Current Issue:
Volume 13 Number 2

Past Issues

Beyond This Issue

Search ECRP

Sign up for the
Email Newsletter

About ECRP

Sponsoring ECRP

Information for Authors

ECRP Survey

Send comments
to the ECRP Editor.

 Share

Introducing the Cycle of Inquiry System: A Reflective Inquiry Practice for Early Childhood Teacher Development

Jane Tingle Broderick*
East Tennessee State University

Seong Bock Hong*
University of Michigan, Dearborn

Abstract

The Cycle of Inquiry (COI) is a tool for emergent curriculum planning and for professional development of early childhood teachers and teacher education students. The COI includes a sequence of five organizational forms connecting analysis of documentation data with intentional planning for long-term emergent inquiry inspired by the Reggio Emilia Approach. The authors discuss and analyze the COI System through examination and analysis of the work of a student in a university early childhood teacher preparation program. Through this case study, the authors explore (1) whether a preservice teacher can learn to use the COI form-driven process to plan and facilitate emergent curriculum and (2) whether a mentor can scaffold and assess the development of an inservice or preservice teacher using the teacher's COI documentation. The authors also describe ongoing research into use of the COI System and outline potential directions for future research.

Introduction

This article uses discussion of a single case to present a system for developing teachers' ability to create and facilitate emergent curriculum. We were motivated to create this system by experiences at a series of conferences on documentation held at the University of Massachusetts Amherst in 1999–2001, where we facilitated breakout sessions on the microanalysis of video and written observation records to interpret the meaning of children's play. Conference attendees included classroom teachers, teacher educators, and directors of constructivist early childhood programs, most of which were inspired by the schools of Reggio Emilia, Italy. After the conferences, many participants wondered, "Now what? Since we've successfully interpreted children's play in-depth and know more about the children on so many levels, how can we use this understanding in our curriculum planning?"

This question led us to develop a system of organizational tools to facilitate the planning for emergent curriculum using microanalysis processes. We introduced this system to participants at the 2001 conference at the University of Massachusetts. The Cycle of Inquiry (COI) System (Broderick & Hong, 2003) is a five-phase cycle of inquiry to guide teachers' planning, grounded in constructivist theory and inspired by constructivist teacher educators (Gandini & Goldhaber, 2001) and educators from Reggio Emilia, Italy (Edwards, Gandini, & Forman, 1998; Hendrick, 1997).

In the Reggio Emilia schools, a *pedagogista* serves as a mentor to teachers throughout the school year, reviewing their classroom documentation to help them plan emergent curriculum. In this discussion of the COI System, *mentors* are the directors of preschools who support teachers and the instructors in early childhood

courses who instruct preservice teachers. *Teachers* are the individuals working in preschool classrooms with children. They may be experienced teachers, novices, or preservice teachers completing fieldwork.

We have piloted the use of this system with preservice and inservice teachers for 7 years at our universities and in the field. In this pilot work, the classroom teachers have used the COI forms to guide their development of emergent inquiry curriculum in the classroom. The mentor reviews the teacher's completed COI forms in collaborative meetings with the teacher and guides and scaffolds the teacher's planning processes. This article focuses on one undergraduate preservice teacher's use of the COI System under the mentorship of one of the authors.

Literature Review

Reflective inquiry has often been associated with science and math curriculum. In those domains, educators recognize the importance of developing strong skills related to questioning, observing, collecting data, reflection, analysis, and generating hypotheses. These skills, organized into procedural steps, provide a structure for scientific inquiry (Elstgeest, 2001; Epstein, 2003; Hoisington, 2002; Thomson, 1969). In many early childhood settings, these aforementioned elements of inquiry are most often categorized as "cognitive development."

According to constructivist theory (e.g., Piaget, 1977), children construct their knowledge through the interaction of their ideas with the world, both social and physical. According to this theory, teachers cannot transmit knowledge to children, but they may facilitate learning. Constructivist teachers provide environments that are conducive to children's continual construction of new knowledge. Constructivist teachers are also informed by Vygotsky's theory that children learn within the context of interactions with peers and adults who provide challenges to and support for children's construction of meaning within the context of day-to-day experiences. The child's interest in making sense of his world forms an internal motivation to engage in experiences that promote continual learning (Chaillé, 2008; Forman & Kuschner, 1983; DeVries, Zan, Hildebrandt, Edmiaston, & Sales, 2002).

In their curriculum planning, teachers often focus on discrete skill development within learning domains, rather than on specific aspects of children's thinking (Fromberg, 2003). In contrast, constructivist educators embrace principles of inquiry as a "state of mind." They rely on careful reflective practice as a basis for the learning and for development processes, continually examining what they are trying to teach and what children are learning. They emphasize the promotion of reasoning through observing, questioning, revisiting previous experiences, and elaborating specific understandings through representation in many media (Fosnot, 1996; DeVries et al., 2002; Forman & Kuschner, 1983). Developing, interpreting, and understanding children's ideas that can be observed in their play are central to constructivist curriculum planning (Duckworth, 2006; Chaillé, 2008).

Constructivist teachers seek to build on children's existing knowledge through developmentally appropriate means, capitalizing on children's intrinsic motivation. In a constructivist classroom, the curriculum emerges from the children's interactions with the environment and with others "in the moment," with teachers helping children think about the relationships among their experiences, which Chaillé (2008) calls the "Big Ideas." These Big Ideas support and extend the purposes of the children's play (Chaillé, 2008; Duckworth, 2006) and allow for many entry points for study.

Planning around children's Big Ideas is sometimes referred to as an emergent curriculum (Chaillé, 2008). In an emergent curriculum, "participants bring their own genuine responses to the topic and collaboratively create the course to follow out of these multiple connections" (Wien, 2008, p. 5).

High-quality documentation that includes teachers' interpretations of children's ideas is a key to successfully planning emergent inquiry curricula. Reggio educators, for example, use documentation as a reflective tool for "making children's thinking visible," so their curriculum planning can follow the children's lead. Following the child's lead is not a "go with the flow" process; it is a reflective process that requires a pedagogy of listening (Rinaldi, 2006), in which teachers observe and carefully analyze and interpret children's ideas and interests and then take responsibility for facilitating the children's explorations of those ideas and interests (Chaillé, 2008).

Emergent curriculum may rely on reflective inquiry tools such as video, photographs, or written records (or some combination of these) to enable careful observation of children. It may also rely on written documentation of teachers' reflective conversations related to their records of children's play. Teachers use these data to build the rationale for their planning (Chaillé, 2008; Gandini & Goldhaber, 2001; Carter & Curtis, 1994; Hendrick, 1997).

The phases of this process have been articulated as a *cycle of inquiry* (Gandini & Goldhaber, 2001) and form the basis of the COI System (Broderick & Hong, 2003, 2005, 2007). All phases of this cycle are referenced elsewhere (see, e.g., Gandini & Goldhaber, 2001; Wien, 2008; Giudici, Rinaldi, & Krechevsky, 2001). With the COI System, we attempt to organize the relevant concepts and activities (e.g., observation, reflection, and planning) into a unified system that teachers can use as a guide through each phase of planning and facilitating emergent curriculum in their classrooms.

Overview of the COI System

The COI System is a tool for teachers to develop an understanding of emergent inquiry as an active research method of curriculum development. The five sections in the COI System (Broderick & Hong, 2007) are represented in Figure 1: (1) Observe, (2) Develop hypotheses, (3) Plan research questions, (4) Plan interventions to guide the thinking of children, and (5) Set up and facilitate play.

[View Figure 1](#)

Figure 1. Diagram of Cycle of Inquiry System.

These five sections help to structure and document teachers' thinking, linking their observation data to records of their planning in a continuous and interactive process. Each section is represented by a form for recording relevant data (Figures 2a–2e). Teachers' reflective examination throughout the process allows them to act with intent.

[View Figure 2a:
Documentation Record Form](#)

[View Figure 2b:
Interpretation Form](#)

[View Figure 2c:
Inquiry Planning Form](#)

[View Figure 2d:
Implementation Form](#)

View Figure 2e:
Reflective Evaluation Form

Figures 2a-2e. Blank Forms.

In our practice, the COI System serves as documentation that helps to guide teachers toward focusing on children's thinking, rather than on "ages and stages" milestones, with the goal of supporting long-term inquiry in their classrooms.

Documentation as an Interactive Process

According to Goldhaber (2009), *documentation* is most often used as a noun referencing the many forms of records kept for tracking data or as a collection of data to help assess developmental levels of young children. But Goldhaber (2009) goes on to say that documentation is also a noun that names a process. We regard documentation as the process of creating and interpreting collectively all the records that teachers produce as tools for assessment and planning—including observation records (video, written records, photos, audio records) and records of teachers' reflections about children's thinking. Thus, documentation provides data to illuminate the purposes and processes of children's play.

The interpretive process of documentation begins with teachers making decisions about what to observe and how to document their observations; these observations must focus on play that is likely to help children explore their developing theories and interpretations of the world. Research (Hong, 1998; Broderick, 2004) shows that certain aspects of technology affect the teachers' mind-sets in different ways while they are creating documentation. For example, observers using video technology to document children's play with the intention of understanding children's theories are more successful in understanding the meaning of the play than are observers using 35-mm cameras. Still cameras force teachers to focus on split seconds of reality, and they are less likely to experience documentation as linking one event to another across time. This effect extends beyond observation into the teachers' reflection, analysis, and planning. Teachers using still cameras have more difficulty in extending children's play into long-term inquiry.

Teacher's Plans as Interventions That Guide and Extend Children's Thinking

During any given phase of the COI, a teacher studies or analyzes his or her own observations of children, interprets what the children's thinking might be at a specific moment, then develops a hypothesis regarding the children's activity (e.g., what the children's "goals" might be during a specific play episode or what their rationale might be for using specific materials to reach those goals). Teachers are also asked to think divergently about what possible interventions they might facilitate (e.g., questioning, conversation, revisiting previous play, or re-representing with new materials) to promote higher levels of inquiry. Careful consideration of children's intentions enables teachers to choose questions and materials that challenge children to explore, experiment, ask their own questions, and solve problems.

Without documentation such as the COI forms, a good teacher may develop hypotheses about children's thinking that are subsequently lost from her memory. Documenting their own thinking about materials and the questions they develop from their hypotheses helps teachers remember what they have done or considered doing with children in their classrooms. Teachers and mentors can reflect on these plans to assess successes and develop future interventions.

Accountability

An emergent curriculum provides ample opportunities for children to meet and even exceed state and national learning standards. Because they focus their planning on children's thinking rather than on meeting standards, teachers who use the COI System record standards that children met at the end of a cycle of learning. The COI System supports teacher accountability by requiring teachers to keep records of their own thinking processes and the thinking and learning of children. The structured COI forms help teachers who are new to emergent inquiry practices, as well as those who are more familiar with them, to internalize an understanding of the COI process. Teachers become aware of what they need to document and may invent their own methods without strictly adhering to the COI forms. In any case, the forms enable the teacher and the mentor to make the planning, the teaching, and the learning visible.

Methods

Purpose of the Study

The following questions were part of our overall focus and our analysis of individuals' work. Can a preservice teacher learn to use the COI form-driven process to plan and facilitate emergent curriculum? Can a mentor scaffold and assess the development of an inservice or preservice teacher using the teacher's COI documentation? The case addressed here was part of our ongoing exploration of the use of the COI with teachers and preservice teachers.

Context

The COI System is used at East Tennessee State University (ETSU) each semester with approximately 28 students in a 3-credit undergraduate creative development course. It is also used at the University of Michigan-Dearborn (UM-D) in a 3-credit teaching strategies course paired with a concurrent 1-credit practicum—the early childhood students' first methods courses. These courses offer students at both universities their first opportunity to record details of children's actions and words and their first experience with interpretive analysis related to children's thinking and strategies. At both universities, the early childhood programs and lab school sites follow constructivist principles, their state standards, and National Association for the Education of Young Children (NAEYC) guidelines. The programs at both sites are accredited by NAEYC.

Students at both sites learn to use the COI System to guide emergent inquiry, first with a group of peers and later with children in a preschool classroom. Students are organized into groups of three, and groups are paired in a role-playing exercise in which one group develops an emergent curriculum for the other. The course instructor prepares a set of materials to begin the inquiry (Broderick & Hong, 2005). Through this process, students become reacquainted with play and with materials that many have not been exposed to since childhood. Each group of three takes turns using the COI System to document the group's observations of the partner group's play—to interpret the meaning of the play; to hypothesize about the partner group's thinking, strategies, and goals; and to plan for and guide the next cycle. This introduction takes students through four cycles of inquiry using the COI System. It is followed by fieldwork during which each group of three is assigned to a university laboratory preschool classroom to plan and facilitate five cycles of inquiry. At UM-D, because of the additional time allowed by using the COI in two courses, each student presents his or her first COI documentation from fieldwork to the whole class to get feedback from a range of peers.

Each semester, the size of groups and number of cycles may vary slightly depending on enrollment, scheduling, and other factors. Based on our review of their COI documentation, we may mentor certain students to spend more time on the completion of their COI documents, which slows their process so that they complete fewer overall cycles.

The mentoring university faculty member uses students' COI documentation to assess and guide their processes. Students also receive feedback from peers as they learn to use the COI System. The courses are structured so that their play among peers, the implementation of play with children at the lab school, and all planning take place during class meeting times, which allows their mentor/instructor to observe them with children and to mentor during their planning processes. Additionally, the teachers in the students' assigned laboratory preschool classrooms provide feedback based on the documentation in their COI forms on site during the field assignment. The COI forms and the students' reflections on their experiences with the COI process are course materials that are collected as COI data with permission from students.

Participants

The authors are early childhood professors at two universities who have developed, used, and adapted the COI System over a period of about 7 years.

We selected the data for this report at random from COI files collected over 5 years in which students in our classes completed all five sections of all five cycles of inquiry with children. The data presented and analyzed here are from COI forms completed by one student in her first two of the five cycles with young children in her coursework. Kelly, a junior at the University of Michigan-Dearborn, was in her early 20s at the time and had little experience working with young children in school settings. She was in her first semester of early childhood coursework.

Using the COI System: Data from Kelly

In each of the following sections, we describe one component of the COI System through the example of Kelly's use of the system in the practicum course, and we provide basic analysis of Kelly's work. We refer here to the teacher educator as the mentor and the preservice teacher as the teacher.

Documentation Record Section

The Documentation Record Section of the COI juxtaposes teachers' running observation records with things that they may wonder about during or after their observations of play.

The teacher's focus during a cycle is on play that engages children for periods of time during which they collaborate and negotiate through interactions involving language, gestures, and materials. The wonderings section of this form is the first step in the pedagogy of listening and developing an intentional focus. The prompt in the wonderings section guides teachers to reflect on their observation records and consider the play from the children's perspective.

Figures 3a–3d are the four pages of observation data documented by Kelly as she used this method for the first time. Students use color-coding to differentiate children's words, the teacher's words, and the actions of any participants. In this record, the red represents children's dialogue, and the black represents the actions. If teacher dialogue were included, it would be represented in blue. These distinctions make it easy to revisit and quickly locate the actions and words of specific children or adults.

View Figure 3a

View Figure 3b

View Figure 3c

View Figure 3d

Figures 3a-3d. Kelly's Documentation Record Sections.

As mentors, we note that Kelly, a novice, is able to stand back to observe and listen. She also becomes an active participant as she notes her wonderings, which guide her to logical conclusions about what she observes.

We encourage teachers to document complete episodes that capture the complex evolution of children's play. The example in Figures 3a–3d demonstrates the importance of recording children's nonverbal actions, not just their dialogue. Kelly learns about Alec's knowledge about and strategies for using his hand to stop the ball. She questions whether he knows to use another method. Actions reveal much about an individual's strategies and goals and are of particular importance when teachers using the COI System record observations. For example, some children may not play with others for reasons related to developmental stage or individual characteristics. A teacher's careful observation records provide data for learning about these children's strategies and goals during play and support planning of curriculum to meet their needs and those of all their classmates.

Interpretation of Knowledge and Thinking Section

In this section of the COI, teachers develop an in-depth analysis that builds on the data and wonderings in the Documentation Record. We encourage teachers to articulate hypotheses (best guesses) about the children's intentions and strategies during play using descriptive language in paragraph form. These elaborations provide a context for understanding the specific play episode, including the theories particular to these children in this context, and suggest multiple lines of inquiry. The teacher can revisit this record immediately to plan for ways to extend the children's thinking. The record can also be revisited later to enable the teacher to see development of her ideas over time. It also provides the mentor with evidence of the preservice teachers' thinking during a university field experience. Finally, administrators can use this section of the COI to revisit the thinking of teachers in their schools for the purpose of providing appropriate professional development.

In Figure 4 (hypotheses), Kelly shares "aha" moments in which she recognizes that the children's goals for the play that she has observed appear to focus on directing and sustaining play. Her intentional look at her data reveals to Kelly that while the play she observed centered on exchanges that emphasized skill development with the ball (turn taking and learning to roll), it is also layered with children's complex social interaction strategies.

View Figure 4

Figure 4. Kelly's Completed Interpretation of Children's Knowledge and Thinking Form.

Kelly acknowledges Mary's role as the director of the play. She is aware of the complexity of Alec's intention—to follow Mary's cues and not welcome Stephen. Kelly develops a hypothesis that Alec is waiting for the right timing for Mary to accept a new person, Stephen, into the play. Kelly documents Stephen's perseverance in strategizing multiple attempts to enter the play:

> I want to sit by you Alec; Can we have the ball now?; Stephen shows Alec the long strand of tape with the rest of the roll still attached at the bottom of the strand; Stephen walked up to Mary and stood closely to see if she had the ball; Stephen walked by Alec somewhat close; Hey Mary, can you pass it to everyone else? Can you pass it to me and Alec and we'll pass it to you too.

Kelly's corresponding hypotheses include the following:

> Mary knew that she did not have another ball in her bag; I wonder if she was thinking that there was not another ball if Stephen would leave her and Alec alone.

> Mary seems happier now to start the game again now that it is just her and Alec.

> This is interesting. Stephen did not really touch either child. I wonder if M and A are now both trying to be in control and are seeing Stephen as a way to let out their aggressions over this tension.

Kelly articulates her thoughts on the social interactions and prepares to move beyond planning related to children's physical development toward organizing ways to foster children's social interaction strategies.

Developing Research Questions Section

Development of research questions by the teacher is crucial to the action research purposes of the COI. In this section, teachers consider possible ways to facilitate the children's learning or development. Their research questions connect the "so what?" of the play they have observed and documented (that is, what might it mean?) with the "now what?" of intentional planning. Teachers may formulate these questions in two ways: by studying their own ideas about the children's play ("What can I learn about the children?") or by studying the concepts evident in the children's play interactions ("What are the children thinking and what do they want to know?").

A teacher's questions will be related to her interpretations of the Big Ideas in the observed play. The teacher looks for documentation of inspirations or insights expressed by the children and for concepts that may engage them and that will allow for further study with many entry points (Chaillé, 2008; Duckworth, 2006).

Teachers are also asked to match at least four intervention strategies with each research question in this section of the COI. In doing so, they develop fluency and flexibility with materials and questioning strategies that allow them to take risks and be open to the children's insights.

In our experience, teachers new to this process, such as Kelly, can successfully interpret the Big Ideas, but

they are often less certain what interventions to choose to facilitate further inquiry. In our example, Kelly's initial list of Big Ideas (see black type in Figure 5) may work more appropriately as intervention questions, which she has learned about through previous cycles of recording and planning. The continuous feedback that Kelly receives from her COI records allows her to reflect on her previous planning in relation to the children's responses. Through revisiting and reflection, she and other teachers can adjust their thinking and planning. We have found that like Kelly, most teachers need to enter the implementation phase in order to test their plans, learning from interactions with children what will and will not work.

View Figure 5

Figure 5. Kelly's Developing Research Questions Section.

We note that Kelly's initial suggestions are excellent for a novice. They are linked to her hypotheses about the children's knowledge and thinking and can be incorporated into a plan for play. In Figure 5, we highlight our own additional Big Ideas and intervention suggestions (in maroon type) to indicate what we as mentors would discuss with Kelly to support further development of multiple lines of inquiry. In fact, with time and practice, Kelly was able to plan for multiple lines of inquiry, leading from what she observed. As a next step, she sets up a plan based on her questions about the physics of the ball, which incorporates two of her research questions: What are other objects that roll? What about these objects make them easy to roll?

Developing these research questions is one of the most complex parts of the COI planning process. Equally complex is the process of choosing interventions, materials, and questions to facilitate children's ongoing inquiry. When learning to plan for children's emergent inquiry, we encourage teachers to be patient and reflective because this process of developing research questions to guide curriculum plans may feel new and challenging. Slowing down is an aspect of the creative process that allows insights to occur that can support inquiry (Harman & Rheingold, 1984). Educators in Reggio Emilia, for example, consider taking the time to both observe and interpret the data as an essential component of the inquiry process (Rinaldi, 2006). It is in this section of the COI System that teachers revisit their previous thinking, and the thinking of the children, and consider how and where to adjust intervention strategies in their plans to facilitate children's inquiry.

Inquiry Implementation Section

In the Inquiry Implementation section, teachers revisit previous data one final time, formulating new connections between the observation data and their many layered analyses or perhaps confirming that the old connections were "spot on." This form frames teachers' thinking around all the concepts in the COI System, organizing the following inquiry elements—observing, developing hypotheses, developing research questions, developing interventions—into a plan for facilitating a next step in the children's continuous play cycle. In this planning section, teachers record (1) one line of inquiry or Big Idea to follow with the children, (2) the specific observation data that suggest that this inquiry is relevant and appropriate, (3) interventions (questions and materials, other) that the teacher might use to guide the children's thinking, (4) a plan for setting up the classroom materials for guiding the inquiry, and (5) a procedure for facilitating children's engagement in the anticipated play.

Often one of the teacher's previous research questions becomes the impetus for planning in this section, yet we frequently find that with a final revisiting many teachers reconstruct their earlier research questions into a collapsed or newly formulated, more complex question for study. One goal of emergent curriculum is to maintain an open-ended and uncertain stance about the direction of the inquiry and learning (Chaillé, 2008), but we have often found that having an implementation plan grounds the trajectory of the many potential lines of inquiry and intervention strategies that a teacher such as Kelly may have considered.

Having a plan, as well as several possible lines of inquiry, can help a teacher to remain flexible and prepared to recognize and value unexpected responses from children. This centers the teachers' thinking on the specific aspects of play for which they are planning and serves as a clear rationale for this evidence-based process. In our example (Figure 6), Kelly focuses on the idea that "for the game to be fun, it has to have rules." She chooses examples of evidence from her documented observation data to support her hypothesis: that Mary began a game with Alec by explaining it to him, and that she asked another child, "Is this fun?"

*Figures 6a-6b. Kelly's Inquiry Implementation
Section.*

Kelly seems to recognize the link between two of her research questions; she combines them in the Big Idea section of this form. In the Big Idea companion box, teachers list materials to be used as interventions. Kelly responds that she plans to present the children with various kinds of balls with the potential to roll (or not), which have enough distinctive qualities for each to be examined and compared to the others.

In the following box, teachers are asked to plan how they will set up these materials in ways that might prompt the children to play without verbal guidance or to pose their own problems or questions. Kelly describes a simple set up for the materials based on the rolling play she previously observed. She hypothesizes that her purpose (rolling the balls) will be apparent to the children in how she sets up the materials. She anticipates that setting a basket of the balls in the same area where she initially saw children rolling the ball together will be aesthetically inviting, motivating the children to remove and explore the items and learn about the properties related to rolling. Kelly also plans to place an easel in the center. We might assume that the easel is for writing the predictions about rolling and not rolling that she intends to elicit from the children, as indicated in the procedures section at the end of her form.

In the next box, teachers are asked to list the questions that they have planned to guide the play. Formulating questions that promote children's own questioning and reasoning helps to organize the teacher's thinking about the planned activities. This process, we have found, helps teachers ask their questions in a developmental sequence. We have found that having at least four questions allows for optimal consecutive flow. Kelly, however, poses three questions:

1. How does an object roll?
2. What about an object makes it easy to roll?
3. If an object rolls, will it also bounce?

Finally, Kelly uses the form to outline procedures for the planned explorations. In this part of the form, teachers sort out their ideas about how to follow the children's lead, how to facilitate without coercion, and how and when to ask questions. We expect that they learn that entering the play with their own questions is possible but not probable and that standing back and observing is more likely to result in the children developing their own ideas and questions. Kelly proposes to inform the children about the materials in an open-ended way and invite them to explore on their own terms. Referring to her first step, she might ask, "What is similar about each of these objects?" She anticipates that children will discover the rolling property of certain objects. Kelly's planned procedure begins with two open-ended steps. At step #3, we note that she returns to a more directive approach, with which she appears more comfortable; her strategy for prediction and testing children's knowledge is most likely related to her own prior, more didactic school experience. As mentors reviewing Kelly's documentation with her, we would note this as an area to focus on, to help her better understand the open-ended nature of emergent curriculum. Kelly's plan to use prediction shows some sophistication. However, we would want her to develop to the point that she would list it as an area for possible questioning in the "posing questions" box instead of listing it as a "necessary" procedural step.

Analyzing Kelly's forms, we see that her questions and procedure do not align. The *Inquiry Implementation form* helps us, as her mentors, to articulate where individuals like Kelly may need additional information or other support. In this instance, our goal would be to help Kelly learn to hold back from leading the children, instead allowing them to explore, wonder, and develop their own questions about the objects she provides. Perhaps rolling will not be the focus of their play. We would encourage Kelly to proceed with this plan, however, because we know that to construct her own understanding of teaching and learning, she must experience and reflect on what did and did not work. We recognize our concerns about Kelly, but we refrain from leading her.

Inquiry Reflection Section

At the end of each session with children, preservice teachers like Kelly meet with their instructors and classmates in their small groups. In these sessions, they write their reflections in the *Inquiry Reflection* section and talk with the mentor/instructor. This section concludes each cycle with a series of questions about the children's thinking during the previous play session, providing coherent closure to the episode and serving as a

transition for thinking forward to the next cycle. The questions help to prevent the teacher from planning a new, unrelated activity, which is a tendency of teachers who are new to planning for emergent inquiry.

The reflection section starts with a focus on the children's responses to the facilitated play experience. Kelly's reflection section (Figure 7) indicates that she found the children to be very interested in exploring the objects that she set out in the basket. She notes that they were having fun within what she perceived to be a random process. Next Kelly interprets what she believes the children learned and how they learned; she states that the children could identify which objects would and would not roll, that they could communicate about these properties, and that they based these distinctions on their own prior experience.

View Figure 7

Figure 7. Kelly's Inquiry Reflection Section.

Reflecting on what went well with this facilitation, Kelly comments that her set up of the materials successfully engaged the children; they immediately developed a game centered on rolling objects back and forth, picking up where they left off in the previous play session. We note that this time Kelly also highlights the children's social interactions.

Even though Kelly has observed the children to be fully engaged in their play, she indicates that she believes that what did not go well with this facilitation is that the children didn't follow through with all of her plan. They became involved in predicting, but she recognizes that her plan for eliciting predictions was too teacher directed; the children needed more time for their own exploration to unfold.

This portion of the COI thus provides an opportunity for Kelly to recognize a gap in her thinking and facilitation; in her next cycle, her work may reflect development of a new level of understanding.

Considering how to build on this learning is an important final reflection for Kelly. She has observed that children showed strong interest in playing with the objects and peers in a game format; therefore, she plans to ask children how they can create their own game. She also recognizes that presenting them with fewer material variables might help them focus on a game rather than on objects as they did when she provided multiple objects.

At the end of the COI Cycle, we ask teachers to review their documentation and record the state early learning standards that were met by the children. We believe that over time, teachers who use emergent inquiry will learn that children will not only meet, but exceed, these standards. Based on our mentoring experiences, we believe that when teachers plan with a mind-set of meeting specific standards, children in their classes tend to only meet those standards, which may limit many children from reaching their full potential. The purpose of this section of the COI System is to provide evidence of standards that were met to share with administrators who may not realize the value of play. New preservice teachers like Kelly may not record the full range of standards, or they may list standards that are not really applicable. They learn to record more effectively over time, based in part on feedback from mentors and from the classroom teachers with whom they are placed at the laboratory school.

Kelly's Second Inquiry Implementation Form

COI forms completed by teachers who have had more experience guiding children's emergent inquiry will look quite different from our samples from Kelly's first use of the COI. The following form (Figure 8), for example, completed by Kelly during her next cycle, illustrates how her thinking has developed.

View figures 8a-8b

Figures 8a-8b. Kelly's Second Inquiry Implementation Section.

This form shows evidence that Kelly has dug more deeply into her documentation of previous play and has

moved beyond the idea that "games must have rules in order to be fun." She now addresses four major elements—object, player, game, and rules—and considers a fifth element—that games have rules. She believes that these four theories are supported by the evidence in the running record from her second COI: (1) rules must match the game, (2) I need to plan for socialization when there are more than two players, (3) in order for games to be successful, the spatial ordering of children must be considered (seating of children), and (4) the methods for moving the ball will make the game successful. We note that theories 1, 3, and 4 represent what Kelly sees as the children's Big Ideas about playing the game, while theory 2 represents her own thinking. The *Inquiry Implementation Section* in the COI System enables teachers to consider their own intentions and those of the children as they plan.

At the same time that she has been learning the COI System, Kelly has been learning about early childhood content in various methods courses in her teacher preparation program. Revisiting what she notes here regarding her theories about games and rules will help her and her instructors to know whether she needs to do further research (for example, seeking out relevant early childhood literature or books about games or perhaps talking with experts such as physical education instructors).

Kelly's research question is directly drawn from her observation that children were creating their own games. We see that now, when planning for materials, she limits them to one ball to focus on children's ideas about game formation and rules without the potential distraction of discovering properties of multiple objects. One flaw is apparent in Kelly's materials set up (Figure 8): she does not specify the spatial arrangement, although she did so in her previous plan of putting the objects into a basket. We have found this to be typical; often novice teachers believe that if they articulated their ideas about presenting materials in a previous plan, they can bypass it in their next write up. As mentors, however, we emphasize the importance of fully referencing all components in the COI forms each time to maintain a holistic mind-set and to note distinct differences from one session to the next. In our experience, administrators and licensing personnel also like to see the whole process when examining a teacher's COI forms. Licensure guidelines often require that teachers post weekly lesson plans for families, administrators, and licensing agents to view.

Administrators need to know that curriculum plans are in place, and indeed many preschool teachers may be required to design an overall plan for their year in advance with themes or units. Since emergent curriculum is not designed far in advance, this *Inquiry Implementation Form* provides administrators and licensing agents with classroom teachers' documentation of plans based on evidence that is closely linked to previous plans. We recommend to our students such as Kelly that they keep notebooks with these plans in their classroom for this purpose.

Further analyzing the form in Figure 8, we see that Kelly's questions are aligned with her previous observations of the children playing with the balls. We believe that these questions will invite children to express their thinking specific to their play in ways that make their own theories more visible to themselves and her. Kelly's questions demonstrate a growing knowledge of how to scaffold in a developmental progression—how to consider which ideas children might need to know in order to proceed to the next question or set of ideas. For example, children may need to understand what a rule is in order to understand the structure or function of a team. We also see that Kelly's procedures now reflect a more open-ended sequence; she is aware that children may not necessarily follow some of "her" lines of thought. She now takes into account the novel possibility that the basket could become part of the play. "Asking" children about their play is central to her plan, reflecting her inquiry mind-set.

The following segment of Kelly's next *Inquiry Reflection Section* highlights Kelly's perception of her own development:

> I will build on this learning by exploring the ideas of turn taking and roles within games. I will also make a poster of the rules that the girls came up with. I would like to see if they still like these rules and want to play by the rules that were stated. Or, instead, if they think that because the rules are in writing, they have to follow them. Also, I am going to have two future provocations. One provocation is that I am going to have a pile of three red tank tops and three black tank tops sitting by the ball and the basket. I am going to see how the children use these. I wonder if they are going to create teams. The next provocation is that I am going to use the tank tops that I previously suggested as well as one white tank top. I wonder if they will use this for the "charger," the person in charge. Or, will they use the shirt for something different?

In analyzing Kelly's comments, we see that she makes connections that are new for her between rules, games, and social interaction. In essence, this process is an action research study for her; she now sees the potential that a new play material—different colored t-shirts—may have for leading children to think about teams. (The introduction of a new material or related concept is referred to in Reggio-inspired education as a *provocation*.) We see Kelly's developing flexibility in her plans to use the t-shirts as a provocation for children's questions; Kelly believes that the children will wonder why the t-shirts are in the game center, which may lead to several possible problem-solving experiences. She hypothesizes that they may be aware that teams wear shirts of different colors. As mentors, we note that this approach is quite different from her previous, more teacher-directed plan that involved telling children how a ball rolls.

Preliminary Discussion

In this report, we have examined the COI records of one undergraduate preservice teacher and made some interpretation of her development as shown in her completed COI forms. We have not included other data relevant to the ongoing study of which this work is only a small part. For example, we also collected documentation of Kelly's interactions with her mentors, her classmates, and her supervising teacher in the university laboratory school classroom. Child change indicators also were not included here. All are important to our larger study of implementation of the COI with preservice teachers and with other populations.

We find that the COI provides evidence that we as mentors need to scaffold teachers' development. We are able to hold off on feedback in many areas, knowing that the COI will guide the teacher, for example, when Kelly realized that her original set up for play was oriented toward "teacher direction" as opposed to more open-ended exploration. She learned from her reflection on the evidence of her experience, as noted in the COI, that she needed to shift her strategy.

Our findings, including what we have seen with Kelly, suggest that with consistent use of the COI System throughout a semester both preservice and inservice teachers become increasingly proficient at planning provocations while maintaining flexibility, showing both insight and the use of high-level thinking—synthesis and knowledge application. We often observe this kind of progress early on in teacher development when using the COI System.

From our ongoing analysis of data collected from preservice teachers such as Kelly, several themes have emerged related to their perceptions of their own development with regard to using the COI System. These themes include *engaging in collaborative inquiry, using documentation record data as a memory tool, understanding what children know (and they know more than we imagined), choosing the right materials to extend play concepts, valuing mistakes, following the pace of children, and re-representation as a means to stay on topic vs. changing direction.*

Our analysis of data from both UM-D and ETSU has suggested four potential levels of development regarding inquiry among teachers using the COI System. We have articulated these four levels from *Inexperienced* to *Reflective* in a rubric that enables us to further study the effectiveness of the COI System. We are examining reliability and validity, and we are determining the feasibility of using the COI System across a broad range of conditions.

Future Directions

The COI System differs significantly from approaches that emphasize skill development and activities that have discrete beginning and end points, rather than focusing on the child's conceptual development (Broderick & Hong, 2005). Our ongoing use of the COI includes several lines of inquiry, and additional potential research directions are suggested.

We are planning longitudinal inquiry to identify and investigate empirical indicators of child change among children ages 3–6, sensitive to inquiry instruction, for example, communication, problem solving, and representation. Ultimately, we expect to explore possible links to more distal indicators such as literacy and performance in academic areas—for example, does a relationship exist between use of the COI System by teachers and child progress in such content domains as mathematics, science, language arts, and music? Another potential direction for study is whether or not integration of these domains progresses naturally in the children's emergent inquiry as teachers use the COI System.

We anticipate investigating what point in a candidate's program of study might be the "optimal time" for introduction and practice with the COI System. Direct study of the feasibility of implementing the COI System in diverse environments is another potentially fruitful area. For example, preservice teachers and inservice teachers often initially express concern over the time required to complete COI forms and the feasibility of using the COI System in their planning. In our university courses, preservice teachers have COI planning time incorporated into class sessions where we can mentor their progress. We have found that inservice teachers whom we mentor adapt the COI in ways that do not require them to complete all COI forms from one day to the next. Investigation of these adaptations is ongoing in the context of previously mentioned studies using the COI rubric as a measure of teacher development from *Inexperienced* to *Reflective*. In preschool settings, the pivotal role of directors in facilitating teachers' use of the Cycle of Inquiry System could also be studied. We are also investigating the ways that teachers' multilayered weaving of multiple threads of inquiry for planning purposes may be made visible using the COI System.

Preservice teacher education can provide a starting point for constructing norms of good teaching. In our experience, the COI System supports an active research method of curriculum development with teachers as active participants. Development of the COI System is iterative and ongoing; we hope to collaborate with others who wish to investigate implementation of emergent inquiry using the COI System.

Acknowledgments

References

Broderick, Jane Tingle. (2004). *The BNS: A notation system for developing better ideas about children's strategies.* Unpublished doctoral dissertation, University of Massachusetts, Amherst.

Broderick, Jane Tingle, & Hong, Seong Bock. (2003). *The cycle of inquiry system.* Unpublished observation and planning tool.

Broderick, Jane Tingle, & Hong, Seong Bock. (2005). *The cycle of inquiry system—2005 revision.* Unpublished observation and planning tool.

Broderick, Jane Tingle, & Hong, Seong Bock. (2007). *The cycle of inquiry system—2007 revision.* Unpublished observation and planning tool.

Carter, Margie, & Curtis, Deb. (1994). *Training teachers: A harvest of theory and practice.* St. Paul, MN: Redleaf Press.

Chaillé, Christine. (2008). *Constructivism across the curriculum in early childhood classrooms: Big ideas as inspiration.* New York: Allyn & Bacon.

DeVries, Rheta; Zan, Betty; Hildebrandt, Carolyn; Edmiaston, Rebecca; & Sales, Christina. (2002). *Developing constructivist early childhood curriculum: Practical principles and activities.* New York: Teachers College Press.

Duckworth, Eleanor. (2006). *The having of wonderful ideas: And other essays on teaching and learning* (3rd ed.). New York: Teachers College Press.

Edwards, Carolyn; Gandini, Lella; & Forman, George (Eds.). (1998). *The hundred languages of children: The Reggio Emilia approach—Advanced reflections* (2nd ed.). Greenwich, CT: Ablex.

Elstgeest, Jos. (2001). The right question at the right time. In Wynne Harlan (Ed.), *Primary science: Taking the plunge* (2nd ed., pp. 25-47). Portsmouth, NH: Heinemann.

Epstein, Ann S. (2003). How planning and reflection develop young children's thinking skills. *Young Children, 58*(5), 28-36.

Forman, George E., & Kuschner, David S. (1983). *The child's construction of knowledge: Piaget for teaching children.* Washington, DC: National Association for the Education of Young Children.

Fosnot, Catherine Twomey. (1996). *Constructivism: Theory, perspectives, and practice.* New York: Teachers College Press.

Fromberg, Doris Pronin. (2003). Professionalism in early childhood teacher education in an era of elevated standardization and minimalist testing. *Journal of Early childhood Teacher Education, 24*(2), 103-109.

Gandini, Lella, & Goldhaber, Jeanne. (2001). Two reflections about documentation. In Lella Gandini & Carolyn Pope Edwards (Eds.), *Bambini: The Italian approach to infant/toddler care* (pp. 124-145). New York: Teachers College Press.

Giudici, Claudia; Rinaldi, Carla; & Krechevsky, Mara (Eds.). (2001). *Making learning visible: Children as individual and group learners.* Cambridge, MA: Project Zero; Reggio Emilia, Italy: Reggio Children.

Goldhaber, Jeanne. (2009, February). Valuing children as citizens of their community and stewards of the natural world. In J. Kaminski (facilitator), *Innovations in early childhood education: A seminar series for early childhood educators.* Wayne State University, Detroit, MI.

Harman, Willis, & Rheingold, Howard. (1984). *Higher creativity: Liberating the unconscious for breakthrough insights.* New York: Tarcher/Putnam.

Hendrick, Joanne. (1997). *First steps toward teaching the Reggio way.* Upper Saddle River, NJ: Merrill.

Hoisington, Cynthia. (2002). Using photographs to support children's science inquiry. *Young Children, 57*(5), 26-30, 32.

Hong, Seong Bock. (1998). *Documentation panel-making and revisiting using technology to enhance observation and instruction skills in student teachers.* Doctoral dissertation, University of Massachusetts, Amherst. (UMI No. 9841879)

Piaget, Jean. (1977). *The development of thought: Equilibration of cognitive structures.* New York: Viking Press.

Rinaldi, Carlina. (2006). *In dialogue with Reggio Emilia: Listening, researching, and learning.* New York: Routledge.

Thomson, Ralph. (1969). Learning to question. *Journal of Higher Education, 40*(6), 467-472.

Wien, Carol Anne (Ed.). (2008). *Emergent curriculum in the primary classroom: Interpreting the Reggio Emilia approach in schools.* New York: Teachers College Press.

Author Information

Dr. Jane Broderick is currently an associate professor of early childhood at East Tennessee State University (ETSU). She teaches undergraduate and graduate courses that focus on creative development of young children, documentation, and assessment of the learning process. Prior to coming to ETSU, Dr. Broderick studied at the University of Massachusetts under the guidance of Dr. George Forman, where she served as the atelierista, documentarian, and co-teacher in the university's Reggio-inspired Early Childhood Laboratory School. Currently Dr. Broderick mentors the Child Study Center teaching staff at ETSU as they journey through their process of implementing inquiry practice that is Reggio inspired. She also serves as a board member of the Association for Constructivist Teaching and has been a co-editor of *The Constructivist*.

Jane Tingle Broderick, Ed.D.
Associate Professor
Department of Human Development and Learning
East Tennessee State University
Box 70548
Johnson City, TN 37614
Telephone: 423-439-7695
Email: broderic@etsu.edu

Dr. Seong Bock Hong is currently an associate professor of early childhood education at University of Michigan, Dearborn. She is the early childhood program coordinator and teaches undergraduate and graduate courses that focus on inquiry-based curriculum development and constructivist education. Prior to her current position, Dr. Hong studied at the University of Massachusetts under the guidance of Dr. George Forman and worked at the Early Childhood Laboratory School for six years as the first documentarian, co-teacher, and interim director. Dr. Hong is the faculty curriculum advisor for the Early Childhood Education Center, a university laboratory school where a transdisciplinary and Reggio-inspired approach is strongly applied and practiced. She serves as a board member of the Association for Constructivist Teaching.

Seong Bock Hong
Associate Professor
University Michigan-Dearborn
19000 Hubbard Drive
Dearborn, MI 48126
Email: Seong@umich.edu

University of Illinois at Urbana-Champaign
College of Education
Early Childhood and Parenting Collaborative

ECRP