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An exploratory study of prekindergarten teachers' underlying assumptions about how children learn

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Abstract

This study investigated eight prekindergarten teachers' underlying assumptions about how children learn, and how these assumptions were used to inform and enact instruction. By contextualizing teachers' knowledge and understanding as it is used in practice we were able to provide unique insight into the work of teaching. Participants focused on children's ability to remember information, frequently through engagement and repetition. Teachers also anticipated what children would be learning in the early elementary years and taught that content, yet they did not necessarily expect children to remember the information, or even know if children learned the information. Implications for the design of both preservice and in-service teacher education are discussed. This includes helping teachers develop a strong foundational understanding of how children learn, establishing the pedagogical content knowledge relevant to teaching advanced symbol systems like literacy, and shifting pedagogical reasoning about practice. Given the link between the quality of instructional support and learning in the early years, developing the early childhood teaching force's capacity to use knowledge to reason skillfully about teaching offers a critical lever for creating robust learning in the early years.

Preschool has long been considered a critical lever for setting a strong foundation for schooling, especially when high-quality, responsive supports for language and learning exist (Bowman, Donovan, & Burns, 2001; Neuman & Dickinson, 2001; Shonkoff & Phillips, 2000). The importance of interactions between early childhood (EC) teachers and children has proven particularly critical for learning (Burchinal, Vandergrift, Pianta, & Mashburn, 2010; Keys et al., 2013; Pianta et al., 2005). Thus, efforts to improve quality in preschool teaching practice have centered on improving practice through preservice and in-service teacher training, often building teacher knowledge (e.g., Buysse, Winton, & Rous, 2009; Hamre et al., 2012; Neuman & Cunningham, 2009; Powell, Diamond, Burchinal, & Koehler, 2010; Sheridan, Edwards, Marvin, & Knoche, 2009).

Efforts to improve the instructional quality of EC education are taking place in a policy context of increased standards and testing. The Race to the Top Fund (U.S. Department of Education [DOE], 2009) has resulted in wide adoption of the Common Core State Standards (CSS, National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010), a set of learning outcomes for K–12 students that have permeated most educational contexts and indirectly affect teachers of preschool age children. More recent initiatives like the Early Learning Challenge Fund (U.S. DOE and U.S. Department of Health and Human Services, 2014) have introduced more formalized testing into both kindergarten and EC settings.

In this critical moment of shifting academic expectations and growing attention to instructional quality of early education, teachers of young children may feel the need to adapt their teaching in response to increasing EC and kindergarten standards and the growing prevalence of assessment in preschool. The K–12 education system has long been regarded as posing a potential "downward pressure of increased academic focus and more narrowed instructional approaches" (National Association for the Education of Young Children [NAEYC], 2015, p. 4) into EC classrooms. Yet, little is known about how this focus on preschool teaching quality and rising expectations for children's learning outcomes might couple to influence the day-to-day practice of preschool teachers. This is critical as almost half of U.S. states have developed comprehensive early childhood assessment systems (CECAS) which consist of screenings, formative assessments, measures of classroom quality, and kindergarten readiness assessments (Goldstein, McCoath, & Yu, 2016). CECASs aim to monitor and evaluate the quality of EC learning programs like preschool.

The present study seeks to understand teaching practice in EC education during this critical moment when expectations of and focus on instruction in preschool are high. By investigating the underlying assumptions about how children learn that inform EC teachers' reports of their pedagogical reasoning during instruction, we aim to better understand how preschool teachers make instructional choices in the classroom. This work can help inform those seeking to promote meaningful changes in preschool teaching practice in the present political context in which EC education is on "the brink of a great change" (Goldstein et al., 2016, p. 1) and preschool teachers and advocates fear the effects of high-stakes testing will reshape even preschool classrooms (NAEYC, 2015).

Knowledge for teaching

From a research standpoint there is a growing knowledge base about what it means to learn, for young children and throughout the life span. There are multiple theories that might inform how learning is conceived. Typically, in EC education, sociocultural constructivist approaches whereby children create meaning from their environment and learn through experiences, exploration, play, and social cooperation are viewed as the most efficacious ways to bring about young children's learning (Bruner, 2009; NAEYC, 2009; Piaget, 1952; Vygotsky, 1978). The teacher's role is to facilitate these experiences by structuring the classroom, the schedule, and the activities. Teachers support children's learning in this environment that is at once structured, but flexible and open to possibility with opportunities for individual learning, timely feedback, questions, and provocations that require children to resolve apparently conflicting information (Ashiabi, 2007; Hamre & Pianta, 2005; NAEYC, 2009). This is challenging work that requires a range of knowledge both for planning and enacting practice.

Learning experiences for both preservice and in-service teachers tend to focus on developing these abilities in teachers through providing knowledge about learners, knowledge about content, and knowledge about how to teach content to young children (Cox, Hollingsworth, & Buysse, 2015; Shulman, 1987). This is, in part, because evidence suggests that EC teachers typically have less than ideal levels of knowledge about how young children learn (e.g., Cunningham, Zibulsky, & Callahan, 2009; Hindman & Wasik, 2011; O'Leary, Cockburn, Powell, & Diamond, 2010), a predicament which is exacerbated by low and inconsistent requirements for formal preparation for teaching in EC (Child Care

Aware, 2013; Marato & Brandon, 2012; NAEYC, 2016; Rhodes & Huston, 2012). It is also theorized that by gaining this knowledge, teachers will be better equipped to enact successful learning activities, resulting in improved outcomes for children.

However, given the complex work of teaching described above, it may be that simply having knowledge of how young children learn is not enough to bring about this type of practice. Rather, teachers must be able to use knowledge to enact instruction in the moment that is responsive to diverse learners. In the K–12 theoretical literature, thinking with knowledge in order to enact instruction has been conceptualized as pedagogical reasoning (Nilsson, 2009; Shafto, Goodman, & Griffiths, 2014; Shulman, 1987). Pedagogical reasoning is a process through which teachers strategically make sense of multiple sources of knowledge in order to transform content in ways that make it readily understood by learners: "Pedagogical thinking is strategic, imaginative, and grounded in knowledge of the self, children, and subject matter" (Feiman-Nemser & Buchmann, 1985, p. 1). Pedagogical reasoning is uniquely important to the work of teaching because it is how teachers actualize knowledge through in-the-moment thinking. Shulman notes that teachers use multiple sources of knowledge during this process, including using knowledge about how children learn in light of the context and goals for children's learning.

Role of context

Context comprises multiple layers that all directly or indirectly influence and inform instruction (Cohen, Raudenbush, & Ball, 2003; Lampert, 2001; Lee, 2014). The most immediate layer is the classroom context. This includes the physical structure of the classroom, however, it can also include the specific schedule for the day, the personalities of individual children, or the teacher's goals for a particular lesson. All of these factors inform a teacher's pedagogical reasoning as s/he attempts to bring about learning. The classroom context is nested within the larger school context in which teachers must negotiate practice. This influences a multitude of variables that inform practice through school-level decisions related to curricula or norms for interacting with families, which can also inform teachers' pedagogical reasoning and enactment of practice (Lampert, 2001).

Schools are then nested in the broader educational context and preschool teachers enact practice into a regulatory landscape of policies spanning preschool through higher education (Cohen et al., 2003). Even with polices not directly related to EC, teachers are responsible for

children who will eventually matriculate to local school districts. The increasing policy focus on standards and ongoing assessment of children's progress forms an integral part of the pedagogical context. In fact, NAEYC (2015) has even issued a statement for teachers of young children about negotiating the CCSS in relation to developmentally appropriate practice.

These contexts all inform the work that teachers do. Moreover, these contextual influences may conflict with teachers' knowledge about child development and/or views about how children learn. Some have argued that the new polices are not necessarily fitting with research evidence or best practices in EC (Graue, 2006; Yoon, 2015). For instance, the increasing prevalence of assessment data in kindergarten reduces literacy instruction in preschool to easily measured language and literacy skills like letter and word recognition, while other competencies are deemphasized or ignored (Dyson, 2013; Yoon, 2013, 2015).

There are emerging discussions about how to reconcile new requirements with educational principles (Brown, 2013; NAEYC, 2015), including the need for preschool teachers to translate new standards and assessments through a developmentally appropriate practice lens. Such a lens considers children's age, developmental status, individuality, and the sociocultural context in which children live (NAEYC, 2015). Still, not much is known about how EC teachers are responding to these new standards in their classrooms. Further, there is little guidance to support preschool teachers in understanding how to best prepare children who will take a readiness assessment at the onset of kindergarten. Developmentally appropriate practice suggests that EC teachers should sensitively meet children where they are as they traverse unique developmental pathways, but kindergarten readiness assessments offer a narrowly defined skill set which should be attained by all for readiness for learning to be obtained and demonstrated.

Why knowledge in use?

Although there is a research focus on EC teachers' knowledge, traditionally, this has been assessed using static measures (e.g., Cunningham et al., 2009; Hindman & Wasik, 2011; Neuman & Cunningham, 2009). In other words, our understandings of teachers' knowledge is measured in isolation from context and the process of using knowledge to enact practice. Returning to the theory of pedagogical reasoning helps to underscore the need for understanding knowledge in use. If reasoning about practice is a process and an assimilation of multiple sources of knowledge, including information about the context, then static measures of

knowledge do not provide a full understanding of the relationship between knowledge and practice. Thus, it is important to understand teachers' underlying assumptions about learning as they are used within moment-to-moment practice.

Present study

Both the policy context and efforts to increase teacher knowledge have resulted in evolving roles for EC teachers. We are interested in how teachers use knowledge, their underlying assumptions drawn from a base of facts, principles, and experiences about how children learn, in their pedagogical reasoning. We focused on this specific type of knowledge because of its centrality in the theory of pedagogical reasoning, its role as the focus in multiple professional learning opportunities, and its position as the foundation of many preservice teacher programs. What is particularly valuable about this research is the ability to contextualize and uncover the links between teachers' underlying assumptions and enacted practice in specific and actual classrooms moments. Thus we asked: *What underlying assumptions about learning informed prekindergarten teachers' pedagogical reasoning?*

Method

Theoretical orientation

We hold a sociocultural perspective on teaching and learning, with the view that language and social interaction are the basis for learning (Vygotsky, 1978; Wenger, 2000). Individuals are learners who also experience the world and learn through interactions with others (Palincsar, 1998). This theoretical orientation assumes an evolving relationship between the internal thoughts and the external actions of teachers. Using this orientation towards teaching and learning allows one to consider that what teachers know and act upon is related not only to the circumstances and the interaction at hand, but also to their previous interactions and the associated assumptions and knowledge cultivated through experience. Further, it suggests that there is always a purpose for and a rationale behind teachers' actions, a critical insight for those aiming to enhance classroom practices.

Returning to Shulman's (1987) conceptualization of pedagogical reasoning, we view teaching as an intentional act in which teachers bring together multiple sources of information to inform and enact practice. Teachers' pedagogical reasoning "requires both a process of thinking about what they are doing and an adequate base of facts, principles, and experiences from which to reason" (Shulman, p. 13). This base plays an instrumental role as teaching involves a process of knowing content, teaching that content, and evaluating instruction (Wilson, Shulman, & Richert, 1987). For the purposes of our present study, we were specifically interested in teachers' underlying assumptions about how children learn and the ways that these assumptions informed teachers' reasoning about and enacted practice.

Settings and participants

Two schools and eight prekindergarten teachers in a large Midwestern city were recruited for participation in a study examining teachers' experiences in the classroom. Pseudonyms are used for the schools and the participants. The schools were selected for their close geographic proximity and sizable enrollment of families from similar socioeconomic backgrounds (upper-middle to upper class). Therefore, both schools were subject to the same regulatory context as private preschools in the same geographical region, serving socioeconomically similar children. Based on information gained during interviews with school directors, one school focused on children's social emotional development and also implemented a letter/number of the week curriculum (the Friendship School). The other school, The ABC School, was "academically focused" and implemented a scripted language arts curriculum entitled *Beginning to Read, Write, and Listen K-1* (MacMillan/McGraw-Hill, 1995).

All of the participants in the study were Caucasian females aged 27–67 (*M*= 49.5, *SD*=16.19). As presented in Table 1, participants represented a range of teacher background characteristics including degree and years of teaching experience. Only one teacher held an EC-specific certification, all of the teachers with education-related degrees majored in elementary education (K–5/6). All but one of the teachers in this sample possessed a bachelor's degree, making this a more highly educated group of teachers than is typical in center-based care.

Although all but one of the teachers lacked an early childhood specific college degree, the lack of an early childhood specific bachelor's degree is typical for teachers working in center-based care. Nationally, estimates

Table 1. Teacher descriptive characteristics.

	Years of experience teaching preschool	Years of experience teaching other grades	Highest degree and certifications
Friendship School			
Amanda	5	n/a	BA General Studies
Jacki	Less than 1	More than 15 in multiple elementary grades	BS Elementary Special Education Certification Education, K–5
Catherine	6	n/a	MA Religion and Art
Pamela	12	n/a	BA Elementary Education, K–6
ABC School			
Beth	3	More than 20 in kindergarten	MA Elementary Education, K–6
Linda	22	n/a	AA Secondary Education
Abby	15	n/a	BA Elementary Education, K–6 Early Childhood Certification Reading Endorsement
Deanna	15	2 in third grade 3 in eighth grade	ME K–12 Education

Pseudonyms are used for schools and teachers.

range from 13% to 21% of center-based educators possessing a bachelor's degree (Maroto & Brandon, 2012; NAEYC, 2016; Rhodes & Huston, 2012), similar to the 13% in this study. Only 18 states and Washington, DC, require early childhood educators in child care centers to have more than a high school diploma. Further, 17 states do not even require a high school degree. In all, only 10 states require at least some early childhood specific college preparation prior to teaching (Child Care Aware, 2013). The matter is further complicated by the fact that early childhood is recognized as spanning from birth to age 8 or third grade, but state teaching licenses often do not cover this age span, beginning instead with kindergarten (NAEYC, 2009) as was the case for the state in which the study occurred.

Data collection

The data presented in this study were collected as part of a larger, exploratory study of EC teachers' perspectives on practice. For this study, data were from a teacher questionnaire, observations of instruction, and stimulated recall interviews. The teacher questionnaire was administered at the beginning of the study and used to collect demographic information about teachers presented previously. The observations were

used to both prepare for and serve as the stimulus in the interviews with teachers. The stimulated recall interviews accessed teachers' pedagogical reasoning during practice and the underlying assumptions informing the reasoning.

Observations

Each teacher was observed and video-recorded four times, twice during whole-group instruction and twice during language and literacy instruction. Both of these activities were selected due to their prolific occurrence in EC classrooms (Early et al., 2010; Fuligni, Howes, Huang, Hong, & Lara-Cinisomo, 2012) and their potential as rich learning opportunities (Dickinson & Smith, 1994; Early et al., 2010; Han, Roskos, Christie, Mandzuk, & Vukelich, 2005; Yifat & Zadunaisky-Ehrlich, 2008). Whole-group activities were what the teachers labeled "circle time" instruction consisting of daily routines incorporating calendar, days of the week, the weather, and letter of the week/unit activities. Language and literacy instruction varied by teacher, although for the ABC School the activities were from the scripted curriculum. We asked to observe teachers during their regularly scheduled instruction. Teachers then selected which days and activities to be observed. There was some variation in number of minutes spent in each activity (Circle time: M= 22.78, SD = 9.85; language and literacy: M= 22.16, SD = 9.55; all times were rounded to the nearest half minute).

Stimulated recall interviews

Stimulated recall interviews were used to access teachers' thought processes during instruction without interrupting the act of teaching (Clark & Yinger, 1977;Mcalpine, Weston, Berthiaume, & Fairbank-Roch, 2006; Shavelson & Stern, 1981). All but one stimulated recall interview occurred within 24 hours of instruction to optimize the teacher's recall of events (Ericsson & Simon, 1980; Lyle, 2003). In this study, the stimulated recall interviews were used to access underlying assumptions about children's learning informing teachers' pedagogical reasoning during whole-group and language and literacy instruction.

Prior to beginning the stimulated recall interviews, observation videos and field notes were reviewed to select four instances of instruction where teachers engaged in teaching practices identified as effective for children's learning derived from several reviews of the literature (e.g., NAEYC, 2009; National Early Literacy Panel, 2008; Snow et al., 1998) and assessed in observational measures of teaching quality (e.g., Pianta, La Paro, & Hamre: The Classroom Assessment Scoring System, 2008;

Smith & Dickinson: The Early Language and Literacy Classroom Observation, 2002) that could be observed regardless of the specific instructional moment. These were chosen using the videos and field notes as a means for understanding teachers' pedagogical reasoning around enacting highly encouraged practices (e.g., teaching a vocabulary word, responding to a child's question) as well as ensuring a minimum amount of data per teacher. Because teachers' instruction varied, the selected instances of instruction differed based on the specific teacher and instructional activity. However, for each observation of each teacher we were able to observe four instances of effective practices.

During the stimulated recall interview, teachers viewed the video of their instruction and were invited to stop the video when "anything interesting or out of the ordinary occurred." Thus, not all of the instructional moments teachers chose to talk about represent research-identified effective teaching practices or developmentally appropriate practices. The intent of the study was to understand how teachers' reasoned about their teaching practice, and how that reasoning informed what they did in the classroom, even when activities fell outside the scope of recommended teaching in EC settings. In addition, the researcher stopped the video at the four preselected moments of instruction. Once the video was stopped, teachers were asked, "Why was this interesting/What were you thinking about?" depending on who stopped the video. These prompts were developed in research piloting, derived from previous research, and found to be the most efficacious way of eliciting teacher pedagogical reasoning (see Schachter, 2014). A follow-up question, "Why do you think that?" was also asked in order to understand the knowledge base informing teachers' pedagogical reasoning. This resulted in 32 total interviews, 4 interviews per teacher.

Data analysis

There were multiple steps in the data analysis. First, all interview data were transcribed and descriptions of the instruction that initiated the stopping of the video were created. These were used to contextualize teachers' pedagogical reasoning into the specific moment of instruction. As part of the larger study, there were 537 instances of pedagogical reasoning. For the purposes of this study, the subset of pedagogical reasoning using assumptions about how children learn was identified for analyses, 98 instances in total. These instances were identified during coding of the larger data corpus that involved identifying individual moments of

pedagogical reasoning and then flagging instances that referred specially to reasoning about practice with information about how children learn. No a priori assumptions about learning were used to identify these instances, rather we identified all instances where teachers mention learning or a process of learning as it related to reasoning about instruction (explicitly or implicitly). Given that the participants were also allowed to stop the videos for discussion and that some participants were better informants than others, there was an uneven number of instances across participants. The uneven number of instances of reasoning may derive from a number of variables ranging from the content of the videos to more personal factors like comfort with the interviewer. However, there were no discernible patterns in teacher background to explain differences in the number of instances of pedagogical reasoning (e.g., teachers with higher instances of reasoning were from both schools and had differing background experiences).

As the purpose of the present study was to understand teachers' underlying assumptions about how children learn, the base of principles, facts, and previous experiences, that ultimately influence moment-to-moment reasoning about practice, we examined the 98 instances of pedagogical reasoning with information about how children learn. Both authors individually read the data to identify emerging themes in teachers' underlying assumptions about how children learn. A grounded approach was used for coding such that the words of teachers were prioritized instead of a priori assumptions drawn from the literature. For example, codes such as 'repetition,' 'reinforcement,' and 'making connections' were drawn from teachers' verbatim statements about children's learning. Codes such as 'anticipating future learning' described moments when teachers discussed what children needed to do in kindergarten, first, or second grade, as the teachers' reasoning about learning was oriented toward the future (See Table 2 for codes, definitions, and examples).

After discussing initial themes, we open coded the transcripts. We then identified the axial code and revisited the transcripts to confirm the axial code, additional coding categories, and exemplars of those codes (Corbin & Strauss, 2008). Through a process of memoing, discussion, and reviewing the transcripts, we collapsed several codes and finalized the coding scheme. Each instance of pedagogical reasoning was double coded separately by the authors. All disagreements were reconciled through discussion. Finally, we looked across the codes in order to find larger patterns in teachers' underlying assumptions about how children learn and subsequent practice.

Table 2. Coding exemplars.

Code	Definition	Exemplars
Remember and knowing	References to children knowing or remembering information	"Well that shows that they've truly learned what we have been talking about."—Catherine
Engaged/building from interests	Assumptions that children learn by being engaged or interested	"I think bringing in somethin' that a kid's interested in will help him focus more on the task."—Amanda
Repetition	Assumptions that children learn through repetition	"And it's all a matter of just doing it over, and over, and over. . ." —Deanna
Anticipating future learning	References to what children will need to know/learn in the future beyond prekindergarten	"And nobody expects them to get all of this this year, but the basic ones, and ... the more they can start to understand it and get it this year, the easier it's gonna be in kindergarten, you know, for them, 'cause they'll just build upon that."—Beth
Reinforce	Assumptions that children learn through reinforcing content/topics	". . . because somebody said 'why are there two dinosaurs?' Well let's talk about all the /d/ words that are on there. Again just to really reinforce what, what we were learning that week all those words that begin with /d/."—Abby
Make connections	Assumptions that children learn by making connections	"The more that they make connections the more that they will be able to remember."—Catherine
Metaphorical language	The use of metaphorical language to describe the learning process	". . . then it will become more implanted in her brain."—Pamela
Different levels	Assumptions that children have differing abilities that should be accounted for in the learning process	"And some will get it, and some won't."— Pamela
Class management or behavior management	Assumptions that children learn through routine and "behaving"	"Kids thrive on rules and regulations. And if you let one get by with it, you got to let all of them. This is the way it is."— Linda
Positive reinforcement	Assumptions that children learn through feeling good about their accomplishments	". . . feeling good about what they're doing is very important. I want them to be happy. I want them to feel good about what they're doing. . . But I want them to be proud of their own work, their own accomplishments."—Deanna

Importantly, teachers often discussed underlying assumptions of how children learn in multifaceted ways, and thus multiple codes could be applied to one moment of pedagogical reasoning. For example, when discussing why she had a child repeat the letters in her name, Catherine stated, "I think when you go over something again they have a better chance of remembering the lesson, or whatever we've just talked about. It reinforces what we've just done." This instance was double coded as repetition and remembering as Catherine connected the two concepts, "go[ing] over something again," and "remembering the lesson." We developed an overarching assertion by considering the kinds of relationships that teachers drew between the codes, and the relationship of the codes to the axial code of remembering, which was the most prevalent code in the data, and the code which served as the desired outcome of the teachers' instruction.

The present study was exploratory in nature, intended to understand teachers' conceptions of how children learn as they were used to inform practice. As such, participants were recruited to reflect a variety of background experiences. The data were examined for patterns of differences based on background experiences and school curricula. This was done by tracking the number of times each code applied to the reasoning of each teacher. For instance, all eight teachers cited the importance of engagement in their reasoning about children's learning. Then, the prevalence of each code by school curricula was determined by counting the number of times teachers from each school reasoned in a particular way. For example, teachers at both the Friendship School and the ABC School anticipated children's future learning in kindergarten and beyond when reasoning about their instruction in the classroom. By examining each teachers' degree background, similarities and differences in background experience could be determined. For instance, teachers with a bachelor's degree in a field other than education, a bachelor's degree in Elementary Education, and a Certificate in Early Childhood all cited the importance of children remembering things through a process of repetition. Thus, even though the teachers in the sample had different formal preparation for teaching and taught under different curricular conditions, the themes reported in this study reflect shared patterns in the way that teachers in this study reasoned about teaching regardless of their background. When differences occurred these are noted in the Results. However, we were cautious not to overemphasize these differences given the small sample size and descriptive nature of this study.

Results

When questioned about the pedagogical reasoning informing their in-the-moment instruction, the teachers in this sample drew on underlying assumptions about how children learned, the aims of instruction, and optimal ways to meet these aims. Conceptualizing learning as primarily brought about by engagement and repetition, the teachers focused on children's ability to remember information, frequently in anticipation of what children need to be able to do in the early elementary grades. However, the teachers also expressed considerable ambivalence and uncertainty about what children would actually remember from instruction.

Although the teachers in this study were intentional about their teaching, their reasoning about instruction revealed underdeveloped conceptualizations of how children gain knowledge and an accompanying narrow range of instructional approaches. The primary animating assumption was that when children are engaged, repeated exposure to information enables children to remember. Pamela emphasized this point, explaining: "The more you hear a song; if it's played in the room all day long, every day, in a couple weeks they're gonna be able to sing along to it."

Next we describe how the teachers emphasized the need for engagement and repetition to aid children's capacity to remember, even as teachers instructed children on information they felt that children would need to know later but that they did not expect children to remember. We contextualize participants' reasoning within the context of instruction in order to make explicit the relationship between pedagogical reasoning with assumptions about children's learning and enacted practice. Importantly, although there were differences in teachers' background characteristics and the curricula used at each school, the patterns we report next were observed across all participants.

Engagement

> "So *it was just another way to engage them. . . I tried to stop at certain words that they seemed really interested in and go a little bit further with it*. Like counting with the fingers. . ."
>> —Catherine explaining the reasoning for pausing and holding up her hands when she read the word "finger" in a book

The teachers in this study saw engagement as a prerequisite for learning, seeking to maintain children's attention and interest even as instruction relied heavily on repetition and routine. For instance, Catherine cited the need for children's attention when learning letters as the reason for asking the whole group to help a child identify the first letter of her name. She said,

> I was trying to get them to become more engaged with what we were doing so that they would stop talking amongst themselves. And the more that they pay attention to the letters, the more that they will be able to recognize them.

The other participants were also quick to notice and value engagement. For example, when reasoning about a child's question during a rhyming activity, Jacki commented, "She's the one who whenever I'm reading a book will say, 'Well, what does that mean?' You know, so I know she's listening. I know she's focused on the book. . ." From these teachers' perspective, children need to "pay attention," "focus," and "listen" in order to learn in the classroom.

Maintaining children's engagement, ultimately, depended on the teacher's ability to gauge interest and respond accordingly. As Amanda noted when explaining her reasoning upon observing that the children were restless during a circle time activity, "They're not learning anything if they're over it. . . the kids are going to be really interested in it, and then they're totally not. You have to be flexible and kinda play off of them a little bit." When reasoning about practice, these teachers saw engagement as necessary for learning as children will not learn "if they're over it." Consequently, teachers needed to flexibly adapt in response to children's demonstration of or lack of interest. One way that the teachers did this was to purposely use children's interests to heighten engagement. As Amanda remarked about incorporating tweezers that a child had been playing with into an activity, "Everyone's different, and I think bringing in something that a kid's interested in will help him focus more on the task" (Schachter, 2017).

Teachers stated that they knew children were engaged when they were asking questions, and teachers frequently maintained engagement by answering children's questions. Deanna cited children "asking and noticing" as a justification for teaching new information such as when children in her classroom noticed a question mark in a book and wondered what it was. For the participants, children's questions served as both an

indication of interest and a way to further extend interest. Consequently, the teachers saw children's questions as a positive opportunity to reinforce instruction. As Beth noted about an explanation she provided children with regarding the difference between "to" and "too":

> You answer their questions because they will let you know when they're not interested anymore. They'll move onto something else. But if they're interested, they will ask you another question that will link back into. . . pretty much what you're saying.

Repetition

> "So I was holding it so he could feel what direction to go in. And, *it's all a matter of just doing it over, and over, and over* until. . . eventually if he does it that way. . . then, he goes through life making it that way."
> —Deanna on helping a child to practice writing letters by holding the pencil with him as he wrote

The participants' underlying assumption about the value of repeated exposure necessitated careful attention to children's engagement because instruction unfolded primarily through repetition and routine. For the teachers, routines were activity structures like circle time which unfolded primarily through small behavioral scripts in which children were asked to carry out the same actions and use the same language each day. Routines like circle time included repeated, set activities like completing the calendar. Classroom routines relied heavily on repetition as activities like calendar were introduced and completed in similar ways from day to day. Describing the value of daily routines like circle time, Linda commented,

> That's how they learn the best. What's the beginning, middle, and end? When we do—like if there's a full moon or the routine changes sometimes, they'll call me on it or call Teacher about it, and sometimes they get a little crazy 'cause kids learn by routine. What's coming next, what's expected, and what's first, second, and third. That's how they learn at this age.

Pamela further elaborated on the value of routines, explaining that "repetition and a routine" are a "calming," "comforting thing" in her discussions of pedagogical reasoning. She went on to say that children are

"creatures of habit. But, with that being said I still think they memorize and learn better if it's constantly repeated." Routines were not just a part of daily classroom life, but informed teachers' underlying assumptions about how children "learn at this age."

Given the teachers' reliance on routines to organize the classroom day, it is not surprising that repetition acted as a primary lever for bringing about remembering. Discussing her pedagogical reasoning while a child named Kate was serving as the weekly calendar helper, Pamela stated:

> This is day four of Kate doing this everyday. This is one of the reasons why I do love having a helper 'cause I do think that whole repeat, repeat, repeat, repeat it kicks in especially for children like Kate who struggles with remembering from day one to day two. So, I felt she was so close to getting it on her own if I could just give that first sound, that /n/ she could get it. She knew last month was October 'cause she had heard that, so after 31 days she remembered it.

Deanna used a similar reasoning when considering her children's struggle to learn and read the days of the week. She said, "I know it's an important thing to do. So I thought, well, if most of them are struggling with this, then we'll just keep on repeating it every day. And at some point, they'll get it" (Schachter, 2017). When trying to help children remember discrete pieces of information like the name of the month or the days of the week, the teachers' primary instructional strategy was repetition, reasoning that children would eventually "get it."

Because the teachers believed that children learned best by repetition, they used repetition in their daily instruction, regarding it as a kind of practice. As Beth noted when discussing her pedagogical reasoning behind telling children to practice their sight words,

> Just to acknowledge, that I think this is what we need to do in order to learn these words. Everybody needs to practice. . . And just to acknowledge the fact that that's how you learn is through repetition and the practice.

Here Beth's assumptions about learning are made explicit in her explanation to children about how to learn.

Remember

> "*The more that they make connections the more that they will be able to remember*. Like with the chameleon, we read about chameleons so I wanted them to know. *Just see what they could remember from that book and bring it to this book and hopefully then they'll remember what a chameleon is*."
>
>> —Catherine on her reasoning for asking a child to locate a classroom book about chameleons after reading about them in a picture book

Participants saw children's capacity to remember as the desired outcome of instruction. Whether teaching letter-sound associations, rhymes, or calendar, the teachers intended for children to remember discrete pieces of new information, especially the names or labels for different pieces of information like numbers, letters, or words. The teachers used engagement and repetition as a way to bring about this remembering, as in the example of Kate remembering that the name of the previous month after 31 days of repetition. Similarly, in a representative quote, Catherine explained her reasoning for having a child repeat the spelling of her name saying, "I think when you go over something again they have a better chance of remembering the lesson, or whatever we've just talked about." When explaining her pedagogical reasoning during phonics instruction, Pamela echoed Catherine's sentiments about the value of repetition for bringing about children's ability to remember. She said, "They might not always have the right order for what something is taught, or the definition of it, but they do eventually come around. . . And then the more we do it, the more they remember it."

There seemed to be a continuum in teachers' understanding of what it means for children to remember. Participants varied from not considering learning outcomes to considering children's thinking and capacity to make connections as central to remembering. On one end of the spectrum, the two teachers with the least amount of formal knowledge about education, Amanda (BA in General Studies and 5 years of teaching experience) and Linda (AA in Secondary Education), did not refer to learning outcomes as they discussed their pedagogical reasoning about practice. Instead, these two teachers focused on more immediately apparent problems like managing a classroom of children or maintaining children's interest and engagement. For example, Amanda aimed to flexibly adapt so as not to teach when children "are over it." Linda focused on behavioral regulation in the classroom. When explaining the reasoning behind

questioning children about the rules during a circle time activity, Linda commented, "Kids thrive on rules and regulations. And if you let one get by with it, you got to let all of them. This is the way it is." When reasoning about instructional practice, Linda and Amanda did not focus on children remembering or knowing information, so much as on monitoring and managing engagement and behavior.

On the other end of the spectrum, the teachers with more extensive education training in preschool through fifth grade along with special certifications, Jacki (BS Elementary Education and Special Education Certification) and Abby (BA Elementary Education, EC Certification, and Reading Endorsement), aimed to build connections and develop deeper understandings as part of the remembering process. Although Jacki and Abby named children's ability to remember information as a desired outcome of instruction, they also described learning as a thinking process which requires understanding. For instance, Jacki said:

> But I do a lot of exaggerated words. Like if I'm reading a book and the book aims at a given letter, I kind of try to exaggerate the sound. For a while I felt like I was stuttering because I'd go, "Oh, the /d/d/d/dog," or that kind of thing. But I want them to hear it. I want them to process it. I want them to learn it.

In this instance, Jacki emphasized a particular letter sound with the intention of highlighting the sound so that children could focus on the sound, think about the sound, and ultimately learn the sound. She intended for children to do more than simply demonstrate a verbal recall of information. In a similar fashion, Abby described the reasoning behind her transition from naming the months to looking at the calendar during circle time saying:

> I just think it's important that they're ready to know months and weeks and days and—it's good to focus on them because when we go to the calendar and talk about November it's good for him to say all the months and then kind of think about the months that came, the month that came before it and what the next month is gonna be, so I like to do that before we go into the actual calendar. I think it gets them ready to see and kind of remember what month we're on, and if it's the beginning of the month they can remember what was before it and what's gonna come after it.

From Abby's perspective, if children "focus on" the months, "say all the months," and "think about the months," then they will be able to remember what "month we're on," and ultimately understand the order of the months. The assumption underlying Abby's practice is that learning is a thinking process, not solely a process of remembering what has been repeated — an advanced conceptualization for this group of teachers.

Future thinking

> "Because then when they see the letter W, they'll maybe put the sound with it and sound out a word. So if they see the letter W when they walk by the whale room, 'Whale. Wa. W' . . . Maybe not. *But eventually, they will. Not today. Maybe not tomorrow, but I think by the end of the year*, they're gonna walk by the whale room and say, 'Whale.'"
>> —Pamela on teaching letter-sound correspondence by asking a child to produce the /w/ sound during an activity

The teachers' efforts to help children remember information maintained a future focus as much of what they taught they considered information that children would need to know in early elementary grades. The teachers saw instruction focused on kindergarten and first-grade skills as a form of preparation that would help children be "familiar" or "aware" when it was time to learn the content. In a representative comment, Pamela discussed teaching phonics, saying:

> The reason I started introducing the lines and the happy smiles—I don't call them what they'll call 'em in first grade, but I do that, so phonically, they kinda get an idea of what that is. Now, it's gonna be in their brain. They're not gonna remember it next year. It's not gonna be like, "Oh my Gosh!" but they might. It'll jog something and be easier for them to learn when it is time, when they really get knee deep in phonics in kindergarten and first grade…

Rather than teaching what children need to know and use now, Pamela and the other teachers in the study taught with an eye to the future, hoping that familiarity with more advanced content would "jog something" and make it "easier" for children "to learn when it is time."

Teachers also taught with a future focus because they saw learning as a gradual process in which children could build on beginning knowledge. For example, Beth commented on her reasoning about having children exaggerate the sounds in words:

> The 'guh' and the 'juh.' And you have to really fine tune some of that. And, nobody expects them to get all of this this year, but the basic ones. . . And the more they can start to understand it and get it this year, the easier it's gonna be in kindergarten for them, 'cause they'll just build upon that.

Teaching what "nobody expects them to get all of," Beth remarked that the aim was for children to recognize basic letter-sound correspondence. With the basics in place, Beth echoed Pamela's sentiment that later learning would be "easier." In this case, the difficulty of later learning would be made easier not because memory would be jogged, but because children could "build upon" what they already know such as recognizing the letter-sound relationships in their own name.

Ambivalence and uncertainty about what children will remember

> "If they see something and it's done the wrong way on the board they're just going to internalize it. *Whether it sticks or not nobody's really going to know for, you know, awhile.*"
> —Beth on her decision to erase and rewrite the number "2" on the board

A consequence of instructing children in content, that as Pamela commented, "they don't have to know" was both ambivalence about whether children needed to remember information and uncertainty about what children would remember. The teachers were ambivalent in that on the one hand their primary goal was for children to remember information, and yet, they repeatedly stated that children did not really need to remember what they were teaching. The participants' future focus put them in the unusual position of teaching content that they did not expect children to learn and remember. Instead, the teachers readily accepted that children would learn what they were teaching "when it is time," "in kindergarten and first grade," or simply "later." As Catherine noted about her decision to tell children that a letter was uppercase when they incorrectly answered her initial question, "If they don't get it right away, it's

fine. That's something that will come later." Deanna used similar reasoning when explaining a question mark to children and discussing the difference between lower and uppercase letters. Her pedagogical reasoning was that "if they don't get it, they don't get it, but at least I'm just gonna offer it to them." Thus it seems that teachers were offering content to children that they did not expect children to "learn" or, given their conceptualization of learning, remember.

Not only were the teachers ambivalent about whether children needed to remember or not, they also expressed considerable uncertainty about their capacity to know what children remembered. For instance, Beth commented on the differences among children in her classroom saying, "Some of them will remember hearing about this later on in kindergarten or first grade, if they see it again. Some of them will internalize it right then. Just because you never know what they're gonna be listening to." While reasoning about taking extra time to discuss the meaning of the word "too," Beth again remarked that "you don't know how many are going to really remember." In a similar vein, Pamela explained her reasoning during a language and literacy activity saying, "Will they remember next year what a syllable is? Maybe not." In instances such as these teachers were acknowledging that there may not be long-term retention of what they were teaching, but this recognition did not influence their reasoning about teaching such that they changed their instruction. Instead, the teachers' focus on the future served as a rationalization for instruction in which children did not always learn what was taught.

Metaphors for how children learn

Metaphors about how children acquire and use information, often in the form of misconceptions, underlay the participant's ambivalence and uncertainty about what children would remember. When reasoning about instructional practice, the teachers in this study envisioned an almost absorption-like process in which exposure to information allowed children to retain information and as Abby put it, "Soak all that in," or as Amanda said, "Keep it into their little brains." Similarly, Pamela commented that children are "like sponges." Extolling the value of repetition and practice, she explained her pedagogical reasoning about a child judged to be in need of additional support: "If she hears more of it at home, then it will become more implanted in her brain. Then, she'll recognize it later." Describing her pedagogical reasoning informing teaching children words associated with the letter of the week, Catherine noted that her intention

was to "saturate" children with words related to the letter. She later described evidence of children's learning, saying, "They have actually absorbed what we've been talking about and it's part of their memory now and part of their knowledge."

This vision of "absorbed," "implanted," or "embedded" information suggests a process of learning in which children learn new information as it is presented, rather than interpreting new information, revising existing understandings, or transforming information to fit existing conceptions. These views of learning suggest either passive or incidental forms of learning and leave little room for imperfect, partial, or even individually constructed understandings, and little need for individualized, differentiated, or alternative instructional approaches. This vision of learning is reinforced through teachers' conceptualizations of remembering where only two teachers' pedagogical reasoning seemed to move beyond simple retention/memorization of information to more complex learning processes.

Discussion

Asking teachers to describe their pedagogical reasoning about their in-the-moment instruction revealed the connection between teachers' underlying assumptions, the base of facts, principles, and experiences through which they make decisions, and their enacted instruction. When reasoning about practice, the participants relied on an underlying set of assumptions about learning informed by a conception of learning as a relatively passive process in which teachers envisioned children learning information as presented, as a kind of whole which could be learned in an osmosis-like fashion with information "absorbed" and "embedded" in the mind. This conceptualization informed the teachers' pedagogical reasoning about instruction as they attempted to use repeated exposure to information—a process of engage and repeat—to help children learn just as one might if they heard music in a room "all day long, every day." The teachers maintained a future focus in which they intended for children to remember primarily discrete pieces of information like letter-sound associations, words that begin with a particular letter, or days of the week. Despite the teachers' focus on children's ability to remember information, they admitted considerable uncertainty about whether children would remember and ambivalence about whether they needed to remember the content that was taught.

Additionally, the teachers in this study reasoned about practice in ways rooted in the local classroom contexts in which they worked, including the broader policy context. The teachers responded to the imperatives of their context, the need to keep children interested and engaged. The broader academic context presented teachers with the challenge of preparing children for more advanced learning in kindergarten and first grade. This, in part, may have contributed to the teachers' uncertainty and ambivalence as they focused on preparing children to remember later literacy skills that they assumed would be addressed at the beginning of formal schooling. Taken together, these two contextual influences played a large role in informing the teachers' pedagogical reasoning, especially given the way that teachers' future focus shaped their expectations for children's learning.

Implications for teacher preparation

In many respects, the imperatives of participants' classroom context, nested in the broader educational landscape, outweighed strong foundational understandings of child development and learning with several consequences that are informative for teacher educators. This study aligns with previous research which suggests that EC teachers have underdeveloped knowledge of children's learning (Cunningham et al., 2009; Hindman & Wasik, 2011; O'Leary et al., 2010). Growing expectations for children's learning coupled with the need for more developed knowledge of children's learning supports ongoing and renewed calls for EC teachers to be required to have EC-specific college preparation prior to teaching in EC classrooms (Bueno, Darling-Hammond, & Gonzales, 2010). However, just as critical is the need for EC teaching preparation programs to ensure that preservice teachers develop a strong foundational understanding of children's learning and optimal ways to support it.

This study offers unique insights relevant for improving not just the knowledge of teachers, but the way that they put knowledge to use to reason about and enact instruction. For instance, the participants' focus on children's capacity to remember information offered a narrow and limited conception of instructional outcomes which omitted several core competencies like skill and dispositional development (Da Ros-Voseles & Fowler-Haughey, 2007). Further, in teaching content typically reserved for the early elementary grades, the teachers engaged in instruction that was not in keeping with the tenets of developmentally appropriate practice (NAEYC, 2009). These teachers' use of widespread practices such as the daily calendar routine, long noted for its limited instructional value and

developmental inappropriateness (Ethridge & King, 2005), suggests that the teachers' formula for learning (engage + repeat = remembering) may underlie the instruction of other EC educators who employ formulaic and repetitive instructional methods like the daily calendar to teach discrete pieces of information. Moreover, the participants' focus on engagement may be due to the need to keep children's attention within the context of activities that they may not be developmentally ready to experience.

Supporting a foundational knowledge base for teaching

The imperative to improve children's learning outcomes by improving instructional quality requires supporting both the knowledge and the pedagogical reasoning that informs teachers' practice in the classroom. The underlying assumptions of participants revealed several sources of knowledge in need of bolstering, including: knowledge of learning, knowledge of pedagogy, and pedagogical content knowledge (Shulman, 1987).

Knowledge of children's learning

   Conceptualizing learning primarily as a process of remembering, the teachers in this study ranged from not considering learning outcomes in their reasoning about practice to seeing building connections and repeated exposure as needed for remembering. A foundational understanding for teaching in EC is realizing that learning is optimally supported when it is goal-directed, when there is an intended end or goal in mind, when it builds on children's prior knowledge, when it is socially and culturally relevant in its content and presentation, and when it is meaningfully connected to real-world interests and concerns (Bowman et al., 2001). In short, learning is more than remembering discrete pieces of information for later use. Learning is centrally about building one's capacity to navigate the social world by putting relevant information to use.

   Language and literacy development can be supported as socially and culturally shaped practices when children are given opportunities to practice language and literacy skills toward meaningful ends. For instance, telling stories allows children to meet important language learning goals like using language in extended turns, while simultaneously using and hearing language in patterns shaped from extensive experience in the home (Flynn, 2016). Hands-on experiences like drawing and writing books position children as authors who must think about ways to communicate an experience to an audience for whom the experience is not shared (Ray & Glover, 2008). Such experiences require children to

consider relevant information and representational choices as they solve real-world problems like developing shared understanding.

Absent from many of the teachers' conceptualization of children's learning is the understanding that children, like all learners, process new information. They make sense of new information in light of what they already know. They develop connections between relevant information, seeking patterns in the environment as they analytically approach the world. Beginning in infancy, children think, predict, and experiment (Gopnik, Meltzoff, & Kuhl, 1999). If teachers do not realize the centrality of children's thinking in the learning process, then they are unlikely to arrange instructional opportunities which provoke good thinking, and in turn, rich learning.

Posing problems for children to solve is one way to evoke rich thinking. How can one document and record a favorite classroom dance so that it can be taught to others? If one were to develop a classroom starter kit for a new classmate, what would it be important for the child to know? Such an activity might involve map making of important spaces and resources like the classroom, playground, or school kitchen. Or, developing a directory of all the important people at the school. Importantly, children would have to think, share information, consider other perspectives, and try things out that may not work the first time, but provide valuable feedback on the road to a more polished performance.

Learning entails more than the transmission of information from an expert to a novice, positioned to passively receive knowledge as given (Rogoff, 1994). The participants assumed that children learned information as presented rather than considering understandings as partial, constructed, informed by prior knowledge (Piaget, 1952), or developed in cooperative relationships with others (Vygotsky, 1978). This conceptualization of learning information as presented and as a whole, coupled with uncertainty about what children would or should remember, reveals an uncertainty about the mechanisms of learning and cognitive development typically supported in theoretical and research literatures. Further, the teachers' understanding of learning departs from the sociocultural constructivist theories which underpin the pedagogical approach to early learning supported by the EC field (Bruner, 2009; NAEYC, 2009; Piaget, 1952; Vygotsky, 1978).

Importantly, of the participants with formal training related to education, only one held an EC-specific degree, the rest held BAs in K–5/6 education. This may have contributed in some way to the use of teaching content and methods which were not age-appropriate for the children in their classroom. Instead, teaching practice was motivated by a vision of

the requirements of the early elementary classroom and teachers seemed unprepared to fully understand if children were learning the concepts they were teaching. This suggests the need for more cross-communication between teacher education programs so that preservice teachers understand a continuum of learning and how skills develop over time. Further, the future focus maintained by the teachers in this sample may be an artifact of limited EC preparation, highlighting the need for EC-specific education both prior to teaching and in an ongoing fashion through professional development. Future research is needed to determine the extent to which patterns documented in this study extend to teachers with an EC-specific degree so that the influence of the content and preparation of EC degree programs can be understood more fully.

The continuum in teachers' conception of what it means for a child to remember reveals the kind of variation which exists when teachers reason about and enact instruction. When teachers like Jacki reason about children building connections and processing information or when Abby aims for children to understand as a way to remember, it shows that more sophisticated understandings of learning are possible. For preservice and in-service teacher educators, bringing about these more sophisticated conceptions can be supported in professional learning opportunities that help teachers notice and appreciate children's thinking. For instance, videos of teaching practice that elicit children's thinking offer a rich resource for teacher preparation because teachers can examine and analyze children's thinking as a meaningful outcome in its own right. These collaborative, low-stakes environments could also offer opportunities for teachers to practice eliciting and responding to children's language.

Knowledge of pedagogy

The teachers' understanding of learning also surfaces a vexing pedagogical question for the field of EC education: How can teachers play a role in developing children's understanding of complicated symbolic systems without relying on one of two extremes—the transmission of isolated skills to a passive child learner or the discovery of knowledge by a child learner on their own? Participants employed a narrow range of instructional approaches to meet the relatively uniform ends of helping children remember isolated information, relying almost exclusively on engagement and repetition during instruction. Instead of drawing on a range of activities, or flexibly adapting teaching practices in response to children's understanding, the teachers favored a process of a gradual learning brought about by repeated exposure to the same information. This more restricted conceptualization of learning outcomes and

instructional techniques underscores the need for EC teacher preparation and in-service learning experiences which foster a strong foundational understanding of learning and knowledge acquisition as well as ways to instructionally support this learning while being responsive to the unique developmental needs of children.

For instance, developing teachers' understanding of the value of structure and continuity in the classroom without developing an overreliance on repetition remains an important challenge for teacher educators. Whereas routines offer the structure children need to support engagement in the classroom, when teaching becomes reduced to instruction driven by the repetitive introduction of isolated information, learning is hindered (Da Ros-Voseles & Fowler-Haughey, 2007). Those preparing EC teachers need to be able to develop teachers' understanding of how complex theories of learning are translated into meaningful educational experiences that fit within structured classroom environments.

Teachers can be supported to enact instruction which brings about more than remembering discrete pieces of information by observing, analyzing, and practicing component parts of skillful teaching practice (Grossman et al., 2009). A focus on component parts of skillful teaching involves identifying critical components so they can be made visible for novice teachers. For instance, introducing a lesson, establishing problems that evoke children's thinking, and asking questions are all component parts of teaching required for bringing about the information processing which underlies learning. Each of these skills can be examined, analyzed, and practiced in teacher preparation settings. Learning such processes may also result in more sophisticated circle time instruction that moves beyond day-to-day repetition of the same calendar-based activities.

Pedagogical content knowledge

Beyond knowledge of learning and instruction, skillful teaching requires pedagogical content knowledge. Pedagogical content knowledge consists of knowledge of the aspects of content that are most central for teaching the content: "the ways of representing and formulating the subject that make it comprehensible to others" (Shulman, 1986, p. 9). For example, central to understanding the system of written language is understanding that it is a way of recording, remembering, and communicating information to accomplish everyday social goals. A critical insight for early learners is that an occurrence can be represented by a sequence of symbols and remembered and shared in another time and place. Further, these symbolic representations serve meaningful functions in the world.

One might begin by writing a child-generated list of special daily occurrences on large paper so that the children can see the writing process unfold. At the end of the week, the class could select their favorite occurrence from the week and compose a story of the event while the teacher writes down the story, pointing out features of writing relevant to the children's ongoing learning. As the year unfolds, the class develops a growing collection of classroom stories. In this way, children's introduction to written language centers on critical insights needed to comprehend writing as a symbolic system which is fundamentally about documenting and sharing information across contexts.

Finally, if EC teachers felt more secure in their knowledge of how children learn symbolic systems like literacy, understanding how foundational insights underlie the development of more formalized skills, then teachers would be better positioned to teach what they can expect children to learn in the present. Ultimately, teachers would be better positioned to communicate the value of that learning to important partners like families. Thus teacher education programs should focus more on a continuum of children's development showing the connection between EC skills and content and early elementary skills and content.

Cultivating EC teachers' pedagogical content knowledge offers a way to re-envision EC contexts. Routines like circle time can remain, but what occurs during the circle time routine needs to move beyond surface understandings to teach concepts, reasons, and purposes. For instance, children might work in pairs to decide on the day of the week and an explanation of how they know. The teacher could call on a child to name one thing that happened the day before, on another student to say one thing that will happen today, and on another child to make a prediction about what will happen the next day. In this way, children can develop a sense of past, present, and future in a way that is meaningfully connected to classroom events. The value of calendar lies not in reciting the days of the week, but in the calendar's function as a way to mark and keep track of time and significant events. To understand the meaning and purpose of their learning, children need to use a calendar for its intended function.

Teachers need ways of teaching children that help children access conceptual understanding of a calendar, and other symbolic systems, in ways that make the calendar as a time-keeping system comprehensible. Similarly, teacher educators must facilitate EC teachers' understanding of the critical role of not just learning information, but developing conceptual understanding of systems of meaning that can be quite complex, but have an underlying logic.

Supporting pedagogical reasoning

Along with stronger foundational knowledge of learning, pedagogy, and pedagogical content knowledge, shifting teachers' pedagogical reasoning about practice offers a way to bring about more robust learning interactions for children in the classroom. The teachers in the study were engaged in pedagogical reasoning; they were thinking about the "ends, means, and their consequences" in the classroom (Feiman-Nemser & Buchmann, 1985, p. 1). However, when faced with evidence of children's difficulty learning as intended—in this case, remembering what was taught—the teachers did not adjust their instruction. Instead, the teachers accepted the possibility of children not learning what they intended to teach, and as a consequence continued the same instructional practices. In short, teachers need support for reasoning, using their knowledge of learning and pedagogy, in the moment, to strategize ways of teaching that bring about the intended learning, instead of persisting with a narrow and repetitious range of instructional practices. By making the process of reasoning more explicit, teachers can be aware of how this process shapes enacted instruction (Horn, 2012; Nilsson, 2009). Moreover they can learn new information and develop their own pedagogical reasoning (Shafto et al., 2014).

At the heart of the dilemma lies the future focus wherein the teachers found themselves teaching content that they did not expect children to know until later schooling. This represents another pedagogical dilemma. It stems from the unusual position of teaching what one does not expect children to learn. Teaching is by definition an act of bringing about intended learning. As Ball and Forzani note, "Although learning can occur without teaching, such serendipitous learning is chancy. The practice of teaching comprises the intentionally designed activity of reducing that chanciness, that is, of increasing the probability that students will attain specific intended goals" (2009, p. 499). In order to meet their intended instructional goals, teachers need to teach content which they can reasonably expect children to learn. Then, they can strategize about ways of teaching that best bring about the learning.

Teacher educators can support the development of EC teachers' pedagogical reasoning. This can be accomplished by scaffolding EC teachers lesson planning, by critically dissecting and examining videos of teaching practice cooperatively in the teacher education classroom, and by assessing and developing responses to artifacts of children's learning like a photograph of newly built block tower, and by encouraging in the

moment and post-teaching reflection. Flexibly responding to the complex challenges of EC classroom learning is a daunting challenge, but it is one that EC teacher educators can support in preservice and in-service learning opportunities by reasoning about practice along with budding educators. Doing so clearly communicates how teachers can engage in pedagogical reasoning with formal understandings about how children learn.

Limitations

The present study's capacity to closely illuminate specific instructional contexts works as both a strength and a limitation. The stimulated recall interview procedure produced insights about teachers' reasoning which are not general or decontextualized, but rooted in the immediacy of everyday classroom instruction. However, teachers' pedagogical reasoning is directly informed not only by the broader academic context, but by the local school context. In this case, both schools served a higher socioeconomic status group of children, which may directly or indirectly inform the heightened academic focus found at the Friendship School and the ABC School. An expanded and more diverse pool of school sites is needed to understand the extent to which the findings of this study apply to other EC contexts.

Interestingly, although the two schools varied in the level of structure provided by curriculum with the ABC School utilizing a more elaborated curriculum and the Friendship School using a letter of the week approach, the teachers at the two schools reasoned about instruction in similar ways. Further work is needed to understand the extent to which curriculum influences teachers' reasoning about practice. The presence of curricular support in these two schools suggests that curriculum may not be sufficient to bring about skillful instruction as the teachers' pedagogical reasoning revealed underdeveloped understandings of children's learning, content knowledge, and pedagogical content knowledge. All of which informed enacted instruction in these classrooms.

Further, our findings might be constrained due to the instructional contexts that were observed. It is possible that teachers use different assumptions about how children learn to inform practice in other activities such as math or classroom transitions. This will need to be explored further. Although practice was understood as it was enacted in contexts, there may have been contextual variables specific to these activities informing teachers' pedagogical reasoning that were not explicit for teachers and thus did not emerge in our current findings.

In future work, it will be important to ascertain whether EC-specific college preparation leads EC teachers to have relevant child development knowledge that leads to different forms of reasoning about instruction. This sample of EC teachers, though more highly educated than typical EC teachers working in child care settings (Maroto & Brandon, 2012; NAEYC, 2016; Rhodes & Huston, 2012), lacked EC-specific bachelor's degrees or teaching certificates (with the exception of Abby who held a teaching certificate in EC). As of yet, only a small number of EC teachers nationally hold bachelor's degrees with an EC-specific focus and many states do not require EC-specific college preparation of any kind to teach in child care settings (Child Care Aware, 2013). Instead, EC teachers work in classrooms with young children, bringing a wide range of prior experience and preparation. Understanding differences in knowledge and reasoning arising from specific types of teacher preparation is beyond the scope of this exploratory research, but a necessary next step in arguing for EC-specific degrees in all child care settings.

Finally, although representing a variety of background experiences typical of less regulated fields like EC, our sample is small due to the nature of the exploratory study. Thus, findings about patterns across differing characteristics should be interpreted with caution and not overgeneralized.

Conclusion

Robust learning equal to the promise of EC education depends upon a more knowledgeable teaching force, prepared to reason skillfully in the classroom from a strong foundational understanding of the work of teaching. Such an understanding involves conceiving of children's learning as more than a passive or implicit process. Ultimately, for teachers to teach content they can expect children to learn requires answering the questions: What do children need to know now? For what purpose? Is preschool simply a preparation for later, or an important life moment in its own right, with needs, questions, and interests rooted in the moment? Preparation for later learning is important, but cannot become an all-encompassing rationale for action in the classroom. This is an especially critical question when it comes to learning in the EC classroom. What would it mean to prepare teachers to "teach for today" instead having teachers so oriented toward tomorrow?

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