

Reflecting, Coaching and Mentoring to Enhance Teacher–Child Interactions in Head Start Classrooms

Betty Zan · Mary Donegan-Ritter

Published online: 30 April 2013
© Springer Science+Business Media New York 2013

Abstract In this study we examined the impact of a year long model of professional development comprised of a monthly cycle of video-based self-reflection, peer coaching, and mentoring and bimonthly workshops focused on selected Classroom Assessment Scoring System (CLASS) dimensions. Education supervisors were trained and supported by project staff to lead coaching sessions with a team of teachers. Monthly changes in the quality of teacher–child interactions as measured by CLASS were examined. The intervention group ($n = 38$) was significantly different than a comparison group ($n = 22$) at the end of the year. There were significant increases in four dimensions related to behavior management, productivity, language modeling and quality of feedback. Similar patterns of change were found for teachers with and without college degrees. Effective instructional practices can be developed and implemented by teachers when they are provided multiple opportunities to engage in sustained professional development experiences based on a valid observational measure. Implications for designing cost effective CLASS-based professional development as well as limitations of this study are discussed.

Keywords Professional development · Mentoring · Peer coaching · Teacher–child interactions · Head Start teachers

Introduction

Research shows teacher–child interactions are a critical component of high quality preschools and strongly related to children’s learning and development (Burchinal et al. 2002; Hamre and Pianta 2001; NICHD ECCRN 2000; Pianta et al. 2005, Pianta et al. 2008a; Pianta and Stuhlman 2004 summarized by the National Scientific Council on the Developing Child 2004). Specifically, this body of research suggests that certain characteristics of high-quality learning environments and teacher–child interactions are associated with greater academic and social gains for children. Learning environment characteristics include high productivity, opportunities for higher-order thinking skills, and enthusiasm for learning. Teacher characteristics include child-centered beliefs about children and learning; warm, sensitive relationships with children; and high-quality language modeling and verbal feedback.

These characteristics tend to transcend teacher qualifications, credentials, and curriculum. In fact, teacher characteristics such as degrees and credentials are not the best predictors of child outcomes (LoCasale-Crouch et al. 2007; Early et al. 2006, 2007). That is, some teachers without degrees seemingly naturally interact with students in ways that are associated with quality outcomes for children. However, often these teachers do not have the training or education to develop strong curriculum and assessment strategies or understand how to teach children with special needs. Despite the Office of Head Start’s recommendation for higher levels of formal education and specialized early childhood professional preparation, early childhood teachers and supervisors with a wide range of formal education levels work together in Head Start classrooms (this is also true of community-based preschool and child

B. Zan · M. Donegan-Ritter (✉)
Regents Center for Early Developmental Education, University
of Northern Iowa, 012 Schindler Education Center,
Cedar Falls, IA 50614, USA
e-mail: mary.donegan-ritter@uni.edu

care settings). The field of early education needs effective models of professional development (PD) that are linked to higher quality early education and positive outcomes for children at risk for later school failure and that are effective with teachers from a wide range of educational levels.

The Classroom Assessment Scoring System (CLASS) (Pianta et al. 2008a) provides a way to assess and quantify aspects of classroom quality that are described as process variables related to how teachers implement curriculum and interact with children in ways that support children's social and academic performance. The CLASS was developed at the Center for the Advanced Study of Teaching and Learning (CASTL) at the University of Virginia. Based on developmental theory, the CLASS was developed in response to research examining the central role of teacher–child interactions in development and learning. It was developed from scales used in several large-scale national studies of child care, preschool, and early elementary classrooms, including the NCEDE Multi-State Study of Pre-Kindergarten and the Study of State-Wide Early Education Programs (Early et al. 2005).

In two large national studies of prekindergarten that together spanned 11 states and included 705 classrooms (Early et al. 2005), results of the CLASS (which rates ten dimensions within three domains on a 1–7 scale with 7 being high) suggested that most prekindergarten classrooms score in the mid to high range on the *Emotional Climate* domain (mean 5.52) but score much lower on the *Instructional Support* domain (mean 2.03). (It should be noted that at the time of these studies, this domain consisted of 2 dimensions—concept development and quality of feedback. The language modeling dimension was added subsequent to this research.) These findings were echoed in the results of the My Teaching Partner project (Pianta et al. 2008b) in which the CLASS was used as part of a PD intervention in 113 preschool classrooms. In this study, mean scores for the three dimensions of the Instructional Support domain were all below 3 (mean scores were 2.69 for Concept Development, 2.87 for Quality of Feedback, and 2.85 for language modeling).

Professional development for early childhood teachers is an essential element in improving the quality of teacher–child interactions in early education. As a supplement to coursework and workshops, various combinations of coaching, mentoring, and peer learning models are being implemented as a means of supporting teachers to apply new learning in their classroom interactions with children. Neuman and Cunningham (2009) found a college course and ongoing coaching to be more effective than a college course alone in teachers' use of literacy strategies in child care and home-based programs. Head Start teachers who engaged in ongoing and sustained PD related to literacy made more gains than a comparison group of teachers

(Algozzine et al. 2011). Pianta et al. (2008b) report that teachers who received online consultation with individualized feedback showed greater improvement in their interactions with children than teachers who only had access to video clips. In addition, teachers in high poverty classrooms who received individualized intervention showed improvement in teacher–child interactions over the course of the year while classroom teachers who received fewer supports had a pattern of declining quality.

This article reports on the results of an experimental research study of the effects of an intensive professional development program called Coaching and Mentoring for Preschool Quality (CAMP Quality) which was developed with the support of a Head Start–University Partnership Teacher Effectiveness grant. The PD program was designed to improve the quality of teachers' interactions with children as measured on the CLASS. Given that low levels of Instructional Support, moderate levels of Classroom Organization, and high levels of Emotional Support have been found in national studies of early childhood quality (Curby et al. 2010; Pianta et al. 2008a, b), the primary emphasis of CAMP Quality was on improving teachers' use of instructional supports. Previous research on the use of CLASS for PD has relied on the use of outside experts to work with teachers (for example, Pianta et al. 2008b). In contrast, the CAMP Quality model used Head Start education supervisors to provide coaching to a teaching team (comprised of lead teacher and an assistant teacher or two co-teachers). These supervisors were trained in coaching skills and in using the CLASS with reliability, and were given ongoing support by project staff.

The goals of the CAMP Quality project were: (a) to increase the effectiveness of Head Start teachers in promoting the language, academic, social, and emotional development of children; (b) to increase the effectiveness of Head Start supervisors in mentoring Head Start teachers, and (c) to improve the educational and social-emotional outcomes of Head Start children. Our hypothesis was that we would see higher end-of-year CLASS scores in the intervention group. Our research questions were: (a) do preschool teachers who participate in an eight month long program of intensive PD improve their interactions with children? and, (b) do teachers who possess a bachelor's degree or higher make the same gains as teachers who have lower educational attainment?

Method

Participants

Directors of four Head Start grantees in Iowa were contacted by project staff to discuss the opportunity for their

staff to participate in an intensive eight month long program of CLASS-based PD. Each agreed to participate. Two of the grantees were located in urban areas and two were located in primarily rural areas. Participants in the project included mentors (the education supervisors) and teachers (both lead and assistant).

Mentors

Each director selected four to six education supervisors to be trained as mentors, for a total of 19 mentors. Demographic data on the mentors can be found in Table 1. Supervisors who were new to Head Start were excluded from participation. Supervisors generally were responsible for supervising from 5 to 10 classroom teams. Two classroom teams that were part of each supervisor's case load were identified, invited to participate, and randomly assigned to either the intervention group or the comparison group.

Teachers

A total of 60 teachers (lead and assistant) from 30 classroom teams participated in the study. The teachers from three grantees were randomly assigned into an intervention or comparison group. Eight teams from the comparison group were dropped from the analysis due to incomplete data. Teachers from the fourth grantee ($n = 8$) were only assigned to the intervention group because this grantee had fewer staff available due to being part of the pilot project. As a result, 38 teachers were in the intervention group and 22 teachers were in the comparison group. All comparison

group teachers were offered the CAMP Quality PD program the following year.

As shown in Table 1, basic characteristics of ethnicity, gender, education, and years of experience were similar across both groups of teachers.

Procedures

Each grantee was given videotaping equipment, a DVD duplicator, blank DVDs, training on how to use the equipment, and ongoing technical support. Project staff conducted an orientation meeting with participating staff. Each classroom team was given a binder with all written forms, and postage paid addressed envelopes to send completed forms and a copy of each classroom DVD to the project office. Lack of access to high speed internet, outdated computers and resistance to working in an online environment prohibited completing and exchanging PD materials online.

Teacher Professional Development

The CAMP Quality model of PD consisted of four components (see Fig. 1): workshops, teacher video-based self-reflection, peer coaching, and mentoring. These components of the model are explained below.

Workshops

Teachers and mentors participated in four bimonthly three-hour interactive workshops developed and conducted by two project staff. Each of the four workshops used a combination of lecture (which included examining videotape exemplars), discussion, and active learning (demonstrations and role plays) to learn about teacher–child interactions related to school success. The first workshop focused on the emotional support domain (positive climate, teacher sensitivity and regard for student perspective) and the other three workshops focused on a dimension within the instructional support domain (i.e., language development, concept development and quality of feedback) with the integration of content from literacy, math, physical science, and visual arts. Our decision to focus most intensively on the instructional support domain was based on national research findings as well as a needs assessment during a pilot study that showed consistently low scores in this domain.

Video-Based Self Reflection

Monthly video-based teacher self-reflection was a main component of the professional development. Each

Table 1 Teacher demographics

	Intervention teachers N = 38	Comparison teachers N = 22	Mentors N = 19
White	35 (92 %)	20 (91 %)	19 (100 %)
African-American	2 (3 %)	–	–
American Indian/ Alaska native	1 (3 %)	–	–
No information on race/ethnicity	–	2 (10 %)	–
Female	37 (97 %)	22 (100 %)	19 (100 %)
Male	1 (3 %)	–	–
Average age	39 years	36 years	47 years
Teaching experience	10 years	8.6	15 years
Degreed (\leq BA)	21 (55 %)	12** (63 %)	13 (68 %)
Non-degreed	17 (45 %)	7** (37 %)	6 (32 %)

** Only 19 comparison teachers provided education data

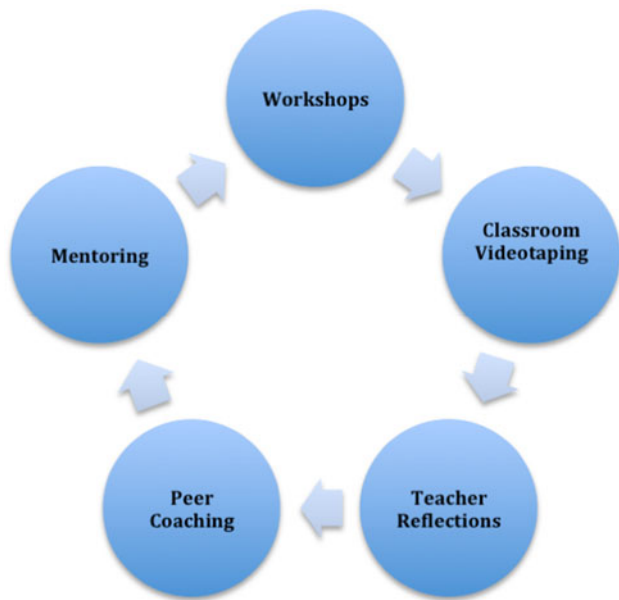


Fig. 1 CAMP quality professional development model

intervention teacher was videotaped monthly for 15–20 min during a structured time (e.g., adult led group time) and for 15–20 min during an unstructured time (e.g., child initiated centers). We believed this guideline would provide a consistent picture over the course of the 8 month PD program and allow comparisons to be made. The videotapes were copied onto DVDs and given to teachers, mentors and project staff. Each month, teachers watched their DVDs in private during paid release time, using written teacher reflection guides developed by project staff to focus on specific CLASS dimensions that varied by month. The guides provided a structure for teachers to reflect and respond to questions in writing about their interactions with children. In addition, the guides probed teachers to identify specific video segments and describe in writing specific types of interactions with a child/children (e.g., an informal conversation), as well as to identify missed opportunities and describe what they could have done or said. Figure 2 shows a teacher reflection guide for the CLASS dimension of language modeling.

Peer Coaching

Several days following the video-based self-reflection, a peer coaching meeting took place between each lead teacher and his or her assistant teacher, also during paid release time. Peer coaching or peer learning is defined as a reciprocal sharing of information and support between lead and assistant teachers in a one-to-one manner (US Department of Education 2010). Written guides were completed by each teacher as they asked their partner

teacher questions that were somewhat more general but similar in content to those on the teacher self-reflection guide. Each peer coaching meeting varied in time ranging from 20 to 45 min. This component was designed to allow teachers an opportunity to talk aloud to their teaching partner about what insights they gained during their individual teacher reflections. Figure 3 shows a peer coaching guide for language modeling.

Mentoring

Monthly mentoring meetings were led by Head Start supervisors who were trained and supported by project staff. The project made a deliberate decision to use Head Start supervisors as coaches or mentors, rather than outside experts. The project provided training in coaching skills and ongoing support on a monthly or as-needed basis. The supervisors who assumed the role of mentor each worked with one classroom team that was a part of their assigned caseload. Each classroom team was comprised of a lead teacher and an assistant teacher or two co-teachers. The mentors met monthly with this classroom team, either individually or together, for approximately 1 hour in mentoring sessions (during paid release time). The mentors used written guides with open-ended questions they could select and use to encourage each teacher to share his or her observations and insights and to engage in discussion to exchange ideas between the teacher and mentor. A mentor guide for language modeling is shown in Fig. 4. The teachers shared what they learned from their self-reflection and peer coaching. Mentors, who had already viewed and CLASS scored the classroom DVDs, provided encouragement, made suggestions, and shared resources. The completed teacher reflection guides, peer coaching guides and mentoring guides were copied and sent to project staff and served as a fidelity of implementation and dosage indicator.

Content of the Monthly Coaching and Mentoring

The focus of each month's video-based self-reflection, coaching, and mentoring were purposefully similar to one another. The first month's focus was broad and served to introduce participants to the self-reflection, peer coaching, and mentoring process. The second month's coaching and mentoring focused on emotional supports, given that this was typically an area of strength for teachers. Two months of coaching and mentoring focused on classroom organization. Four of the eight months of coaching and mentoring focused on the instructional support domain of CLASS. Pianta et al. (2005) found that the ways in which teachers implement curriculum to support cognitive and language development are predictive of student's later academic achievement. In addition, the instructional support domain has been found to

Fig. 2 Teacher reflection guide for language modeling

Teacher Reflection Guide for Language Modeling

CAMP Quality Teacher Reflection Guide #4 (December)
FOCUS: Scaffolding Children’s Language Development

This month’s reflection follows up on what we learned about in our second workshop-- the various ways teachers support children’s oral language skills in the preschool classroom.

Please read over the following questions. As you view your DVD, jot down notes on what you observe that demonstrates how you facilitate children’s understanding and expression of spoken language. For the last question we ask you to write down the time of a video excerpt that shows how you facilitate children’s language to share with your peer coach and mentor. Then write your responses to the questions.

Be sure to make a copy for your folder and bring it with you to your peer coaching and mentoring meeting. Thank you for your cooperation!

- 1) Describe an instance in which you engaged in a conversation with a child. Count how many back and forth exchanges took place between you and the child. Write down what you did or said to get the conversation started (i.e., sit on child’s level, follow the child’s agenda, describe what the child was doing, ask questions). What did you do to keep the conversation with the child going? If the child initiated the conversation, how did you respond to his or her initiation to keep the conversation going?
 - 2) Did you use self-talk or “thinking out loud” as you interacted with children? If so, describe what you said. If you did not, when could you have done so? What could you have said?
 - 3) Did you repeat or extend what the child said? If so, write down what the child said and what you said. If not, what could you have said in response to a child’s attempt to communicate verbally or nonverbally?
 - 4) What advanced words or new vocabulary did you use? What kinds of words did you use (i.e., nouns, verbs, adjectives, adverbs)? Describe what you said to give clues about the meaning of one of the new words. What ideas do you have for reinforcing these new words so the children learn them?
 - 5) Write down the questions that you asked children during one 15-20 minute video segment. Look them over. What questions did you ask that require a longer response? Mark them as OE (open-ended). What questions did you ask that children could answer with one word? Mark them as CE (closed-ended). Do you ask more open-ended questions or more closed-ended questions? How can you reword the same closed-ended question in a way that requires a more elaborated response?
 - 6) Briefly describe what took place in the excerpt you want to share that shows how you encourage children’s talking. Note the time of the excerpt. Why did you select that excerpt? What strategies did you use? How effective were your strategies in promoting children’s language?
-

Fig. 3 Peer coaching guide for language modeling

Peer Coaching Guide for Language Modeling

Coach: _____ Site: _____

Teacher being coached: _____ Date: _____

PEER COACHING MEETING GUIDE #4 (December)

You and your partner will each take turns being the “coach.” Ask the following questions to your partner. Jot down a summary of your partner’s responses.

Bring a copy to share with your mentor during your upcoming meeting.

- 1) During a conversation with a child or children, how many back and forth exchanges took place between you and the child/children? What did you do or say to get the conversation started and keep it going?
 - 2) In what ways did you use self-talk or “thinking out loud” as you interacted with children?
 - 3) In what ways did you repeat or extend what a child says?
 - 4) Describe an example of how you used advanced words or new vocabulary with children in your classroom.
 - 5) What kinds of questions did you most frequently use when interacting with children? What changes can you make to encourage children to talk more?
 - 6) Give some background about the excerpt you selected that shows how you encouraged children’s talking. View the excerpt together. Identify what strategies you used. How effective were your strategies in promoting children’s language?
-

be the lowest performing for most teachers. Hence, the CAMP Quality model was designed to give each instructional support dimension particular emphasis. Figure 5 lists the topics of each month’s PD.

Mentor Professional Development

Before the start of the project, mentors participated in a two-day training, conducted by project staff, to use CLASS with reliability. The mentors from each grantee met monthly with their assigned project staff in a small group setting to develop mentoring skills (e.g., effective communication, descriptive praise). During these mentor development meetings they often viewed DVDs of classroom observations in order to closely observe specific

interactions, discuss ways to coach teachers in the change process, and address issues that mentors raised (such as overcoming resistance). The meetings allowed project staff to model collaboration by sharing resources and engaging in open communication with the mentors. The project staff, certified as CLASS trainers, also conducted regular CLASS reliability drift checks during these meetings.

Measures

Each teacher’s 30–40 min video recording was divided into two segments of 15–20 min’ duration for CLASS coding by graduate students trained to reliability and blind to the study condition. A second coder independently coded a random selection of 10 % of the DVDs with an overall inter-rater

reliability of 85.1 %. The comparison teachers were videotaped in September and April. Paired t-tests were conducted for each group (degreed and non-degreed) for each dimension of the CLASS in September and April.

Results

Our first research question focused on the impact of participation in the CAMP Quality professional development program on teacher’s interactions with children. As shown

in Table 2, the intervention group showed statistically significant change in four of the ten CLASS domains between September (the pre-test) and April (the post-test). Among intervention group participants, mean scores in the Behavior Management domain increased significantly from 5.4 in September to 5.8 in April ($p = .008$). In the Productivity domain, the intervention group’s mean score increased significantly from 5.4 in September to 5.9 in April ($p = .008$). Quality of Feedback increased among intervention group participants from 3.2 in September to 4.1 in April ($p = .004$). Finally, language modeling

Fig. 4 Mentoring guide for language modeling

Mentoring Guide for Language Modeling

Mentor _____ Site _____

Teachers _____ Date _____

Mentoring Guide #4 December
Focus Area: Scaffolding Children’s Language Development

DIRECTIONS to Mentors:

- 1) Read over the teacher’s reflection guide
- 2) View the excerpts the teachers selected (If none, encourage them to do so next time).
- 3) Generate one or two questions that you want to ask each teacher about their facilitation of children’s language development. Write your questions below:

- 1.
- 2.

MENTORING QUESTION BANK:

Select any of the following as conversation starters.

- What strategies did you use most frequently to promote children’s oral language in your classroom?
- What kinds of questions did you tend to ask? Why?
- What did you do or say to get conversations going between you and children?
- What advanced language or new vocabulary did you use? What did you say to help children understand the meaning of the word?
- In what ways can you support children with language delays?

Fig. 4 continued

- What ideas do you have for different learning activities that promote language use?

ASK BOTH TEACHERS THE FOLLOWING QUESTIONS:

- a) Why did you choose the excerpt you selected? What did you learn from watching it?

Teacher 1:

Teacher 2:

- b) Name one thing that you learned today that you will take away and put into practice.

Teacher 1:

Teacher 2:

- c) What is your goal for the next few weeks?

Teacher 1:

Teacher 2:

- d) What do you need to reach your goal?

Teacher 1:

Teacher 2:

increased in the intervention group from 3.3 in September to 3.9 in April ($p = .004$). In contrast, the comparison group showed statistically significant change in two of the ten domains during the same time period. Negative Climate increased from a mean score of 1.1 in September to a mean score of 1.5 in April ($p = .005$) (it should be noted that Negative Climate is reverse-scored). Regard for Student Perspective decreased in the comparison group from a mean score of 4.9 in September to a mean score of 4.4 in April. CLASS scores in the instructional support

domain did not change significantly over the course of the year.

Our second research question was concerned with whether participation in the CAMP Quality PD would have a similar impact on degreed and nondegreed teachers. Participants classified as “Degreed” were those who had earned a Bachelor’s degree or higher. Participants classified as “Non-degreed” were those who had completed a high school diploma, GED, some college courses, or an Associate’s degree. In order to reduce variability, CLASS

Fig. 5 Topics of monthly CAMP quality professional development. ** Also the topic of a workshop

Topics of Monthly CAMP Quality Professional Development

•September:	General Introduction
•October:	Emotional Climate**
•November:	Making the Most of Time
•December:	Promoting Language**
•January:	Scaffolding Thinking**
•February:	Scaffolding Thinking
•March:	Facilitating Engagement
•April:	High Quality Feedback**

Table 2 Changes in CLASS scores from beginning to end of year

Class dimension	Intervention (N = 38)			Comparison (N = 22)		
	September mean (SD)	April mean (SD)	<i>p</i> value	September mean (SD)	April mean (SD)	<i>p</i> value
Positive climate	6.0 (.64)	6.2 (.36)	n.s.	5.8 (.74)	5.8 (.80)	n.s.
Negative climate	1.1 (.23)	1.1 (.31)	n.s.	1.1 (.29)	1.5 (.73)	.005
Teacher sensitivity	5.5 (.53)	5.6 (.42)	n.s.	5.3 (.69)	5.3 (.80)	n.s.
Regard for student perspectives	5.3 (.70)	5.1 (.62)	n.s.	4.9 (.74)	4.4 (1.05)	n.s.
Behavior management	5.4 (.69)	5.8 (.60)	.028	5.3 (.78)	5.1 (1.08)	n.s.
Productivity	5.4 (.59)	5.9 (.52)	.008	5.5 (.52)	5.4 (.99)	n.s.
Instructional learning formats	4.6 (.60)	4.8 (.69)	n.s.	3.9 (.91)	4.0 (1.11)	n.s.
Concept development	2.9 (.69)	3.1 (.70)	n.s.	2.3 (.84)	2.2 (.79)	n.s.
Quality of feedback	3.2 (.69)	4.1 (.68)	.001	3.1 (.78)	3.1 (.60)	n.s.
Language modeling	3.3 (.74)	3.9 (.56)	.004	2.8 (.78)	2.7 (.73)	n.s.

scores from two months were used for fall and spring comparisons as shown in Table 3. Based on comparisons of pre-test and post-test CLASS scores, teachers showed identical patterns of uptake of the PD. That is, significant differences were found in both groups for the domains of Behavior Management, Productivity, Quality of Feedback, and Language Modeling. No significant differences were found in the other six dimensions for either group. These results indicate that the CAMP Quality PD approach was equally effective for both degreed and non-degreed teachers.

Discussion

In this experimental study of the effectiveness of CLASS-based professional development comprised of bimonthly workshops and monthly video-based teacher self-reflection, peer coaching and mentoring, intervention teachers made statistically significant improvements in the quality of their teacher–child interactions in the domains of behavior

management, productivity, quality of feedback, and language modeling as measured by CLASS. However some of these changes, although statistically significant, may not have made a practical difference. For example, the finding that scores on Behavior Management increased significantly in the intervention group was puzzling, given that Behavior Management was not a focus of this professional development. We concluded that PD on the use of Positive Behavior Supports that had taken place over the previous two years, including in Head Start programs across the state, may have had an effect on the Behavior Management scores.

The finding of a significant increase in the Productivity scores among the intervention teachers was also slightly puzzling. Although Productivity was the focus of one monthly cycle of CLASS professional development titled “Making the Most of Classroom Time,” it was not a workshop topic. The increase may have been a result of the children learning the routines and making transitions more efficiently. It may be that it is a dimension that requires

Table 3 Differences between degreed and non-degreed teachers from beginning to end of year

Class dimension	Degreed			Non-degreed		
	Sept/Oct	Mar/Apr	<i>p</i> value	Sept/Oct	Mar/Apr	<i>p</i> value
Positive climate	5.9	6.1	n.s.	5.9	6	n.s.
Negative climate	1.2	1.1	n.s.	1.1	1	n.s.
Teacher sensitivity	5.5	5.6	n.s.	5.6	5.8	n.s.
Regard for student perspectives	5.1	5.1	n.s.	5.3	5.4	n.s.
Behavior management	5.2	5.8	.026	5.3	5.8	.001
Productivity	5.3	5.7	.013	5.3	5.9	.005
Instructional learning formats	4.6	4.4	n.s.	4.6	4.6	n.s.
Concept development	2.9	2.9	n.s.	3	3	n.s.
Quality of feedback	3.3	4.2	.001	3.5	4.2	.016
Language modeling	3.3	3.9	.002	3.4	3.8	.031

relatively little effort to improve. The results from the Instructional Support domain provide stronger support for the effectiveness of our model of PD. Quality of feedback, concept development and language modeling were each topics of workshops, as well as the focus of four months of reflection, peer coaching and mentoring cycles. The intervention group improved almost one point on quality of feedback and more than half a point on language modeling while the comparison group teachers on both CLASS dimensions stayed the same over the same time period. Even modest gains in the instructional support domain have been linked to academic gains for children (Howes et al., 2008). The lack of significance in the dimension of Concept Development (end of year mean was 3.1) may be related to the relatively high score (2.9) for the intervention group at the start of the year. The comparison group had similar scores in concept development at the beginning and end-of-year (2.3 and 2.2 respectively), which is closer to the national average in that dimension.

The finding that both degreed and non-degreed teachers showed similar patterns of improvement in teacher–child interactions suggests that the PD was equally effective with both groups. This may be due to the fact that the teams of teachers, most frequently comprised of a degreed and non-degreed teacher, worked on the same skills at the same time and supported each other during the peer coaching component. Hence it is not surprising that similar gains were made. Akerson et al. (2009) found that a community of practice among teachers alone was not sufficient but, when combined with reflections and workshops, resulted in improvement in teacher knowledge and practice. Whether led by supervisor (expert model) or peer (reciprocal model), coaching has been found to be an effective model of follow-up support for teachers implementing evidenced-based practices (Kretlow and Bartholomew 2010). Similar to findings of previous research in early childhood settings, intervention teachers who received coaching were more

likely to enact the desired teaching practices and apply them appropriately (Landry et al. 2009; Neuman and Cunningham 2009; Pianta et al. 2008a, b).

In this project teachers observed their interactions with children and analyzed what they did through the use of video-based self reflection. Each teacher then formulated a plan for change during the peer coaching meeting with their partner teacher and during the mentoring meeting with their mentor/education supervisor. The use of video-based teacher reflection allowed the coaching and mentoring to be based on observations grounded in teacher practice. Video-based self-reflection has been found to be an effective tool for supporting preservice teachers through the change process (Robinson and Kelley 2007; Welsch and Devlin 2006).

The CAMP Quality model of PD contributes to a growing consensus on best practices in early childhood PD that includes focusing on small groups of teachers in the teacher's setting (Kretlow and Bartholomew 2010), using a validated, objective lens to set goals (LoCasale-Crouch et al. 2011), and providing a sustained amount of time for PD (Yoon et al. 2007). In an extensive review of literature on PD, Yoon et al. (2007) found that sustained and intensive PD (i.e., 30–100 h spread out over 6–12 months) predicted student achievement gains. PD that is sustained and intense has a greater chance of transforming teaching practices and student learning. Student achievement improved the most when teachers participated in PD that was sustained, collaborative, (Algozzine et al. 2011) and focused on deepening teachers' content knowledge and instructional practices (Saxe et al. 2001). The CAMP Quality model was designed with these characteristics in mind, and the results are in line with previous research on effective PD.

Although this study contributes to what is known about what constitutes effective PD, we must recognize that it was a small, tightly-controlled study. In thinking about generalizability, we acknowledge significant barriers related to

lack of time and resources. The grantees we approached willingly participated in this time-intensive PD model. The adoption of CLASS as a part of the Office of Head Start's federal review process spurred increased interest and commitment to this project across our state in CLASS-related PD. An attractive component of this PD model was the involvement of Head Start supervisors, many of whom had little or no formal training in supervision and PD, to prepare them to serve as expert coaches or mentors. Although each mentor worked with only one classroom team using the CAMP Quality model, our hope was that the skills they gained and the CLASS lens they developed would be a means of ensuring sustainability and improving overall program quality. The decision to train and support existing Head Start supervisors resulted in the coaching being set in the context of an on-going, individualized relationship between the coach and teacher. The mentor PD stressed and modeled a paradigm shift away from a supervisory focus on changing deficits to a more supportive mentoring relationship. In an ideal situation, mentoring and coaching would be conducted by people who do not have supervisory responsibilities. However, tight budgets in Head Start programs require staff to wear many hats and to navigate the sometimes blurry boundaries between roles.

In this model, the role of the project staff during the 8 months of PD was to conduct workshops, lead mentor development, and provide reminders to staff on keeping to timelines and submitting paperwork as a means of ensuring high rates of dosage. This project had exceedingly high implementation with a mean of 94.1 % completed teacher reflections, 86.4 % completed peer coaching meetings and 77.6 % mentor meetings. For example, all except two of the 19 mentors completed at least 7 of the 8 mentoring meetings with their teachers. These findings suggest that technical assistance ensured high levels of implementation through ongoing support.

Limitations and Future Research

There are several limitations to this study. First and foremost is the relatively small sample size and the larger group size of the intervention group. In addition, data analysis was based on two 15–20 min videotaped segments for each participating teacher in the first month which were CLASS coded and compared to two video segments in the last month of the study. More videotaped segments would have given a fuller picture of how the teachers interacted with children. The decision to record only two segments was entirely based on the grantees' lack of resources and staff to conduct the video recording. Furthermore, our study was conducted with Head Start teachers and may not be generalizable to child care staff or privately funded preschool programs. Although participation in the study was voluntary and teachers were

randomly assigned to intervention or comparison groups, these programs were highly motivated to participate in CLASS-related PD due to the Office of Head Start's decision to use CLASS for program monitoring and reauthorization. Whether other early childhood programs not being monitored by CLASS would invest this level of commitment to PD is unknown. Finally, this study lacks evidence that teacher change is related to student growth and learning.

Future research should focus on identifying how much of which component of PD is most effective in creating teacher change. Whether the intervention group maintained changes in teacher practice over time and across curricular areas is another area of study. Examining the quality of the coaching relationship and determining whether higher quality coaching is positively related to greater teacher change is also important to explore in the future.

Conclusion

This study provides evidence that an eight-month long program of PD comprised of workshops, video-based teacher self-reflection, peer coaching and expert coaching showed modest improvement in teacher–child interactions for degreed and non-degreed teachers alike, compared to a group of similar teachers who did not participate in the PD. In addition, when given training and ongoing support by project staff, we found that most Head Start education supervisors developed coaching and mentoring skills that are related to improved teacher interactions as measured by CLASS. The CAMP Quality model provides early childhood programs a cost effective and intensive approach to improving classroom quality.

Acknowledgments This research was funded by a Head Start—University Partnership Research Grant: Strategies for Developing Head Start Teacher Effectiveness. HHS-2008-ACF-OPRE-YR-0060.

Conflict of interest The authors state that they have no conflict of interest.

Ethical standards This research study was reviewed and approved by the Institutional Review Board of the University of Northern Iowa. All persons gave informed consent prior to the start of the study.

References

- Akerson, V. L., Cullen, T. A., & Hanson, D. L. (2009). Fostering a community of practice through a professional development program to improve elementary teachers' views of nature of science and teaching practice. *Journal of Research in Science Teaching*, 46, 1090–1113. doi:10.1002/tea.20303.
- Algozzine, B., Babb, J., Algozzine, K., Mraz, M., Kissel, B., Spano, S., et al. (2011). Classroom effects of an early childhood

- educator professional development partnership. *NHSA Dialog*, 14(4), 246–262.
- Burchinal, M., Peisner-Feinberg, E., Pianta, R., & Howes, C. (2002). Development of academic skills from preschool through second grade: Family and classroom predictors of development trajectories. *Journal of School Psychology*, 40(5), 415–436.
- Curby, T. W., Grimm, K. J., & Pianta, R. C. (2010). Stability and change in early childhood classroom interactions during the first two hours of a day. *Early Childhood Research Quarterly*, 25(3), 373–384.
- Early, D., Barbarin, O., Bryant, D., Burchinal, M., Chang, F., Clifford, R., et al. (2005). *Pre-kindergarten in eleven states: NCEDE's multi-state study of pre-kindergarten and study of state-wide early education programs (SWEEP). Preliminary descriptive report*. Chapel Hill, NC: University of North Carolina, Child Development Institute. Retrieved November 28, 2007 from www.fpg.unc.edu/ncedl/pdfs/SWEEP_MS_Summary_final.pdf.
- Early, D., Bryant, D., Pianta, R., Clifford, R., Burchinal, M., Ritchie, S., et al. (2006). Are teachers' education, major, and credentials related to classroom quality and children's academic gains in pre-kindergarten? *Early Childhood Research Quarterly*, 21, 174–195.
- Early, D., Maxwell, K., Burchinal, M., Bender, R., Ebanks, C., Henry, G., et al. (2007). Teachers' education, classroom quality, and young children's academic skills: Results from seven studies of preschool programs. *Child Development*, 78(2), 558–580.
- Hamre, B. K., & Pianta, R. C. (2001). Early teacher-child relationships and the trajectory of children's school outcomes through eighth grade. *Child Development*, 72(2), 625–638.
- Howes, C., Burchinal, M., Pianta, R., Bryant, D., Early, D., Clifford, R., et al. (2008). Ready to learn? Children's pre-academic achievement in pre-Kindergarten programs. *Early Childhood Research Quarterly*, 23(1), 27–50.
- Kretlow, A. G., & Bartholomew, C. C. (2010). Using coaching to improve the fidelity of evidence-based practices. *Teacher Education and Special Education*, 33(4), 279–299.
- Landry, S. H., Anthony, J. L., Swank, P. R., & Monseque-Bailey, P. (2009). Effectiveness of comprehensive professional development for teachers of at-risk preschoolers. *Journal of Educational Psychology*, 101(2), 448–465. doi:10.1037/a0013842.
- LoCasale-Crouch, J., & Donegan-Ritter, M. (2011). *Coaching for professional development: Using the CLASS*. Washington DC: Conference session at the National Birth to Five Leadership Institute.
- LoCasale-Crouch, J., Konold, T., Pianta, R., Howes, C., Burchinal, M., Bryant, D., et al. (2007). Observed classroom quality profiles in state-funded pre-kindergarten programs and associations with teacher, program, and classroom characteristics. *Early Childhood Research Quarterly*, 22, 3–17.
- National Scientific Council on the Developing Child (2004). *Young children develop in an environment of relationships*. Working paper No. 1. retrieved 4/18/11 from www.developingchild.net/pubs/wp.html.
- Neuman, S. B., & Cunningham, L. (2009). The impact of professional development and coaching on early language and literacy instruction practices. *American Educational Research Journal*, 46(2), 532–566.
- NICHD ECCRN. (2000). The relation of child care to cognitive and language development. *Child Development*, 71(4), 960–980.
- Pianta, R. C., Howes, C., Burchinal, M., Bryant, D., Clifford, R., Early, D., et al. (2005). Features of pre-kindergarten programs, classrooms, and teachers: Do they predict observed classroom quality and child-teacher interactions? *Applied Developmental Science*, 9(3), 144–159.
- Pianta, R. C., LaParo, K. L., & Hamre, B. K. (2008a). *Classroom Assessment Scoring System*. Baltimore, MD: Brookes Publishing Co.
- Pianta, R., Mashburn, A., Downer, J., Hamre, B., & Justice, L. (2008b). Effects of web-mediated professional development resources on teacher-child interactions in pre-kindergarten classrooms. *Early Childhood Research Quarterly*, 23, 431–451.
- Pianta, R. C., & Stuhlman, M. W. (2004). Teacher-child relationships and children's success in the first years of school. *School Psychology Review*, 33(3), 444–458.
- Robinson, L., & Kelley, B. (2007). Developing reflective thought in preservice educators: Utilizing role-plays and digital video. *Journal of Special Education Technology*, 22(2), 31–43.
- Saxe, G. B., Gearhart, M., & Nasir, N. S. (2001). Enhancing students' understanding of mathematics: A study of three contrasting approaches to professional support. *Journal of Mathematics Teacher Education*, 4, 55–79.
- US Department of Education. (2010). Office of Planning, Evaluation and Policy Development, Policy and Program Studies Service, *Toward the Identification of Features of Effective Professional Development for Early Childhood Educators*, Literature Review. Washington, D.C.
- Welsch, R. G., & Devlin, P. A. (2006). Developing preservice teachers' reflection: Examining the use of video. *Action in Teacher Education*, 28(4), 53–61.
- Yoon, K. S., Duncan, T., Lee, S. W.-Y., Scarloss, B., & Shapley, K. L. (2007). *Reviewing the evidence on how teacher professional development affects student achievement*. National Center for Educational Evaluation and Regional Assistance, US Department of Education Institute of Education Sciences.