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Characterizing Key Features of the Early Childhood Professional Development Literature

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Professional development (PD) has been defined as facilitated teaching and learning experiences designed to enhance practitioners' knowledge, skills, and dispositions as well as their capacity to provide high-quality early learning experiences for young children. The purpose of this study was to use a framework from the National Professional Development Center on Inclusion (2008) to characterize key components of early childhood PD by conducting a descriptive systematic review of empirical literature. Two hundred fifty-six studies were identified that met specified inclusion criteria: (a) described a type of PD, (b) involved early childhood practitioners who were working with children birth through the age of 5 years, and (c) reported empirical evidence about PD outcomes for either early childhood practitioners or children. Findings revealed that studies typically included information about PD recipients, the topic or content focus of the PD, and the type of facilitated teaching and learning experiences provided. Seventy-four percent of the reviewed studies included systematic follow-up as a component of the facilitated teaching and learning experiences but limited information was provided about dose and fidelity of implementation of the follow-up. The review provides a descriptive characterization of the who, what, and how of early childhood PD. These data complement an emerging experimental intervention literature focused on second-generation PD research questions. We discuss the need to reach consensus about reporting key components of PD interventions to facilitate interpretations of relationships among PD interventions, improvements in practice, and desired child outcomes. **Key words:** *early childhood professional development, follow-up support, training*

AS HIGH-QUALITY early childhood education and care has emerged as a national priority, significant attention has been given to the role of professional development (PD) for ensuring that practitioners have the knowledge, skills, and dispositions needed to support the development and learning of *all* young children. The National Scientific Council on the Developing Child (2007) commented about the pressing

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need for a high-quality early childhood workforce and acknowledged the inextricable relationship between early childhoo professional development (EC PD) and quality early childhood services when they stated,

> The essence of quality in early childhood services is embodied in the expertise and skills of the staff and in their capacity to build positive relationships with young children. The striking shortage of well-trained personnel in the field today indicates that substantial investments in training, recruiting, compensating, and retaining a high-quality workforce must be a top priority. (p. 13)

Bruder, Mongro-Wilson, Stayton, and Dietrich (2009) noted that a major challenge to the field of early childhood intervention is ensuring the provision of ongoing workforce development opportunities so that interdisciplinary practitioners involved in providing services and supports to young children with disabilities and their families will be confident and competent to do so. Given many children with disabilities receive services in nonspecialized settings, Bruder et al. asserted that PD for early childhood intervention practitioners should not be duplicative or exist in isolation from PD designed for early childhood education and care practitioners.

Recent policy briefs and other publications have recommended that PD investments should target integrated and cross-sector systems of PD (National Association for the Education of Young Children, 2008; Ochshorn, 2011; Winton, McCollum, & Catlett, 2008; Zaslow & Martinez-Beck, 2006), and the type and intensity of PD experiences should align with the desired outcomes for PD (e.g., acquisition of knowledge, application of skills in practice contexts, values clarification). When the desired PD outcome is focused on developing or enhancing the skills of early childhood practitioners (e.g., intentional teaching or implementation of evidence-based instructional practices), experiential forms of PD have been recommended, including the provision of systematic follow-up implementation supports (Bruder et al., 2009; Diamond & Powell, 2011; Snyder & Wolfe, 2008; Snyder, Denney, Pasia, Rakap & Crowe, 2011). Systematic follow-up implementation supports refers to PD that extends over time and includes practice, support, and feedback in applied contexts (e.g., coaching, mentoring, consultation, communities of practice, peer support groups).

As decisions are being made about cross-sector PD investments, examining the empirical literature and characterizing the key features of EC PD, particularly the types of follow-up implementation supports being provided, might be useful to guide PD research and practice (Winton, 2010). Understanding more about PD has become increasingly important because implementation science is receiving increased attention in early childhood. Implementation science emphasizes the importance of follow-up support and relationships among PD approaches, improved practitioner implementation of evidence-based practices, and child outcomes (Child Trends, 2010). A descriptive characterization of the extant literature would highlight strengths and limitations of the existing EC PD literature and offer baseline data useful for helping to advance "a scientific endeavor of early childhood professional development" (Sheridan, Edwards, Marvin, & Knoche, 2009, p. 378).

Several historical and contextual factors support the need to conduct a systematic review to descriptively characterize the empirical EC PD literature. First, despite the acknowledged importance of and "critical need" for EC PD, until very recently, a consensus had not been reached on a definition for EC PD (Maxwell, Feild, & Clifford, 2006; Winton, 2006). Second, few cohesive definitions exist for specific forms of PD such as workshops, staff development, courses, coaching, consultation, or mentoring. Third, EC PD efforts have varied in focus, intensity, and other functional characteristics and these efforts have not been summarized succinctly in the extant literature (Maxwell et al., 2006; Winton, McCollum, & Catlett, 1997, 2008). Finally, although several experiential forms of PD have been described as those holding most promise for supporting application of knowledge, skills, or dispositions in practice contexts (e.g., coaching,

communities of practice), descriptive information is needed about whether and how these practices have been implemented systematically and reported in the EC PD research literature.

Sheridan et al. (2009) suggested as efforts to establish a scientific endeavor of EC PD proceed, it will be important to move beyond characterizing evidence solely on the basis of the form of PD (e.g., inservice, staff development) and to examine systematically key components or "active ingredients." The focus should be on active ingredients hypothesized to be associated with desired PD outcomes. For example, if the outcome of interest is fluent application of intentional teaching skills by early childhood practitioners in classroom settings, then PD processes that lead to fluency are important to identify and "unpack" as active ingredients. Zaslow (2009) noted that if practice with individualized feedback mediates change in practice, then we need to understand more about how these active ingredients were implemented, with whom, and under what circumstances. Descriptive characterizations of the active ingredients of EC PD interventions as described in the extant empirical literature to date appear to be warranted.

Efforts to unpack the forms and processes of PD associated with various practitioner and child outcomes under specified circumstances will require significant changes to the ways in which PD research is designed and reported (Zaslow, 2009). Thus, descriptive characterizations of what type of EC PD has been provided to whom and under what circumstances is relevant for informing efforts to unpack systematically the active ingredients of EC PD. In addition, findings from a descriptive systematic review of the EC PD literature could suggest strategies for improving reporting practices about EC PD.

FRAMEWORK AND PURPOSE OF THE STUDY

We used a definition and the key components of PD promulgated by the National Professional Development Center on Inclusion (National Professional Development Center on Inclusion, [NPDCI], 2008) to frame the current study. NPDCI (2008) defined PD as

> .. . facilitated teaching and learning experiences that are transactional and designed to support the acquisition of professional knowledge, skills, and dispositions as well as the application of this knowledge in practice. The key components of professional development include: (a) the characteristics and contexts of the learners (i.e., the "who" of professional development, including the characteristics and contexts of the learners and the children and families they serve); (b) content (i.e., the "what" of professional development; what professionals should know and be able to do; generally defined by professional competencies, standards, and credentials); and (c) the organization and facilitation of learning experiences (i.e., the "how" of professional development; the approaches, models, or methods used to support self-directed, experientially-oriented learning that is highly relevant to practice). (p. 3)

Using this framework for the study, we conducted a systematic descriptive review of the empirical literature related to EC PD. The aim of the review was to characterize key features of PD, not to describe or evaluate PD effectiveness. We were interested in describing what EC PD was provided to whom and under what circumstances. Four purposes guided the study. First, identify the number of empirical studies focused on PD in early childhood and early childhood special education (birth through the age of 5 years). Second, describe characteristics of participants, the content focus of the PD, and the type of PD provided (i.e., the "who," "what," and "how" using the NPDCI framework). Third, examine the who, what, and how for subsets of studies focused on instructional practices and five forms of systematic follow-up that have demonstrated promise for supporting practitioners' implementation of empirically supported practices. In this study, we were particularly interested in the subsets of studies focused on instructional practices and systematic follow-up because converging empirical evidence suggests systematic follow-up implementation support

is likely needed to achieve changes in teachers' practices and, in turn, desired child development and learning outcomes (e.g., Buysse, Castro, & Peisner-Feinberg, 2010; Diamond & Powell, 2011; Hemmeter, Snyder, Fox, & Algina, 2011; Landry, Swank, Smith, Assel, & Gunnewig, 2006; Neuman & Cunningham, 2009; Pianta, Mashburn, Downer, Hamre, & Justice, 2008; Powell, Diamond, Burchinal, & Koehler, 2010; Snyder, Hemmeter, McLaughlin, Algina, Sandall, & McLean, 2011).

METHODS

Developing working categories and definitions for who, what, and how of PD

The research team developed working coding categories related to the who, what, and how of PD as well as the type of research design used in the study. With respect to the "who" of PD, we developed coding categories to characterize the setting in which practitioners worked and the types of children with whom they interacted. For the "what" of PD, we developed categories that were used to characterize the content focus of the PD (e.g., social-emotional, pre-academic, literacy) and to identify whether the focus of the PD was on instructional practices. For the "how" of PD, given previously identified challenges related to characterizing various forms of EC PD, our initial activity was to develop categories and working definitions for various facilitated teaching and learning experiences (i.e., types of PD) that might be reflected in the empirical literature. In addition, we were interested in developing categories and working definitions for various forms of follow-up, particularly follow-up strategies identified as promising practices for supporting implementation of knowledge and skills in early learning contexts (e.g., coaching, communities of practice, consultation).

Seminal early childhood and school-focused PD texts (e.g., Guskey, 1986, 2000; Guskey & Sparks, 1996; Joyce & Showers, 2002; Winton et al., 1997; Zaslow & Martinez-Beck, 2006), existing literature reviews (e.g., Ackland, 1991; Crow & Snyder, 1998; Scheeler, Ruhl, & McAfee, 2004), syntheses/position statements (e.g., National Association for the Education of Young Children, 1993; NPDCI, 2008), and research reports (e.g., Garet, Porter, Desimone, Birman, & Yoon, 2001; Gersten, Chard, & Baker, 2000) were reviewed to help inform development of the working categories and associated definitions for the "how" of PD.

The research team worked collaboratively to develop and revise these working categories and definitions. An iterative process was used to refine the working categories and definitions of the "how" of PD reported in the present paper. Nine categories and definitions for forms of facilitated teaching and learning experiences are shown in Table 1 and categories and definitions for forms of follow-up are shown in Table 2.

After initial development of all working categories and definitions by two of the authors, the other members of the research team reviewed them and provided feedback. We then applied the working categories to representative articles located through the initial search (see description of search procedures later in the text). Working categories and definitions were adjusted to provide further clarification. We returned to the results of the initial search to verify that the initial coding of the articles fit the revised definitions. In addition, we presented a poster at a professional conference and gathered input from researchers and EC PD experts about our categories and working definitions (Snyder, Hemmeter, Artman, Kinder, & Pasia, 2008).

Procedures used to identify the early childhood PD literature

After the categories and associated definitions for the who, what, and how of PD were developed, we conducted a systematic search of the empirical literature. Relevant articles were identified through a two-step search procedure. First, an electronic search was conducted using the databases of Educational Resources Information Center, PsycInfo, Education Full-Text, and the Social Sciences Citation Index. Search terms included all combinations

Table 1. Professional Development Categories and Associated Definitions

PD Category	Definition
Staff development	Training provided *on-site* to an *individual or group who work together* at a targeted center, program, facility, or agency. This takes the form of an on-site workshop or series of on-site workshops. A needs assessment or follow-up component might be included.
Inservice training	Training provided to an individual or group in a structured setting *outside their regular work setting*. This takes the form of an off-site workshop, series of off-site workshops, or off-site training institutes. A needs assessment component or follow-up component might be included.
Preservice training	Training provided to teachers, interns, student teachers, practicum students, or paraprofessionals who are enrolled in preservice coursework for academic credit in a structured setting. This includes preservice internship, practicum, or student teaching, provided participants receive academic credit.
In situ consultation/ coaching	PD takes place in practice contexts (i.e., in the classroom, in the home for early intervention providers). Learners receive "on-the-job" experiences, consultation, coaching, or feedback but no formal instruction or training occurs outside the practice context. Participants might receive continuing education credit for the experiences, but they are not enrolled in formal preservice academic coursework.
Induction/mentoring	PD conducted on-site for novice professionals or paraprofessionals who have less than 3 years experience. PD is conducted by a teacher or another professional working in the same program.
Web training	Course or workshop accessed via the Internet. The course or workshop might include interaction (electronic, by phone, or face-to-face) between trainer and trainee.
Materials only	Manuals, CDs, or other materials (textbooks, self-guided modules) are provided to participant. No organized formal training or follow-up is provided.
Shared inquiry	Emphasis is on collaborative inquiry and reflection about learning. Learners work in groups to identify PD needs and develop learning plans to meet these needs. Might include identification or assessment of learning outcomes. Typically, there is limited involvement by "experts" or individuals who are not regular group members.
Other	PD not meeting any of these definitions.

Note. PD = professional development.

of the following sets of terms: (a) professional development, teacher training, performance feedback, inservice, peer coaching, coaching, and consultation; and (b) young children, early childhood, preschool, and infants. Second, we conducted an ancestral hand search of the reference lists of all articles identified by the electronic search that met inclusion criteria. Four searches using these procedures were conducted. One search was conducted in mid-2006, the second in early 2009, the third in May 2010, and the last in February 2011. The present review represents the PD literature in early childhood that met established search criteria indexed in these databases and published through February 2011.

Using the search procedures and terms described earlier, 1,816 nonduplicative articles were located. The titles and abstracts for each

Table 2. Follow-Up Categories and Associated Definitions

Follow-Up Category	Definition
Coaching/performance feedback	Coaching is a broad term used to describe implementation support that is delivered to learners, which is sustained and focused. It involves helping participants to implement newly acquired skills, strategies, or models on-the-job. It has four major functions: (a) to provide support, (b) to offer technical or performance feedback, (c) to analyze application, and (d) to adapt the results. Coaching can be guided by experts or fellow learners (peers). As an implementation support activity, coaching or performance feedback can occur alone or after other PD activities occur.
Consultation (not further described)	Targeted support provided to practitioners by a consultant that focuses on a specific child/family, children/families, or classroom or program management or implementation issue. Consultation is distinguished from coaching when authors explicitly use the term "consultation" to describe PD and the four major functions of coaching listed earlier are not explicitly described.
Mentoring[a]	Mentoring is use of an experienced peer or trusted advisor who provides support and feedback to a learner on an ongoing basis. Typically, mentoring occurs in the learner's practice context, although mentoring can also occur outside the practice context (e.g., mentor and mentee meet weekly at a local coffee house).
Peer support group	Peer support groups are designed to help participants work through the various stages of implementation, to develop collegiality, to provide assistance with problems, to develop common language and understandings, and to learn from members' experiences. A collegial or peer support group is a group of colleagues that meets periodically to help and support each other to make desired changes. Peer support groups should be small (5–12 members). Peer support groups should first and foremost be located in places where (a) members volunteer to be present, (b) topics for discussion are generated by group members, (c) the group works together to establish norms for behavior within the support group meeting (e.g., confidentiality, equal participation time, honest feedback), and (d) the primary goal of improving each other's competence in teaching strategies or practices is emphasized. If the peer support group is conducted electronically, this should be noted when coding. As a follow-up activity, these groups would be formed after other PD activities occur.
Communities of practice/shared inquiry	Communities of practice or inquiry groups are specialized peer support groups that typically share a specific focus on a practice or set of practices. These groups share a common interest in a subject or inquiry problem. They collaborate over an extended period to share ideas, develop hypotheses, find solutions, and build innovations. It refers as well to the stable group that is formed from such regular interactions. As a follow-up activity, these communities of practice or inquiry groups would be formed after other PD occurs.
Assignments	PD-related assignments to do "back home." These assignments typically are to be completed after another PD event has occurred (e.g., staff development workshop, inservice training session).

(*continues*)

Table 2. Follow-Up Categories and Associated Definitions (*Continued*)

Follow-Up Category	Definition
Job aids	Job aids include planning sheets, forms, flowcharts, checklists, and "how-to" or "reminder" posters that can be used in the workplace to reinforce PD content/practices. The job aids are generated by the PD instructor(s)/facilitator(s) and are given to learners during the PD event for use after the PD event "on the job."
Back-home plan	Action plans developed by the learner (perhaps in consultation with a trainer or coach), which list one to three goals with action steps to be accomplished following PD. Back-home plans can be derived from an ongoing "to do" list that is part of PD.
Handouts	Blank copies of forms or handouts provided by instructor(s)/facilitator(s) during PD for use during PD event or to refer to "back home."
Refresher session	Participants reconvene with the PD instructor(s) to review and extend their understandings and practices; these sessions can be conducted on- or off-site. These sessions are distinguished from coaching and peer support groups because they are focused on a group of learners and the sessions are conducted by the PD instructor(s).
Follow-up visit (not described)	A live, in-person contact is made to the PD recipient after the PD event, but no descriptions of this visit are provided.
Follow-up phone call or e-mail	A personal contact(s) is made after a PD event by the instructor. This form of follow-up is distinguished from performance feedback delivered via phone or e-mail because it is short-term and episodic (e.g., the PD instructor sends a follow-up e-mail once to inservice training participants).
Follow-up letter/packet	A letter and/or follow-up materials (e.g., related articles, resources) are sent by the PD instructor(s) to the learner after the PD session(s).
Individualized learning contract	Formal "contracts" between PD instructor(s) and learners that specify what the learner is expected to learn or do. These contracts typically are developed after a targeted PD activity.
Discussion board/chat room	PD instructor(s) establishes web-based opportunities for learners to access a discussion board or chat room to provide a follow-up forum. A key feature is that the PD instructor establishes and manages the discussion board and chat room.
Not reported	No follow-up strategies were described.

Note. Follow-up strategies adapted from Snyder and Wolfe (2008). PD = professional development.
[a]The definition of mentoring shown in this table differs from the definition shown in Table 1 because it focuses on ongoing mentoring following an initial induction/mentoring period.

article were read to identify whether the articles met the following inclusion criteria: (a) involved a form of facilitated teaching and learning (PD) that was reflected either by one of the nine categories shown in Table 1 or the definition associated with a category, (b) involved early childhood practitioners who were working with children birth through the age of 5 years, and (c) reported empirical evidence about the outcomes of the PD for either the early childhood practitioners or for children. Of the 1,807 articles, 578 met these prescreening criteria based on the title and abstract, and full texts of the articles were located for further coding.

Applying who, what, and how codes

A three-step coding process was used in this study. In step 1, we confirmed inclusion criteria by reading the full text of 578

articles that met prescreening criteria. Given the focus on EC PD for practitioners working with children birth through the age 5 years, articles that included kindergarten teachers or kindergarten students as part of a larger school-aged sample (e.g., K-5 or K-12) were excluded. Studies that included kindergarten teachers and other early childhood practitioners were retained. Studies that did not include empirical data related to practitioner or child outcomes or that were not published in peer-reviewed journals (e.g., unpublished manuscripts, dissertations, theses) were also excluded. Three hundred twenty-two of the 578 articles initially identified as meeting inclusion criteria based on prescreening were excluded after reading the full text. Two hundred fifty-five articles met the inclusion criteria. One of the 255 articles reported two studies, so the number of studies coded was 256.

In step 2, we applied who, what, and how codes to the 256 studies. For who, we coded information about the setting in which the PD participant worked and whether any children associated with the PD participant were reported to have disabilities or were at risk for disabilities or delays. For what, we coded the content area or focus of the PD. Content area or focus was coded using at least one of nine categories: preacademic, social-emotional (including behavior), motor/adaptive, communication, classroom environment and quality, inclusion, family-centered practices, preservice coursework content, or other. In addition to these nine content categories, we coded whether instructional practices (e.g., incidental teaching, scaffolding, time delay) were included as PD content and whether the PD included strategies (e.g., role playing, modeling) to help learners practice or implement content. With respect to the how of PD, we characterized the type of PD provided to participants using one or more of the categories shown in Table 1. Although studies might have included a specific label to characterize the type of PD, we coded type of PD based on our categories and definitions. For example, if a study referred to the PD as staff development, but the description of the PD provided in the study was consistent with our definition for inservice training, we coded the type of PD provided as inservice training.

As part of step 2, the 256 studies were examined to determine whether a form of follow-up shown in Table 2 was provided to participants as part of their facilitated teaching and learning experiences. This step of coding provided additional detail related to the how of PD. Follow-up categories were not mutually exclusive and studies were coded for each form of follow-up provided. The number of studies reporting at least one of the follow-up forms shown in Table 2 was 215 (84%).

During step 3, a subset of the studies identified during step 2 was analyzed further. This subset was composed of studies that reported providing systematic follow-up related to at least one of the following five categories shown in Table 2: (a) coaching/performance feedback, (b) consultation, (c) mentoring, (d) peer support group, and (e) communities of practice/shared inquiry. This subset of studies was of interest because they included facilitated teaching and learning experiences that are "experientially oriented and highly relevant to practice" (NPDCI, 2008, p. 3). When consultation or coaching was coded as the primary PD intervention in step 2, these studies were coded in step 3 as part of characterizing the who, what, and how of systematic follow-up. One hundred fifty-nine (74%) of the 215 studies used at least one of the five systematic follow-up strategies. For this subset of studies, we used additional coding categories to characterize the study research design, identify whether practitioner or child outcomes were evaluated, and describe the systematic follow-up (i.e., who were the recipients of follow-up, who were the follow-up agents, what were the formats for follow-up, and how follow-up was provided and its implementation monitored, including dose).

Coding procedures and interrater agreement

The responsibility for coding studies was shared among the authors and a trained graduate assistant. Five coders were trained to use investigator-developed coding forms during the three-step coding process and to record data for each study reviewed.

To ensure accuracy and consistency of coding, 25% of the 578 articles that met prescreening and 33% of the 256 studies that were included in the review were randomly selected to be coded independently by a second person. Item-level agreement was calculated for each coding category. The total number of agreements per category were divided by the number of agreements plus disagreements and multiplied by 100. The research team established consensus on disagreements through discussion and review of article content along with a review of coding categories and definitions. Decisions made during the consensus process were entered into the coding database. Findings reported in this article are based on consensus codes. For one coding category used in step 3 (i.e., duration of follow-up), interrater agreement was less than 80%. Two coders working together for all 159 studies repeated coding for this category.

Before consensus coding, percent agreement for meets study inclusion criteria was 92%. For step 2, percent agreement for who, what, and how coding categories was 96% for information about setting; 87% for children with whom participants worked; 94% for content area/focus of PD, including instructional practices as PD content; 84% for whether the PD intervention included strategies to help learners practice or implement PD content; 91% for type of PD; and 94% for follow-up categories. For step 3 coding categories, percent agreement was 92% for the recipient of follow-up, 89% for the role of the individual who provided follow-up (follow-up agent), 90% for the qualifications of the follow-up agent; 88% for type of follow-up strategies used, 84% for follow-up format, 44% for duration of follow-up, 92% for frequency of follow-up, and 92% for length of follow-up session. Percent agreement for whether a protocol was used to guide the provision of follow-up was 90% and 97% for whether fidelity measures were used. For research design categories, percent agreement was 97%. With respect to practitioner and child outcome coding categories, percent agreement was 85% and 90%, respectively.

DATA ANALYSES

Data from the coding forms were entered into a spreadsheet. Double-data entry procedures were used, including having two individuals separately enter data from each coding form into appropriate cells of two separate spreadsheets. A procedure available in the spreadsheet program was used to check accuracy of data entry by comparing the value of the entry in each cell in the first spreadsheet to the value of the entry in each cell in the second spreadsheet. Using this procedure, differences in cell values across the two spreadsheets are highlighted. For the present data set, differences were minimal (number of errors/total number of cells = 0.1%). Discrepancies in cell values were checked and a revised entry was made on the basis of coding form data. Data from the spreadsheet program were imported into PASW Statistics 19.0 (IBM Corporation, Armonk, NY) for subsequent analyses.

Descriptive statistics were generated for each coding category to characterize the EC PD literature according to who, what, and how components of the NPDCI framework. In addition, we conducted comparative descriptive analyses for several subsets of studies: (a) characteristics of all studies included in the review ($n = 256$) versus the subset of studies that included one of the five implementation follow-up forms ($n = 159$); (b) characteristics of all studies included in the review ($n = 256$) versus the subset of studies in which instructional practices were identified as a content focus for the PD ($n = 63$); and (c) characteristics of PD studies that included one of the five implementation

follow-up forms ($n = 159$) versus the subset of these studies that included one of the five implementation follow-up forms and included an instructional practices content focus for the PD ($n = 47$). Differences of 5% or more for each coding category across the subsets of studies were identified. Given the descriptive focus of the review, we did not conduct inferential analyses to evaluate whether reported differences were statistically significant.

RESULTS

Results are initially described for the 256 studies coded during step 2 and are generally organized under the NPDCI framework headings of who, what, and how. Next, we present comparative findings for the 256 studies and the subset of studies from this group that included instructional practices as a content focus for the PD. These findings are followed by the presentation of results for the 159 studies that were coded as part of step 3 and comparative analyses conducted using subsets of these studies. It is important to note that only three of the coding categories were mutually exclusive: characteristics of children, type of PD, and duration of follow-up. Thus, percentages reported might sum to greater than 100%. Percentages for the descriptive analyses we conducted were calculated using the total number of studies reviewed during either step 2 ($n = 256$) or step 3 ($n = 159$) or the subset of studies reviewed (e.g., 63 studies that had an instructional strategies content focus), as applicable.

Who, what, and how of PD

With respect to the who of PD, the most frequently reported settings in which early childhood practitioners worked were preschool/early childhood education (36.7%), Head Start (34.0%), and childcare (32.0%). In 10.2% of the 256 studies, the setting in which PD participants worked was reported to be an early childhood special education setting or other special education setting. Fewer PD participants in the reviewed studies were reported to work in family childcare (5.5%) and Early Head Start programs (2.3%).

In addition, we coded which young children PD participants were reported to interact with or teach. As shown in Table 3, in 77.3% of the 256 studies, PD participants were reported to interact either with young children with disabilities or children at risk for disabilities or delays. In 1.2% of the studies, authors explicitly stated that PD participants did not work with children with disabilities. In 21.5% of the studies, information was not provided about whether children with whom PD participants interacted or taught were either children with disabilities or children at risk for disabilities and delays.

To characterize the what of PD, we coded the content focus of the PD. As shown in Table 3, social-emotional topics (teacher–child interactions, challenging behavior, social skills, or emotional behaviors) were the most frequently reported content area (27.3% of the studies). The second most frequently reported category was pre-academic (25.4%), followed by instructional practices (24.6%).

A primary emphasis during this coding step was to use the coding categories and associated definitions we developed to characterize the type or how of PD. As shown in Table 3, the most frequently occurring category of PD was inservice training (33.6%), followed by staff development (28.1%). We defined inservice training as PD provided outside of a participant's regular work setting that might include individuals from other programs or agencies. This was distinguished from staff development, which we defined as the provision of PD on-site, to an individual or a group who works together in a center, program, or agency. Of note, 15.6% of the studies we reviewed reported that in situ consultation or coaching was the primary form of PD intervention. This code was applied to 40 of the 256 reviewed studies because no inservice or staff development preceded the consultation or coaching.

Table 3. Percentage of Studies Reporting Who, What, and How of PD: All Studies and Instructional Practices Subset

Category	All Studies ($N = 256$)	Instructional Practices Studies ($n = 63$)
Setting		
Preschool/early childhood education	36.7	44.4[a]
Head Start	34.0	27.0[a]
Childcare	32.0	36.5
Early childhood special education	10.2	7.9
Other setting	8.2	0.0[a]
Early intervention	7.8	6.3
Family care	5.5	4.8
Kindergarten	3.5	3.2
Early Head Start	2.3	0.0
Setting not reported	0.4	0.0
Children with whom participants worked		
Children with disabilities	44.1	71.4[a]
Children at risk	33.2	17.5[a]
Not reported	21.5	6.3[a]
No children with disabilities	1.2	4.8[a]
Content of professional development		
Social-emotional	27.3	15.9[a]
Pre-academic	25.4	7.9[a]
Instructional practices	24.6	100.0[a]
Other content focus	18.8	11.1[a]
Communication	10.2	7.9
Family-centered practices	9.4	6.3
Course work	8.6	0.0[a]
Classroom environment and quality	7.8	6.3
Inclusion	3.5	6.3
Motor or adaptive	2.7	0.0
Type of professional development	68.0	96.8[a]
Inservice	33.6	27.0[a]
Staff development	28.1	44.4[a]
Preservice	19.9	7.9[a]
In situ consultation/coaching	15.6	22.2[a]
Web training	4.3	0.0
Induction/mentoring	2.0	1.6
Materials only	2.0	0.0
Shared inquiry	1.6	0.0
Other type of PD	1.6	1.6

Note. PD = professional development.
[a]Differences in percentages across study sets for coding category ≥5%.

Comparative analyses for studies focused on instructional practices

We compared the characteristics of studies in which instructional practices were the PD content focus ($n = 63$) to the larger group of 256 studies. As shown in Table 3, PD participants were reported to work with children with disabilities in 74.1% of the

instructional practices studies compared with 44.1% in the larger group of studies. In addition, 44.4% of the instructional practices studies involved staff development (practitioners working in the same center, program, or agency), which differed from the larger group of studies (28.1% of studies). Although only 68% of the 256 studies included a description of the strategies used as part of the PD intervention to help learners practice or implement PD content, 96.8% of the studies focused on instructional practices reported this information.

Characterizing the type of follow-up provided

One or more of the follow-up forms shown in Table 2 were reported in 215 of the 256 studies (84%). As shown in Table 4, the most frequent form of follow-up was coaching with performance feedback (51.6%). Other common forms of follow-up reported in the reviewed studies were job aids (20.7%) and learning assignments (14.5%).

In 159 studies, at least one of the five systematic forms of follow-up was reported to be used. These included 132 studies that involved coaching with performance feedback, 11 studies that involved mentoring, 14 studies that involved consultation, four studies that involved peer support groups, and four studies that included communities of practice/shared inquiry. Coding categories for forms of follow-up were not mutually exclusive, so numbers reported do not sum to 159 because several studies used more than one of form of systematic follow-up (e.g., coaching and peer support groups).

Comparative analyses for studies focused on instructional practices

We compared the 63 studies in which PD content focused on instructional practices to the larger set of 256 studies with respect to forms of follow-up. Some type of follow-up after PD was reported more frequently in the instructional practices studies (90.5%) compared with the larger set of studies (84%). As shown in Table 4, 65.1% of the instructional practices studies reported that coaching was used, compared with 51.6% in the larger set of studies. Handouts were reported to be used more frequently in studies when the content of PD included a focus on instructional practices (17.5%) compared with the larger set of studies (6.6%).

Characterizing the who, what, and how of systematic follow-up support

As noted previously, we applied additional coding categories to those studies that included one or more of the five types of systematic follow-up support. We coded who provided and received systematic follow-up, the content focus of this follow-up, and how this follow-up was provided, including dose and monitoring of implementation. In addition, we coded the type of research design and whether practitioner or child outcomes were evaluated. Percentages reported in text and tables were calculated using the 159 studies reviewed.

As shown in Table 5, all but three studies included sufficient information about who was responsible for providing follow-up. Research staff was reported to be the most frequent providers of follow-up (49.1%), followed by consultants (28.3%) and supervisors (12.6%). Colleagues and peers were reported to be providers of follow-up in 11.9% of the studies and practitioners were reported to provide follow-up to themselves in 8.2% of the studies. With respect to the qualifications and training of those providing follow-up, more than half of the studies (57.9%) included information on the providers' qualifications. In 38.4% of the studies, follow-up providers were reported to have had teaching experience, whereas in only 17.6% of the studies, follow-up providers were reported to have training in coaching and consultation. The education level of providers was reported infrequently, but, in 42.2% of the reviewed studies, providers were reported to have a bachelor's, master's, or doctoral degree.

Lead teachers generally were reported to be the most frequent recipients of systematic follow-up in the reviewed studies (71.1%).

Table 4. Percentage of Studies Reporting Follow-Up Categories: All Studies and Instructional Practices Subset

Category	All Studies ($N = 256$)	Instructional Practices Studies ($n = 63$)
Systematic follow-up forms		
Coaching/performance feedback	51.6	65.1[a]
Behavioral consultation	5.5	3.2
Mentoring	4.3	3.2
Peer support group	1.6	1.6
Communities of practice/shared inquiry	1.6	1.6
Other follow-up forms		
Job aids	20.7	19.0
No forms of follow-up reported	16.0	9.5[a]
Assignments	14.5	14.3
Refresher sessions	9.8	9.5
Back-home plan	7.8	6.3
Handouts	6.6	17.5[a]
Follow-up visit not otherwise described	5.9	1.6
Follow-up letter/packet of information	2.3	0.0
Individualized learning contract	1.6	3.2
Discussion board/chat room	1.6	1.6
Follow-up phone call or e-mail	1.6	0.0

Note. [a]Differences in percentages across study sets for coding category ≥5%.

Findings related to recipient of the follow-up for all 256 studies related to type of setting in which PD participants worked (Table 3) were similar to the findings for the 159 studies that included systematic follow-up (Table 5). For example, preschool/early childhood education was reported to be the setting for 39% of the studies that included systematic follow-up, compared with 36.7% of all studies reviewed.

With respect to the what of PD, the percentages associated with each content focus category for studies that included systematic follow-up are shown in Table 6. These percentages are similar to those shown in Table 3 for the 256 studies. Social-emotional and pre-academic content was reported to be the focus of systematic follow-up in 33.3% and 31.4% of the studies, respectively.

With respect to the how of systematic follow-up, Table 7 shows coding categories and data reported in the 159 reviewed studies. A description of the type of follow-up strategy used by follow-up providers was reported in the majority of studies ($n = 143$). Some form of follow-up observation was reported to occur in 59.1% of the studies. Verbal performance feedback was reported as a follow-up strategy in 57.9%, modeling in 35.2%, and problem-solving discussion in 32.7% of the studies, respectively.

One hundred nineteen of 159 studies (74.8%) included a description of the format of the follow-up. Immediate face-to-face follow-up was reported to occur in 45.9% of the studies whereas follow-up was reported to be provided face-to-face but not contiguous with an observation in 26.4% of the studies.

Using a script or structured protocol to guide the provision of systematic follow-up was reported in only 42 of the 159 (26.4%) studies. This included using a coaching manual (10.7%), a script (8.8%), rubric (2.5%), or other follow-up implementation protocol such as a checklist (5.0%). Measurement of fidelity of implementation of the follow-up was

Table 5. Percentage of Systematic Follow-Up Studies Reporting Who of Professional Development: All Studies and Instructional Practices Subset

Category	All Studies ($N = 159$)	Instructional Practices Studies ($n = 47$)
Follow-up agent		
Research staff	49.1	55.3[a]
Consultant	28.3	23.4
Supervisor	12.6	12.8
Colleague/peer	11.9	17.0[a]
Self	8.2	12.8
Agent not reported	1.9	0.0
Other	0.6	0.0
Qualifications of follow-up agent		
Qualifications not reported	42.1	51.1[a]
Teaching experience	38.4	36.2
Master's degree	20.8	17.0
Training in coaching/consultation	17.6	8.5[a]
Bachelor's degree	14.5	17.0
Higher than master's degree	6.9	6.4
Less than bachelor's degree	2.5	4.3
Follow-up recipient		
Lead teacher	71.1	70.2
Paraprofessional	14.5	31.9[a]
Preservice teacher or intern	11.9	10.6
Teams	10.1	8.5
Other recipient	6.9	8.5
Home childcare provider	5.7	2.1
Settings in which recipients worked		
Preschool/early childhood education	39.0	44.7[a]
Head Start	37.1	29.8[a]
Childcare	30.8	34.0
Early childhood special education	10.7	6.4
Other setting	6.3	0.0[a]
Early intervention	6.3	4.3
Family care	4.4	2.1
Early Head Start	3.1	0.0
Kindergarten	3.1	4.3
Setting not reported	0.6	0.0

Note. [a]Differences in percentages across study sets for coding category ≥5%.

reported in only 30 of 159 studies. Fidelity was reported to be measured primarily by using checklists (8.2%) or by using other measures such as obtaining teacher signatures to document the provision of follow-up (9.4%).

With respect to dose of systematic follow-up, Table 8 shows the coding categories used to characterize the duration of follow-up, the frequency of follow-up contact, and the length of follow-up. Ninety-four (59.1%) studies provided information about the follow-up duration (see Table 8). A relationship lasting 1 year (7–12 months) was reported in 16.4% of the studies, whereas a relationship lasting one semester was reported in 13.2% of the

Table 6. Percentage of Systematic Follow-Up Studies Reporting "What" of PD: All Studies and Instructional Practices Subset

Category	All Studies ($N = 159$)	Instructional Practices Studies ($n = 47$)
Content		
Social-emotional	33.3	19.1[a]
Academic	31.4	10.6[a]
Instructional practices	29.6	100.0[a]
Communication	15.1	10.6
Other content focus	12.6	10.6
Family-centered practices	11.3	8.5
Classroom environment and quality	9.4	8.5
Course work	5.7	0.0[a]
Inclusion	3.1	6.4
Motor or adaptive	1.9	0.0
PD intervention included strategies to help learners practice or implement content	81.1	97.9[a]

Note. PD = professional development.
[a]Differences in percentages across study sets for coding category ≥5%.

studies. Frequency of systematic follow-up was reported in 107 of 159 studies. Weekly follow-up occurred most frequently (30.8%). Only 73 of 159 studies reviewed included information on the typical length of follow-up sessions. Sessions lasting longer than 30 min were reported in about one quarter (28.9%) of the studies.

Table 9 shows the research designs used in the 159 studies that included a systematic follow-up component and whether PD outcomes were evaluated for practitioners or children. Single-subject experimental design was the most frequently occurring category (25.8% of studies), whereas a type of group experimental design was used in 86.1% of the studies. The primary PD outcome evaluated in the studies was practitioner outcomes (80.5%), whereas only half of the studies (50.3%) evaluated child outcomes. In 37.1% of the studies, both practitioner and child outcomes were evaluated.

Comparative analyses for studies focused on instructional practices

We conducted comparative analyses for the 159 studies similar to those conducted with the 256 studies. A primary comparison of interest was between the 159 studies and a subset of these studies in which the PD content focused on instructional practices ($n = 47$). We were interested in this comparison because coding of the 256 studies showed some type of follow-up was reported more frequently in studies with a content focus on instructional practices. Tables 5–9 show the comparisons across the 159 and 47 studies. Most data shown in these tables are relatively comparable, with a few exceptions. The qualifications of the follow-up provider were reported in fewer instructional practices studies (48.9%) than in the 159 follow-up studies (57.9%). Training in coaching/consultation for the follow-up provider was reported in only 8.5% of the instructional practices studies compared with 17.6% in all 159 studies (Table 5). Table 7 shows comparative data for how implementation follow-up was delivered. In the 47 instructional practices studies, performance feedback including verbal (70.2%), written (23.4%), and graphical (14.9%) feedback was used more often than in the 159 studies.

Table 7. Percentage of Systematic Follow-Up Studies Reporting "How" of Professional Development: All Studies and Instructional Practices Subset

Category	All Studies ($N = 159$)	Instructional Practices Studies ($n = 47$)
Type of strategy used during follow-up		
Observing	59.1	63.8
Performance feedback (verbal)	57.9	70.2[a]
Modeling	35.2	31.9
Problem-solving discussion	32.7	34.0
Performance feedback (written)	22.0	23.4
Reflective conversation	21.4	19.1
Goal setting planning	21.4	21.3
Other type of feedback provided	17.6	17.0
Not reported	10.1	4.3[a]
Performance feedback (graphical)	6.9	14.9[a]
Side-by-side verbal support	6.3	8.5
Role play	3.8	6.4
Graphing	1.3	2.1
Side-by-side gestural support	0.0	0.0
Format		
Immediate face-to-face	45.9	51.1[a]
Delayed live	26.4	40.4[a]
Not reported	25.2	10.6[a]
Delayed web-based	8.2	4.3
Delayed self-reflective/journaling	5.7	4.3
Immediate self-reflective/journaling	2.5	6.4
Immediate web-based	0.0	0.0
Follow-up protocol		
Not reported	73.6	63.8[a]
Coaching manual	10.7	10.6
Script	8.8	17.0[a]
Other	5.0	6.4
Rubric	2.5	4.3
Fidelity of follow-up strategies		
Not reported	81.1	76.6
Other	9.4	6.4
Checklist	8.2	14.9[a]
Observational measure	6.3	6.4
Rating scale	0.0	0.0

Note. [a]Differences in percentages across study sets for coding category ≥5%.

With respect to the dose of systematic follow-up (Table 8), slightly fewer instructional practices studies (48.9%) provided information about the duration of follow-up than the 159 studies (59.1%). Daily follow-up was the most frequency occurring category (36.2%) in the instructional practices studies (36.2%) versus weekly in the 159 studies (30.8%). Feedback sessions were more likely to last for less than 15 min in the instructional practices studies versus the 159 studies (25.5% versus 9.4%, respectively). When we compared the 47 studies with an instructional content focus to all 159 studies (Table 9)

Table 8. Percentage of Systematic Follow-Up Studies Reporting Dose of Professional Development: All Studies and Instructional Practices Subset

Category	All Studies ($N = 159$)	Instructional Practices Studies ($n = 47$)
Duration of relationship for follow-up		
Not reported	40.9	51.1[a]
1 year	16.4	8.5[a]
1 semester	13.2	10.6
More than 1 school year	11.9	6.4[a]
1 quarter	9.4	8.5
1 month	8.2	12.8
1 week	1.3	2.1
<1 day	0.0	0.0
Frequency of follow-up contact		
Not reported	32.7	34.0
Weekly	30.8	29.8
Monthly	20.8	8.5[a]
Daily	17.6	36.2[a]
Infrequently	3.1	2.1
Length of follow-up session		
Not reported	54.1	46.8[a]
>30 min	28.9	21.3[a]
15–30 min	10.1	10.6
<15 min	9.4	25.5[a]

Note. [a]Differences in percentages across study sets for coding category ≥5%.

Table 9. Percentage of Systematic Follow-Up Studies Reporting Research Design and Outcomes: All Studies and Instructional Practices Subset

Category	All Studies ($N = 159$)	Instructional Practices Studies ($n = 47$)
Research design		
Single-subject experimental	25.8	55.3[a]
Preexperimental	25.2	25.5
Experimental	23.3	8.5[a]
Quasi-experimental	11.9	4.3[a]
Qualitative	11.9	6.4[a]
Nonexperimental	3.8	4.3
Model demonstration	3.1	2.1
Case study	1.9	0.0
Outcomes measured		
Practitioner	80.5	91.5[a]
Child	50.3	57.4[a]
Both practitioner and child	37.1	53.2[a]

Note. [a]Differences in percentages across study sets for coding category ≥5%.

with respect to type of research design and outcomes evaluated, we found 55.3% of the instructional practices studies used a single-subject experimental design compared with 25.8% for the 159 studies, 91.5% of the 47 studies examined practitioner outcomes versus 80.5% for the 159 studies, and 57.4% of the 47 studies examined child outcomes compared with 50.3% for the 159 studies.

DISCUSSION

The primary purpose of this systematic review was to contribute to the growing science of EC PD by using the NPDCI framework to characterize descriptively the who, what, and how of a relatively large body of EC PD literature. We used systematic search procedures and defined coding categories. The descriptive characterizations in this study provide data useful for advancing understandings about which EC practitioners are receiving what types of EC PD and under what circumstances. The secondary purpose was to compare characteristics of studies that involved an explicit PD content focus on instructional practices to the larger body of EC PD literature. The final purpose was to analyze the elements reported for five systematic forms of follow-up that demonstrate promise for supporting practitioners' implementation of empirically supported practices (Snyder, Denney, et al., 2011).

"Who" of early childhood professional development

Practitioners involved in PD in the reviewed studies most often were those working in center-based childcare, preschool, or Head Start settings. Recent estimates suggest that the majority of paid educators in early childhood care and education are working in center-based programs (51%), family child care (12%), and friends, family, and neighbors (FFN) paid childcare (38%; Institute of Medicine and National Research Council, 2012; Rhodes & Hudson, 2012). Few studies in the present review included practitioners working in FFN settings or with infants and toddlers in center-based programs. This finding was not unexpected and is consistent with published reports that suggest FFN practitioners and those who work with infants and toddlers often have fewer opportunities for and access to systematic and sustained PD (Ochshorn, 2011). In addition, this finding supports the assertion that limited empirical findings are available about PD processes or outcomes for these groups of EC practitioners (Koh & Neuman, 2009).

An unexpected finding in the present review was that about 44% of the studies involved PD participants who reportedly interacted with young children with disabilities. Given only 10% of the studies identified the work setting of PD participants as an early childhood special education classroom, this finding likely reflects that practitioners were interacting with young children with disabilities in inclusive settings. The finding that 77% of the reviewed studies involved practitioners who were reported to work with either young children with disabilities or those at risk for disabilities and delays offers important information about the diversity of children involved in contemporary early learning programs and the differentiated teaching and instructional supports children are likely to need. This finding has important implications for the design and delivery of EC PD with respect to the knowledge, skills, and dispositions needed by early childhood practitioners so that they can implement empirically supported practices with fidelity (Bruder et al., 2009; Snyder, Denney, et al., 2011). The NPDCI (2008) framework emphasizes that it is important to characterize not only who the PD learner is but also with whom the learner interacts in practice settings.

Characterizing the who of PD with respect to facilitators and follow-up agents (e.g., coaches, consultants) in the 159 studies in which systematic follow-up was provided was more challenging, given the information reported in the reviewed studies. For example, we were able to determine that research staff and consultants were those most often providing systematic implementation follow-up, but

in only 58% of the studies were the qualifications of these individuals reported. In only 17.6% of the studies were follow-up agents reported to have training in coaching or consultation. The relevance of these issues for second-generation research in EC PD is highlighted in two recent studies that examined impacts of PD and found variations across coaches in relation to practitioner implementation of practices (Brown, Knoche, Edwards, & Sheridan, 2009; Downer, LoCasale-Crouch, Hamre, & Pianta, 2009). In future EC PD studies, characterizing the who of PD with respect to facilitators is likely as important as characterizing learners. A growing body of evidence suggests that both within-person (practitioners and PD facilitator) and between-person (relational) variables are potential sources of variance related to implementation and impacts of PD (Sheridan et al., 2009).

"What" of early childhood professional development

Social-emotional, instructional practices, and pre-academic topics were typically the content focus of PD in the reviewed studies. An emphasis on communication, inclusion, motor, or adaptive content was less often reported. In the majority of the studies reviewed, authors provided sufficient information about the content focus of the PD (e.g., descriptions of early literacy curriculum or early literacy practice) but limited information was provided about *how* this content was conveyed to learners as part of the PD intervention.

For each reviewed study, we coded whether descriptions of the PD intervention included information about adult learning strategies used to help convey the content focus (e.g., role play, demonstration, video examples, modeling). In approximately one third of the studies, we found that either these strategies were not part of the intervention or there was insufficient information provided about strategies used to deliver the PD content. Although this issue relates to the how of PD, it also is inextricably linked to the content focus for the PD. Different PD strategies and activities might be differentially relevant and effective if the PD content focus is one early literacy practice versus a comprehensive early literacy curriculum. Explicating the strategies and activities used to convey PD content is important to advance further the EC PD knowledge base. As noted by Zaslow (2009), there is a "need to go beyond a description of the formats [type of PD] of early childhood professional development to an understanding of the processes involved in professional development: the specific strategies and activities professional development entails" (p. 527).

"How" of early childhood professional development

In the present review, we were particularly interested in characterizing forms of follow-up provided as part of the how of PD and examining features associated with five systematic forms of follow-up. Almost all studies reviewed provided some form of follow-up as part of the PD and about 60% of the studies reported the PD included at least one of the five forms of systematic follow-up. Coaching was the most frequently used systematic follow-up strategy.

An important caveat related to findings from the present review about systematic follow-up forms is that we used the definitions shown in Table 2 to code the reviewed studies. In the studies reviewed, researchers sometimes referred to a systematic follow-up strategy as mentoring but the description of the strategy met our definition for coaching. Alternatively, researchers might have labeled the follow-up strategy "coaching" but it met our definition for consultation. Several EC PD experts have noted a pressing need for clarification and consistent use of terms when referring to these forms of follow-up (Sheridan et al., 2009; US Department of Education, 2010; Winton, 2010; Zaslow, 2009). On the basis of the findings from the present review, we concur that there is a need for clarification and consistency in terminology. More important, however, is a need to report information about the "active ingredients" of

these systematic forms of follow-up. Our ability to characterize the elements or active ingredients of these forms of follow-up was somewhat limited, based on information reported in the reviewed articles. Nevertheless, we describe major findings later related to active ingredients, based on seven elements we coded to characterize the who, what, and how reported in the 159 reviewed studies involving systematic follow-up.

With respect to the who, research staff or consultants were most often the individuals who provided systematic follow-up. With respect to the what and how, strategies used to deliver follow-up often involved observation of practice implementation, either live or by video, and the provision of verbal performance feedback. Although only reported in 119 of 159 studies, feedback most often was delivered immediately after the observation, in a face-to-face format.

Given that coaching was the most common form of systematic follow-up provided across the 159 studies, findings related to what and how generally are consistent with active ingredients that would be expected to part of coaching (e.g., observation, feedback). However, five elements related to dose, dose form, and fidelity of implementation (i.e., duration of follow-up relationship, frequency and length of feedback sessions, use of feedback protocol, and measures of feedback fidelity) were frequently coded as "not reported." For example, as shown in Table 7, fidelity of implementation was reported in one fifth of the 159 studies and only in one quarter of the studies was a systematic protocol reported to be available to guide the provision of follow-up by the follow-up agent. The use of systematic protocols that define the follow-up activities (i.e., dose form) and the extent to which follow-up is implemented with adherence to the protocol (i.e., fidelity of implementation) would allow for further investigation of the relationship between follow-up strategies and changes in teacher behavior (Duessen, Coskie, Robinson, & Autio, 2007; Snyder, Denney, et al., 2011).

Related to dose, we examined duration of the follow-up relationship and frequency as well as length of feedback sessions. "Not reported" was frequently coded. The absence of this information impedes the ability to calculate and examine cumulative intervention intensity (cf. Warren, Fey, & Yoder, 2007). Differences in intervention intensity might be associated with differential outcomes of PD. For example, a few studies in the literature show that short, focused feedback interventions can have positive effects on discrete classroom practices (e.g., Hemmeter, Snyder, Kinder, & Artman, 2011; Hendrickson, Gardner, Kaiser, & Riley, 1993; Noell et al., 2005; Stormont, Smith, & Lewis, 2007), whereas implementing multicomponent interventions with fidelity requires sustained and systematic follow-up supports (Fox, Hemmeter, Snyder, Binder, & Clarke, 2011). Examining the role of intervention intensity requires sufficient information about dose. Moreover, PD intervention intensity has important implications regarding the personnel and monetary resources required to provide PD. Taken together, documenting dose, dose form, and fidelity of PD implementation especially when systematic follow-up is provided will facilitate the "unpacking" and examination of both structural and process ingredients of EC PD (Sheridan et al., 2009; Snyder, Denney, et al., 2011; Zaslow, 2009).

Research designs and outcomes in systematic follow-up studies

Previous reviews have evaluated the strength of the evidence related to relationships between teacher PD and student achievement for school-age children (e.g., Yoon, Duncan, Lee, Scarloss, & Shapley, 2007). Yoon et al. noted that studies must present high-quality empirical evidence supporting the hypothesized relationships among PD, teacher learning and practice, and desired student or child outcomes to substantiate the empirical link between PD and desired outcomes. Although the evaluation of the strength of the empirical evidence related to PD outcomes was beyond the scope of the

present review, we coded descriptive information about the types of research designs used in EC PD and the extent to which teacher or child outcomes were reported.

One finding of the present review was that nearly half the studies involved examining a PD intervention using group or single-subject experimental designs. About 36% of the studies used quasi-experimental or preexperimental designs. Twenty-seven randomized group experimental design studies were conducted between 2006 and February 2011 and each of these studies involved a form of systematic follow-up as defined in the present review. The trend toward rigorous evaluations of PD interventions and the active ingredients of these interventions will help address second-generation research questions in EC PD related to what PD interventions demonstrate the most promise for supporting which practitioners' use of empirically supported practices and under what circumstances (Snyder, Hemmeter, & McLaughlin, 2011).

The majority of studies reported practitioner or learner outcomes but only 37% of the published studies included both practitioner and child outcomes, which would make it difficult to evaluate relationships among the PD intervention, changes in practitioners' knowledge or skills, and child developmental and learning outcomes. Future research in EC PD should be directed toward specifying and empirically examining theories of change that include both desired proximal (practitioner) and distal (child or family) outcomes (Sheridan et al., 2009; Snyder, Denney, et al., 2011; Zaslow, 2009).

Professional development focused on instructional practices

We comparatively examined the subset of articles where the content focus of PD was instructional practices to the larger body of studies. Studies focused on instructional practices were similar to the larger body of studies with a few notable exceptions.

First, instructional practices was reported as a content focus in almost 25% of the 256 studies reviewed, but only 7.9% of these 63 studies involved preservice training. Given recent recommendations for transforming teacher education through an emphasis on clinical or instructional practices (National Council for Accreditation on Teacher Education, 2010) and choosing PD content that focuses on instructional practices (Lambert, Sibley, & Lawrence, 2010) rather than general content knowledge, this finding might be used as a baseline against which to compare future empirical studies focused on the content focus of preservice PD.

Second, a larger proportion of studies focused on instructional practices included a systematic follow-up component (74.6% for instructional practices studies compared with 62.1% for all studies). These studies more often had consultation or coaching as the initial form of PD and used (a) strategies to help learners implement practices (e.g., modeling), (b) handouts, and (c) verbal performance feedback. The instructional practices studies with a follow-up component were more likely to occur on a daily basis with immediate face-to-face feedback but with fewer minutes of feedback. These procedural decisions made by researchers a priori might suggest that researchers select different types of PD and components of the PD intervention to maximize the likelihood of implementation of the instructional practice. In future studies, additional specificity should be provided about the structural and process ingredients of the PD intervention (regardless of content focus) to unpack systematically which strategies work for whom and under what circumstances.

Delimitations and limitations

Related to delimitations, we were interested in PD targeted to teachers or practitioners of young children birth through the age of 5 years. Studies in which early childhood practitioners received PD along with professionals working with children in first grade and above were not included. The characteristics of the PD that these latter early

childhood practitioners received might differ from the studies summarized in the present review. The purpose of the present review was to characterize descriptively the EC PD literature not to evaluate the rigor of the studies or evaluate relationships between the PD provided and practitioner or child outcomes. We chose to focus initially on these descriptive characterizations given we were not able to locate published data related to the who, what, and how of EC PD.

With respect to limitations, studies included in the present review were identified through the specified search procedures. Although systematic search procedures were used, including electronic and ancestral procedures, it is possible that some EC PD studies were not located, given challenges inherent in using search terms that are not reflected in terms used to index in various electronic databases. We addressed this limitation by using several different search terms related to PD and early childhood.

Implications for improved reporting practices

The present review used a defined body of empirical literature to provide a descriptive characterization of the who, what, and how of EC PD. We developed and validated coding categories and definitions associated with who, what, and how that might be useful for others to characterize features of EC PD. Descriptive characterizations should complement the growing body of evidence from rigorous experimental investigations to help advance the evolving science of EC PD.

On the basis of the findings from the present review, we offer several suggestions for improving reporting practices in empirical EC PD research. First, researchers should identify and define clearly the form of PD. Perhaps more important than consistently naming the form of the PD, researchers should describe the key components of PD such that those components can be compared with PD components used in other studies. Second, beyond specifying the form (e.g., staff development, inservice) and components (e.g., workshops, coaching) of PD, it is necessary to specify clearly the active ingredients of the facilitated teaching and learning experiences implemented in the study. This expands information about the how of PD (e.g., provision of workshops and coaching) to detailed information about structural and process variables associated with facilitated teaching and learning experiences (Garet et al., 2001; Zaslow, 2009). To examine what works in relation to desired outcomes of EC PD, it is essential to unpack and report on the structural and process features of the PD intervention. Third, reporting additional information about learners and the contexts in which they implement the content or instructional practices that were the focus of PD would provide opportunities to examine descriptively and empirically what appears to work and for whom. Fourth, as more intensive forms of PD are used to support practitioners' implementation of curricula or multicomponent interventions, improvements in reporting practices are needed with respect to the who, what, and how of the systematic implementation supports. This includes information about dose, dose form, and fidelity.

High-quality PD has the potential to impact practitioners' knowledge and instructional practices, which, in turn, are linked to child developmental and learning outcomes. The processes or mechanisms of change associated with these relationships are multifaceted. To explore these mechanisms, both teacher and child outcome data are needed along with data associated with setting, practitioner, or child variables hypothesized to mediate or moderate these relationships. Findings from this study suggest that an important first step might be to improve reporting practices related to the who, what, and how of the facilitated teaching and learning experiences that are systematically manipulated in EC PD research. Improvements in reporting practices along with more rigorous EC PD research should help advance the science of EC PD.

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