "baseline" for each teacher and to formally document growth. In addition, mentors update any observed behaviors during regular mentoring visits to track growth and goals met in real time.

DOMINANT GOALS MENTORS AND TEACHERS IDENTIFIED FOR IMPROVEMENT

To further characterize how the goal setting and mentoring system functions, we examine data from a recent academic year that was collected using the COT mentor observation tool. In the fall of the 2010-2011 academic year, 193 mentors collected baseline COT data using 2 to 2.5 hour observations of 3,757 teachers across Texas, representing a mixture of public and private preschool programs. The baseline data are detailed elsewhere (Crawford, Zucker, Williams & Landry, 2013), but in this chapter we consider more closely the types of goals set. On average, mentors and teachers set 43.17 (*SD* = 30.0) goals during an 8-month period of ongoing in-class mentoring visits using the web-based goal-setting system accessed on mentor's portable netbook computers. Goal setting practices were efficient, with 86.46% of goals being set for behaviors that were not observed at baseline. Mentors reported that 80.62% of these goals were met, suggesting meaningful improvements in teacher's use of evidence-based practices (although this was not confirmed by outside observers).

Within each of the domains on the COT, we examined which items were most frequently selected as goals for teacher improvement. These data from a large sample are noteworthy for other early childhood mentors because these are likely to be high-priority areas for mentoring other pre-k teachers as well. Although there were only two items for Classroom Management in this initial version of the COT, the most common goal set for 33.4% of teachers was to increase child engagement in classroom routines and jobs. For Social & Emotional, 24.7% of teachers and mentors set the goal of increasing discussion about emotions and 23.7% set goals to improve the use of specific (rather than non-specific) praise and feedback to children. In regards to independent learning activities at Centers, the most common goals focused on better modeling of learning activities before children went to centers (42.3%) and increased whole-group discussion about children's work after center time (43.2%).

The COT Oral Language goals set focused on providing more brief, child-friendly definitions of vocabulary words (39.9%), asking children to repeat focal vocabulary words to establish a clear phonological representation (39.3%), and increasing use of descriptive language (39.6%). To improve Read Alouds, goals were set for 48.7% of teachers to give a purpose for listening before reading and to revisit that purpose for listening after reading (48.7%); additional read aloud goals for 44.8% of teachers were to increase use of open-ended questions about the text. For the four literacy areas, the highest proportion of goals were set for Phonological Awareness. These goals focused on increasing attention to rhyming words for 47.5% of teachers and increasing sentence segmentation activities for 46.4% of teachers. The most common goal for Letter Knowledge was to increase 40.0% of teacher's use of a provided letter wall as an interactive teaching tool. To increase Print Concept knowledge, the most frequent goals were: to track print when reading aloud (26.9%), to

discuss directionality of print (26.8%), and discuss that text contains letters, words and sentences (26.8%). These final two print concepts were also selected as frequent goals in the context of Writing (41.6% and 43.5%, respectively). But, 41.5% of mentors and teachers also sought to improve Writing instruction by increasing use of shared writing activities in which children contribute ideas to a message as the teacher models writing.

Finally, for 32.2% of teachers a frequent Mathematics goal was to increase opportunities to model and practice counting skills. Another common goal for Mathematics (35.3%) was to provide more opportunities to practice addition and subtraction within the context of simple word problems.

CONCLUSION

To conclude, we firmly believe that concern and urgency is needed to provide pre-k children across our nation with the experiences they need to be successful in kindergarten. This chapter chronicles how we have sought to make progress toward this goal in one state using a comprehensive professional development program that includes a data-based mentoring approach. We remain committed to identifying and extending effective PD programs for early childhood teachers that ensure all children enter school ready to learn.

APPENDIX A

Classroom Environment Checklist (CEC)

Teacher Name:_____School Name:_____Date:___Mentor:_

Center/Independent Workstation Areas & Description		**Rating**
Basic Classroom Arrangement	1 – Room is disorganized, messy, and/or centers are undefined. 2 – Room is organized with three to six defined centers. There is space for large- and small-group meeting areas. Center definition and traffic flow might need improvement. 3 – Room is organized with at least seven recommended centers that are well defined. There is space for large- and small-group meeting areas and good traffic flow throughout the classroom.	☐1-low ☐2-moderate ☒3-high
Center Management System	1 – Centers are not labeled with both words and pictures or labels are not at eye level. Or there is no center management/rotation system. 2 – Three to six centers are labeled with words and pictures/icons and labels are at about child's eye level. There are places for children's name tags at each center or a central center planning board. 3 – At least seven recommended centers are labeled with words and pictures/icons and labels are at about child's eye level. There are places for children's name tags at each center or a central center planning board.	☐1-low ☐2-moderate ☒3-high
Variety of Accessible Center Materials	1 – There are very few materials in most centers and/or center materials are not accessible to children (e.g., paint in large containers that require adult supervision, materials on high shelves children cannot reach safely). 2 – There are some centers with few materials but others have an adequate variety of materials. All center materials are accessible to children. 3 – All centers have an adequate variety of materials. All center materials are accessible to children.	☐1-low ☐2-moderate ☒3-high

Center/Independent Workstation Areas & Description		**Rating**
Center Material Labels	1 – Materials and shelves are poorly labeled or not labeled at all. 2 – Some materials and shelves are labeled with words and/or pictures/icons to facilitate children's independent handling and storage of materials. 3 – Most materials and shelves are neatly labeled with words and pictures/icons to facilitate children's independent handling and storage of materials.	☒1-low ☐2-moderate ☐3-high
Books in Centers	1 – There are no books accessible to children in the classroom or there are only books in the classroom library center. 2 – There are books in the library and available in one to three additional centers. 3 – There are books in the library and are available in four to six additional centers. Books are center specific (e.g., books about building in the construction center) or theme/topic related.	☒1-low ☐2-moderate ☐3-high
Writing Tools in Centers	1 – Writing materials are only available in the Writer's Corner or writing center. 2 – Writing materials are available in the Writer's Corner or writing center and in one to three additional centers. 3 – Writing materials are available in the Writer's Corner or writing center and in four to six additional centers and these centers include a variety of writing tools or papers/materials to encourage purposeful writing activities.	☒1-low ☐2-moderate ☐3-high

Figure A1. Sample Ratings from Selected Items of Mentor's Observational Tools - CEC.

Classroom Observation Tool (COT)

Teacher Name:_____School Name:_____Date:___Mentor:_

(4) ***Oral Language Use: Language to Build Basic and Advanced*** *Understanding*
✓ Check if behavior observed
☒ Mark if observed, but needs support

Eng.	*Span.*	
✓ ☐	☐	Naming/labeling various items and specific parts of objects (e.g., instead of "Hand me that," "Hand me the *apron.*"). ♦Ejemplo español: "En vez de "Dame esto," "Dame el delantal."
☐	☐	Describing (how items look, feel, describe action; e.g., "The *blue* carpet feels *rough.*"). ♦Ejemplo español: "La alfombra azul se siente áspera."
☐	☐	Comparing/contrasting (how items/actions/etc. are the same or different; e.g., "An *apron* is like a *napkin* that is attached at your waist."). ♦Ejemplo español: "Un delantal es como un servilleta que se pone en la cintura."
☐	☐	Inferencing/Judgments (e.g., discuss something not explicitly stated or obvious "I think…" "I bet he's hungry," "I guess it's winter," "I think that's beautiful/funny/etc."). ♦Ejemplo español: "Yo creo que…" "Yo creo que tiene hambre," "Que bonito/chistosa."
✓ ☒	☐	Explaining (function/cause and effect; e.g., "A blender cuts things up very, very tiny." or "When you turn on a blender, the blades chop things up very finely."). ♦Ejemplo español: "Una batidora corta cosas hasta que estén muy pequeños."
✓ ☐	☐	Linking (personal connection; e.g., the bear in the text "sniffs" and teacher links: "When we had lunch yesterday, you *sniffed* the pizza.")

		♦Ejemplo español: “Cuando comimos ayer, oliste la pizza.”
Elicits Language from Children		
✓ ☐	☐	Ask knowledge level, basic questions (have right or wrong answers based on what you can see, hear, smell, taste, touch; naming, describing, recalling, etc.).
✓ ☒	☐	Ask higher level, thinking questions (analysis or thinking required, “why,” “how,” compare, linking, explain, etc.).
☐	☐	Encourage children’s use of language throughout the observation period regardless of type of activities.
☐	☐	Scaffold children’s responses if the task/question is difficult (e.g., simplify the question; provide clues; reduce choices to either/or question “Is it too deep or too heavy?”; provide a cloze prompt “The bucket was too dee…” (deep); model answer and ask child to repeat all or part of the answer “This pail is deep. Say deep.”). ♦Ejemplo español: “¿Es demasiado profundo o demasiado pesado?; El cubo era demasiado profundo.; Este cubo es profundo. Diga profunda.”
✓ ☐	☐	Engage children in conversations that involve child and teacher taking multiple turns about a conversational topic (e.g., 3-5 turns, such as Child(C)>Teacher(T)>C *or* T>C>T>C).
☐	☐	Teacher deliberately elicits language from all children, not just those who volunteer or those with stronger speaking skills.
		♦If dual language/bilingual classroom, teacher encourages child response in the current language of instruction if child responds in other language.
Evidence/Notes:		

Figure A2. Sample Ratings from Selected Items of Mentor’s Observational Tools - COT.

APPENDIX B

A series of figures show the goal-setting system and web-based user interfaces for collecting COT and CEC observational data, creating Mentor and Teacher Short Term Goal Report & Action Plan Reports, and tracking progress over time.

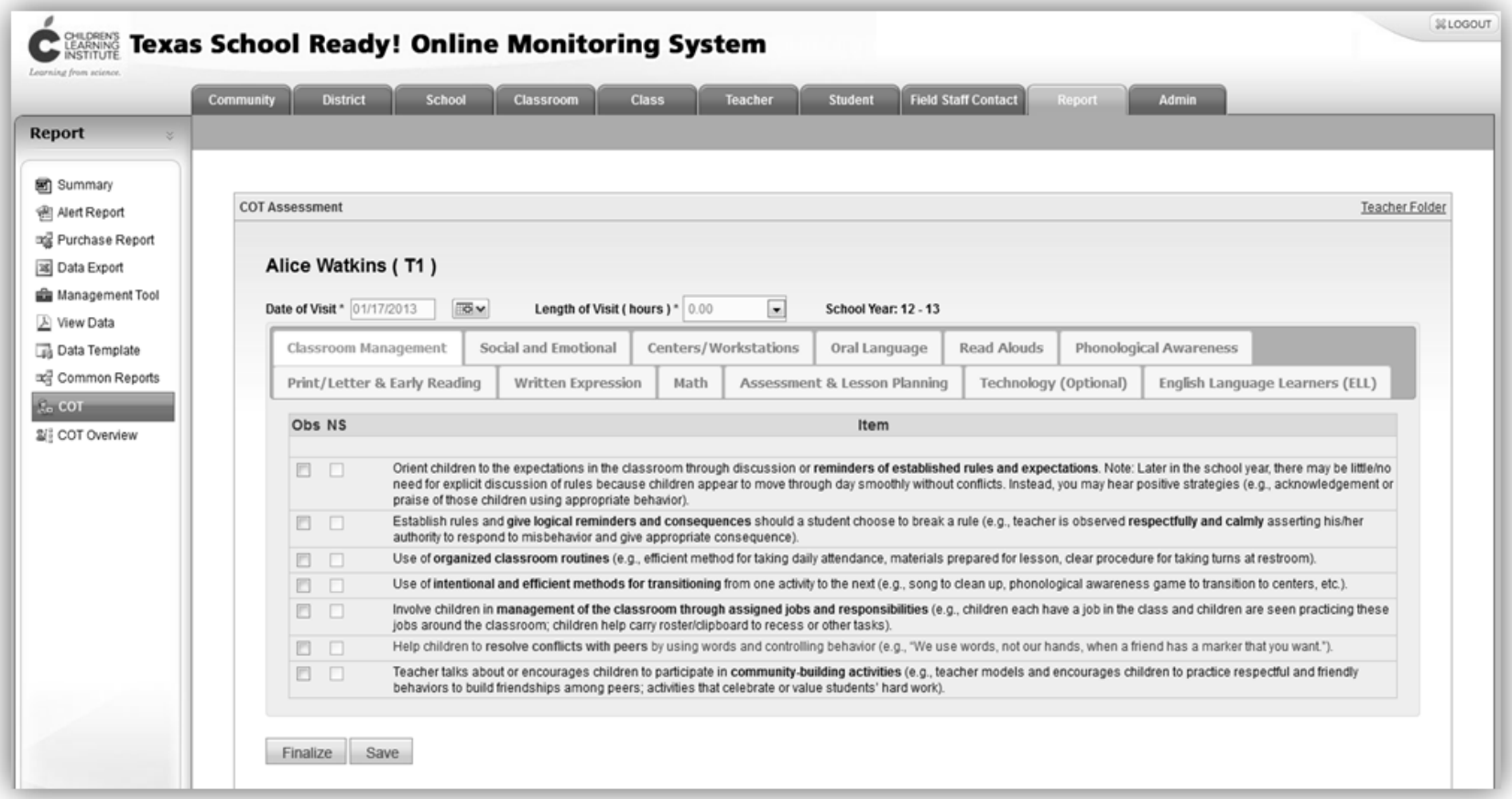

Figure B1. Screenshot of online goal-setting system. This page shows where a mentor documents observed teacher behaviors and flags behaviors that need support (NS) to improve quality or consistency.

Teacher Short Term Goal Report
Teacher Name: Alice Watkins
School Name: BINGHAM-BLANCHETTE EL
Mentor Name: Miguel Gallegos
Date:01/21/2013

Goals

Classroom Management

- Use of **organized classroom routines** (e.g., efficient method for taking daily attendance, materials prepared for lesson, clear procedure for taking turns at restroom).189

Written Expression

Core Concepts - "The What"

- Talk about **letter/sound correspondence during writing** activities.91

Approaches - "The How"

- Talk about and/or engage children in **independent writing** activities linked to current themes or topics of interest (e.g., teacher provides support, scaffolding, and guidance as needed).216

Assessment & Lesson Planning

- **Implement lesson plan activities generally as planned** to follow through with **scheduled** learning objectives.23
- **Duration of whole-group activities is appropriate** for children's attention span.239

Action Plan

On My Own:

The **On My Own** section of the action plan is where the teacher can list goals that she or he can achieve on their own. Help guide the teacher towards these goals by using information gathered from the COT, the children's assessment data, and the teacher's own understanding of what makes an effective lesson and why. Provide the teacher with any needed information, but encourage the teacher to accomplish these goals on her/his own before the next mentoring visit.

With Support:

The **With Support** section of the action plan is where the mentor will list how they will assist the teacher in achieving more difficult goals. Specifically, the mentor will list the mentoring strategy that they will use to best help the teacher accomplish the goal. If a teacher is struggling to meet previously established goals or is taking on goals with a higher level of difficulty be sure to outline specific steps you will take to help the teacher make progress.

Additional Comments:

The **Additional Comments** section is where the mentors can write any other constructive comments that will help support the teacher. These constructive comments can be resources that the teacher can refer to for activities, materials, and/or any other suggestions that can help the teacher. This section can also be used to acknowledge goals that the teacher achieved, or set goals based on the Classroom Environment Checklist.

Figure B2. Printable short-term goal report and action plan created by teacher and mentor.

Resources

Item	CIRCLE Manual	Prekindergarten Guidelines
23	• Read Best Practices. ◦ Challenging Instruction: ▪ Assessment ◦ Developing a Daily Schedule: ▪ Small Group Time ◦ Lesson Plans: ▪ Different Types of Instruction	Read pre-kindergarten guidelines viii. Effective Practices for Promoting School Readiness (p. 29-33).
239	• Read Best Practices. ◦ Developing a Daily Schedule	Read pre-kindergarten guidelines Incorporating Flexible Groupings (p. 33) and Classroom Activity Planning: Creating Opportunities for Interaction as Well as Self Discovery (p. 20).
189	• Read Best Practices. ◦ Establishing Rules and Routines	I.B.1.a. Child follows classroom rules and routines with occasional reminders from teacher.
91	• Read Written Expression. ◦ Shared and Interactive Writing Opportunities in the Classroom: ▪ Daily News ◦ Interactive Writing: ▪ Interactive Writing Lesson ▪ Dictation ◦ Concepts About Print	III.C.2. Child recognizes at least 20 letter sounds. III.C.3. Child produces the correct sounds for at least 10 letters. IV.C.1. Child independently writes some letters on request (not necessarily wellformed).
216	• Read Written Expressions. ◦ Independent Writing	IV.A.1. Child intentionally uses scribbles/writing to convey meaning. IV.B.1. Child independently uses letters or symbols to make words or parts of words. IV.B. 2. Child writes own name (first name or frequent nickname), not necessarily with full correct spelling or well formed letters.

Figure B3. Sample of linked resources suggested to achieve identified goals.

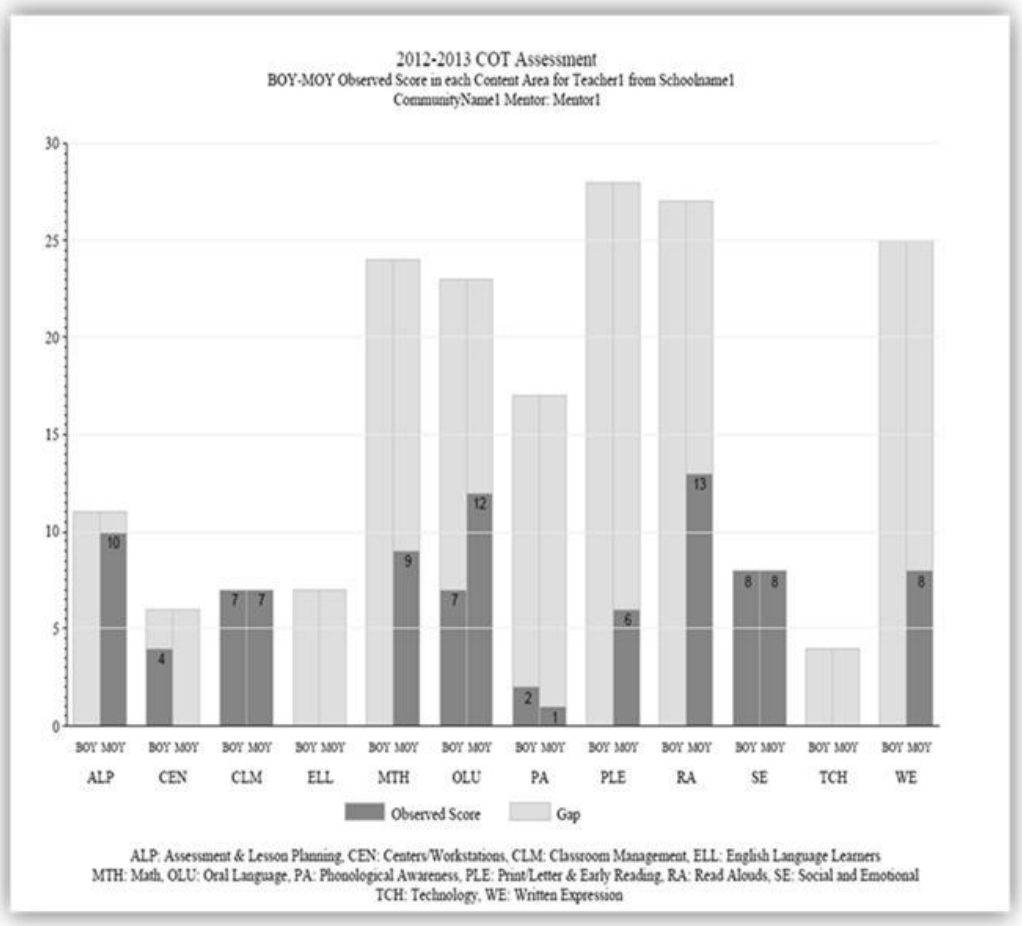

Figure B4. Graph of teacher progress from beginnning of year (BOY) to middle of year (MOY) in demonstrating evidence-based practices on the COT.

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