COLLABORATIVE LITERACY ACTIVITY IN PRINT-ENRICHED PLAY CENTERS: EXPLORING THE "ZONE" IN SAME-AGE AND MULTI-AGE GROUPINGS

James F. Christie
ARIZONA STATE UNIVERSITY

Sandra J. Stone
NORTHERN ARIZONA UNIVERSITY

This study describes the collaborative literacy activity that occurred in one teacher's sociodramatic play center in two situations: when she taught a multi-age (K–2) class and a year later when she taught a same-age kindergarten. In each situation, 15 hours of free play were videotaped and a detailed transcript was made of the action and dialogue that occurred. We analyzed the data to compare the collaborative literacy interactions that occurred in the play center under the two grouping arrangements and to test the assumption that collaborative learning always flows from "experts" to "novices," a basic tenet of the zone of proximal development. Our findings showed that the children in the multi-age group engaged in a larger amount and a broader range of collaborative literacy activities than did the children in the same-age kindergarten. We also found the collaborative interactions that occurred in the play center were more complex than the zone of proximal development would lead one to believe. Many collaborative interactions in both groups were multi-directional in nature, with the "expert" and "novice" roles not firmly set.

J L R
V. 31 NO. 2
1999
PP. 109–131

NEUMAN AND ROSKOS (1997) HAVE SUGGESTED that literacy settings "include not only physical surroundings, but human relationships that determine when, how often, and in what situations children may engage in using the cultural tools of literacy" (p. 10). This social-interactionist perspective postulates that higher order cognitive functions, including literacy, develop in a collaborative social context (Bruner, 1984; Rogoff & Lave, 1984; Vygotsky, 1978). For example, parents and other caregivers read stories, older brothers and sisters instigate "school" play and model reading the TV guide, and same-age peers provide help with making a sign for a lemonade stand. As children engage in these everyday activities with other people, they learn much about literacy. Teale (1982) has argued that "the whole process of natural literacy development hinges upon the experiences the child has in reading and writing activities which are mediated by adults, older siblings, and events in the child's everyday life" (p. 559).

According to this view, literacy development occurs in the "zone of proximal development" – a stage in which a child has partially mastered a skill but can only use this skill with the help of others (Vygotsky, 1978). If temporary assistance or scaffolding is provided, the child is able to engage in literacy activities that he or she could not do alone. This, in turn, extends the child's knowledge and skills to higher levels.

Vygotsky (1978) defined the zone of proximal development as "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (p. 86). Note that this definition specifies a one-way interaction, with "experts" (adults or more capable children) helping "novices" (less able children).

The zone of proximal development concept is widely accepted and has had considerable influence on early childhood education programs. For example, the zone is commonly used as a rationale for the establishment of literacy-enriched play centers. Traditional dramatic play areas, such as housekeeping and restaurant centers, are stocked with theme-related literacy materials. For example, a restaurant center might be equipped with menus, wall signs, pencils, and notepads (for taking food orders). Researchers assert that two aspects of these settings encourage children to incorporate familiar literacy routines and activities into their play: (a) the literacy artifacts or tools that are placed into the play center, and (b) opportunities for children to interact with adults and more capable peers in connection with these materials (Christie, 1994; Morrow & Rand, 1991; Neuman & Roskos, 1997; Vukelich, 1993). Several qualitative studies have established that both adults (Enz & Christie, 1997; Roskos & Neuman, 1993) and peers

(Neuman & Roskos, 1991; Stone & Christie, 1996) can provide this type of expert-to-novice scaffolding in literacy-enriched play settings.

The influence of the zone is also apparent in movement toward multi-age classrooms (Stone, 1994/1995; Veenman, 1995). Multi-age advocates claim that the presence of older children creates a social context that encourages more fruitful collaboration between novices and experts (Goldman, 1981; Graziano, French, Brownell, & Hartup, 1976; Howes & Farver, 1987). Within this social context, older children are perceived by younger children as leaders and helpers, and younger children are perceived by older children as needing help and instruction. According to Katz, Evangelou, and Hartman (1991), "these mutually reinforcing perceptions thus create a climate of expected cooperation beneficial to the children" (p. 10).

We believe that multi-age education offers a new context to explore the dynamics of the zone of proximal development. Multi-age classrooms present a context for learning that differs markedly from teacher-centered instruction that was the norm in the Soviet Union during the 1920s and 1930s, when Vygotsky developed the concept of the zone. Bruner (1987) has pointed out that "Vygotsky was one of the great theory makers of the first half of this century – along with Freud, McDougall, Piaget, and a very few others. Like them, his ideas are situated in his times. But like the best of them, those ideas still point to the future of our discipline." (p. 16)

The current multi-age classroom movement necessitates the exploration of the zone of proximal development within the natural learning dynamics of mixed-age interactions and collaboration. Perhaps the expert-to-novice directionality still prevails. But some researchers, who have observed children in classrooms that encourage collaborative learning among peers, suggest a more complex model of the zone. For example, Goodman and Goodman (1990) have argued that "all social interactions, not only those involving expert peers and adults, provide opportunities for children to learn more about the world" (p. 228).

Do children of like abilities scaffold each other's literacy activities? Do younger, less able children ever provide assistance to older classmates? Limited research supports these possibilities. Pontecorvo and Zucchermaglio (1990) reported that, when children of similar abilities work together on the same literacy task, opportunities emerge for them to pool their knowledge and to negotiate possible solutions to the problems they encounter. Stone and Christie (1996) examined the literacy activity in a multi-age (K–2) classroom and found that 33% of the collaborative literacy exchanges involved same-grade peers and 24% involved younger children helping older classmates.

In addition to the need to examine the zone of proximal development in multi-age classroom contexts, there is also a need to identify the ways in which mixed-age groups of children construct collaborative contexts that create the zone. Previous research has given insufficient attention to the types of collaboration that children use to support each other's learning. Attention has focused on the products of collaboration rather than the process of collaboration.

The present study examined the collaborative reading and writing interactions that occurred in a literacy-enriched play center during 2 years. In the first year, the classroom was organized as a multi-age classroom with a mix of kindergartners, first graders, and second graders. The second year, the classroom was a traditional same-age kindergarten with 5-year-old students. The teacher, room arrangement, and materials in the play center all remained the same. Thus, the physical setting remained constant, but an important element of social environment – the age range of children interacting in the play setting – changed.

Our study had two purposes, both of which are connected to the concept of the zone of proximal development. The first purpose was to examine the amount and types of collaborative literacy interactions that occurred in the play center under the two grouping arrangements. Supporters of multi-age grouping, citing the zone, claim that the broader the age of children in a classroom, the greater the opportunity for collaborative learning. However, there is scant evidence to back up this claim. If the multi-age advocates are correct, we should find a larger amount, and perhaps a broader range, of collaborative literacy interactions occurring in multi-age class than in the same-age kindergarten. Our second purpose was to examine the directionality of collaborative literacy exchanges. The zone concept assumes that collaboration is unidirectional, with older or more competent children always helping younger or less competent peers. We wanted to learn if collaborative exchanges are actually this simple, or if other more complex patterns of interaction would emerge when these exchanges are closely examined.

Method

The study took place in one teacher's classroom across a 2-year period. During the first year, the teacher taught a multi-age K–2 class. It was intended that the kindergarten children would stay with the teacher through the end of second grade, keeping in line with the common definition of a multi-age classroom – a mixed-age grouping of children that stay with the same teacher for several years. The next year, however, the teacher was assigned to a whole-day kindergarten because of school restructuring. Thus,

during the second year of the study, she taught a whole-day kindergarten with same-age students, using the same classroom as in the previous year.

Setting

We selected the teacher and classroom because one of us had taught at the school and knew that this teacher had a social-interactionist perspective and placed heavy importance on play as a context for learning. Her classroom was organized around activity centers and tables (library, writing, play, blocks, art, science, math, etc.). The room arrangement was open and flexible, and the basic centers remained the same during both years of our study. The centers offered open-ended, process-oriented experiences, rather than narrowly defined, skill-related practice. The children did not have their own desks or assigned seating. Whole-group instruction was conducted on a large carpeted area of the floor, whereas small-group instruction occurred at a horseshoe-shaped table while the rest of class worked at the various centers.

The teacher, an 18-year veteran, used the same integrated language arts approach with both the kindergarten and multi-age classes. She engaged the children in a variety of reading and writing activities within an integrated curriculum using themes from literature, science, social studies, and so on. Both classes experienced an active, social learning environment that supported children's efforts at constructing their own knowledge about literacy. Rather than using a prescribed, sequenced curriculum, skills were taught in connection with the children's ongoing reading and writing activities. The teacher also used the same assessment procedures (anecdotal notes, running records, etc.) for both the multi-age and kindergarten class.

The teacher used similar instructional strategies with both classes. She read literature aloud to each group on a daily basis and had regular times allocated for independent silent reading and buddy reading. For large-group instruction, she used shared book experiences with big books and modeled writing combined with daily journal writing. With the multi-age class, the range of skills was broadened to match the needs of the older, more capable students.

Small-group instruction, tailored to the needs and abilities of specific students, took place during center time. While the teacher met with small groups at the horseshoe-shaped table, the rest of the class worked at centers. At the beginning of this 45- to 60-minute period, the children chose which centers they wanted to use, how much time they would spend there, and with whom they would work and play. The only constraint on their freedom of choice was a "hook and name tag" system used to control the number of children who used each center.

The play center, which was the focus of this study, was partially partitioned off from the rest of the classroom with bookshelves, a chart stand, and furniture. The center was stocked with miniature furniture and appliances (refrigerator, stove, crib, table, and chairs), household items (telephone, dishes, cookware, etc.), and dolls. The play center also contained a variety of children's books on open-faced bookshelves and on a book rail mounted on the wall at the children's eye level. Other literacy items included environmental print (empty food containers and store coupons), newspapers, and writing materials (markers, pens, pencils, and paper). The play center had four hooks, so four children could hang up their name tags and play in the center at one time. When a child left and removed his or her tag, another child could use the center.

Participants

The multi-age class contained 10 kindergartners (5 female, 5 male), 7 first graders (3 female, 4 male), and 10 second graders (7 female, 3 male). The same-age class contained 22 kindergartners (12 female, 10 male). The children in both classes were from low-income families and represented diverse ethnic backgrounds, including African American, Anglo, Hispanic, Pacific Islander, Indian, and Native American. Approximately 80% of the students received free or reduced-price lunches.

Data Collection

During the first year, we videotaped 15 hours of activity in the play center of the multi-age class. During the second year, we videotaped 15 hours of activity in the same play center while it was being used by children in the same-age kindergarten. In both years, the videotaping occurred during a 4-week period during April and May. We waited until the school year was almost over so that the children would have time to get to know each other well and form a classroom community.

Starting the first week in April, the teacher videotaped every day that there was an uninterrupted, 45- to 60-minute period for children to use the learning centers. Because of special end-of-the-year activities, several days were skipped during both years of the study. The teacher turned the camcorder on at the beginning of the period and turned it off at the end of the period. She stopped filming once 15 hours of tape had been used (7½ videocassettes). In both years, part of the last session was omitted, because the 15 hours of tape had been used up.

The camera was positioned so that it covered most of the area in the play center. The teacher turned on the video camera at the beginning of the free-choice period and turned it off at the completion of the period.

She then went about her normal routine, providing small-group instruction at a horseshoe-shaped table some distance from the play center. Occasionally, the teacher adjusted the camera angle if it appeared that significant activity was occurring off camera. The directional microphone on the camera and favorable room acoustics enabled most of speech in the play center to be clearly recorded.

The children were not given any special directions for their involvement in the play center. The teacher intervened in the play only if there was a significant disruption (which was a rare occurrence). The play that took place in this center was entirely the result of the children's interactions with each other and with the play setting.

Data Analysis

The data were analyzed in two separate phases. The multi-age videotapes were transcribed and analyzed immediately following the first year of the study (Stone & Christie, 1996). We analyzed the data from the same-age kindergarten 1 year later.

Each year, after the videotaping was completed, we made a detailed transcript of the action and dialogue that occurred in the play center during each session. Bogdan and Biklin (1992) have recommended this type of "self-transcription" so that researchers become very familiar with their data. We organized the transcripts into play groups – different groupings of children who chose to play in the play center. On some days, one group of children would remain in the play center for the entire center time. On other occasions, two or three completely different groups would play in the center during the period. The multi-age transcript was divided into 41 play groups, compared with 38 play groups for the same-age kindergarten. The completed transcripts were quite lengthy: 477 typed pages of transcript for the multi-age classroom, and 577 pages for the same-age kindergarten.

During the first year, we used a combined inductive and deductive approach to code the literacy incidents and collaboration that occurred in the play center (Miles & Huberman, 1984). For purposes of this study, we defined *literacy activity* as any activity involving reading, writing, or interaction with print items (books, newspapers, signs, etc.), and *collaboration* as any attempt by a child to help a peer engage in a literacy activity. We began by independently examining the transcript for the first 10 play groups, using a constant comparison procedure (Glaser & Strauss, 1979) to develop categories for the literacy activities and collaboration that occurred. Once the categories were established, we used these categories to code deductively the collaborative literacy activities of the remaining 31 play groups. The coding was done jointly by the two principal investigators. We simultaneously viewed the videotapes and read over the transcripts.

We independently coded the activity and then compared our coding. In cases when initial codings were not identical, we reexamined the transcripts and watched video segment again in order to reach consensus. On several occasions, we encountered behaviors that did not fit our existing codes, and new codes were added.

We ended up with ten categories of literacy activity for the multi-age group:

1. Environmental print reading: attempting to determine the meaning of "contextualized" print (e.g., labels on product containers)
2. Browsing: picking up a book and briefly looking through it
3. Functional reading: reading to get things done (e.g., reading a cookbook to bake a cake)
4. Recreational reading: reading to oneself (usually aloud)
5. Reading aloud: reading to another person, doll, stuffed animal or imaginary playmate
6. Reading extension: engaging in a book-related activity (e.g., art, drama, game)
7. Academic reading: practicing reading skills (e. g., practicing recognizing the letters of the alphabet)
8. Functional writing: writing in order to get things done (e.g., invitations to a birthday party)
9. Recreational writing: writing for pleasure or self-expression
10. Academic writing: practicing handwriting, spelling, or other writing-related skill

The social context of literacy activity was coded using three categories: (a) solitary, the literacy activity occurs independent of other children; (b) parallel, two or more children engage in the same literacy activity in the play center but they do not interact with each other; and (c) collaboration, children interact together in connection with a literacy activity.

Collaboration was subdivided into five categories of helping behavior:

1. Modeling: demonstrating how to do a literacy activity while peers are nearby and in a position to watch
2. Inviting: asking peers to join in a literacy activity
3. Assisting: helping peers engage in a reading or writing activity
4. Directing: ordering a peer to do a literacy activity
5. Tutoring: using didactic methods to teach peers how to do a literacy activity

For each instance of collaboration, the name and grade level of the children providing and receiving help were recorded, and the outcome of the

collaboration was coded using five categories: (a) ignore, (b) observe, (c) engage, (d) disengage, and (e) extend. For more information about this aspect of the analysis, see Stone and Christie (1996).

One year later, we used the codes developed in the first phase of the project to analyze deductively the literacy activity and collaboration of the same-age kindergarten group. We found that we needed to add one more category of literacy activity:

> Playful assimilations: ignoring the real uses of literacy items and assigning them play-related identities or functions (e.g., using books as *if they were building blocks*)

Reexamination of the multi-age transcripts revealed three examples of playful assimilations.

Next, we examined the data from the coding sheets of both groups to identify representative examples of each type of literacy activity and collaborative interactions that occurred in the multi-age and same-age groups. In addition, we searched for patterns in the directionality of collaborative interactions.

In response to suggestions from reviewers of earlier versions of this report, we subjected the data to several other forms of analysis. The transcripts and videos were reanalyzed by two research assistants in order to determine the percentage of literacy activities in each grouping arrangement that was connected with ongoing dramatic play episodes. The research assistants also checked the accuracy of the codings on the initial analysis sheets. Two mistakes were discovered and corrected.

Finally, we had already obtained frequency counts of the different types of literacy activities and collaborative interactions that occurred in the multi-age and same-age classes. However, we had no information about the amount of time that each group spent engaging in these activities. To obtain this information, we viewed the tapes once more and timed the duration of each literacy activity.

Findings

Our findings focus on three aspects of the children's behavior in the literacy-enriched play center: literacy activities, collaboration, and the back-and-forth flow between experts and novices.

Literacy Activities

Our analyses revealed that children in the multi-age class engaged in a larger amount and wider variety of literacy activity in the play center than did

the same-age kindergarten group (see Table 1). The multi-age group engaged in more than twice as many literacy activities than the same-age group. We were surprised by the sheer amount of literacy exhibited by the multi-age group. They spent more than one third of their time in the play center (5 hours out of a total of 15 hours) engaging in some form of reading and writing.

We examined the types of literacy activities in which the two groups engaged and the duration of these activities. In addition, we compared the literacy behaviors of the kindergartners in the same-age and multi-age classrooms.

Types of literacy activity. The two groups exhibited different patterns of literacy activity in the play center. Browsing was the most common literacy activity among the same-age kindergarten group. Browsing through books occurred both during the midst of dramatic play and during lulls in play activities. For example, Cassie paused, while making a series of pretend telephone calls, to glance through a book that caught her attention. Francis, who had difficulty interacting with other children, tended to use browsing as a way to keep occupied while she watched her peers play.

The same-age kindergartners also engaged in more playful assimilations than the multi-age group, ignoring the real uses of literacy materials and using them for play-related purposes. In one amusing episode, Justine picked up an "alphabet" ice tray that contained 26 cube molds, each with a raised letter of the alphabet at the bottom, and pretended to shake letters out of the ice tray into a soup pot. She then told a co-player that she had just made alphabet soup.

As one would predict from research on emergent literacy (e.g., Teale, 1982), the same-age kindergartners also engaged in functional forms of reading and writing. For example, Shauna used *Kids Can Cook* by Mary Fergus (1990) as a reference while cooking a pretend meal. (This children's cookbook was the most popular book in the play center.) In another incident, several children were arguing over the ownership of pretend food. Holly wrote her name on a sticky note and attached it to a bowl to claim it as her property.

The children in the multi-age class engaged in a wider range of literacy activity than the same-age group. Like the same-age group, they engaged in large amounts of functional reading and writing (three times as much as the other group). However, the multi-age group also engaged in considerable amounts of reading aloud, recreational reading and writing, and academic reading and writing – activities that did not occur very often, if at all, in the same-age kindergarten class.

Reading aloud was often connected with the multi-age group's play themes. For example, Ginger (Grade 2) was pretending to be a mother, and

Table 1. Frequency and Duration of Literacy Behaviors

	Same-age kindergarten			*Multi-age classroom*		
		Duration			*Duration*	
	Frequency	*Mean*	*Total*	*Frequency*	*Mean*	*Total*
Environmental print reading	5	:17	1:23[a]	8	:44	5:50
Browsing	15	:47	11:53	4	:52	3:30
Functional reading	10	1:44	17:20	34	1:34	53:14
Recreational reading	6	3:51	23:03	34	2:05	1:11:05[b]
Reading aloud	5	1:10	5:51	27	2:25	1:05:16
Reading extension	0	0:00	0:00	4	1:09	4:36
Academic reading	1	2:44	2:44	9	1:50	16:30
Functional writing	8	:46	6:09	23	1:54	43:49
Recreational writing	1	:43	:43	10	1:58	19:43
Academic writing	0	0:00	0:00	7	2:34	18:02
Playful assimilations	11	1:49	19:53	3	5:33	16:38
Total	*62*	*1:26*	*1:28:59*	*163*	*1:57*	*5:18:13*

[a] minutes:seconds
[b] hours:minutes:seconds

Caitlin (Grade K) was acting out the role of the baby. Ginger put Caitlin to bed and then read Bill Martin Jr.'s *Brown Bear, Brown Bear, What Do You See?* (1970). Caitlin responded by pretending to fall asleep. In another instance, Cecilia (Grade 1) used *Brown Bear, Brown Bear* to teach a lesson about colors to Priscilla (Grade 2) and Caitlin (Grade K), who were pretending to be her students.

The children in the multi-age group often engaged in recreational reading and writing during lulls in dramatic play activity or when they lost interest in ongoing play episodes. This recreational reading was usually done in a solitary social context. For example, several girls were pretending to cook meals. When the group decided it was time to clean up the kitchen, Priscilla (Grade 2) disengaged from the play episode and began to read a book by herself. Recreational writing, on the other hand, was usually a social activity. Sophia (Grade K) was playing the role of a young child. She suddenly exclaimed, "Mommy! Me print!" and began writing letters on a piece of paper. Soon thereafter, the mother (Jennifer, Grade K) and aunt (Alma, Grade 2) were also writing on pieces of paper, for no apparent purpose other than pleasure.

Academic reading and writing often occurred in connection with school play themes. For example, Amy (Grade 2), in the role of teacher, gave a spelling test to Kristi (Grade 2), while Noah (Grade K) observed. After a

few minutes, the two girls switched roles, and Kristi administered a test to Amy. In another incident, Cecilia (Grade 1) taught the alphabet to Caitlin (Grade K), who was playing the role of a reluctant student.

A large majority of both groups' literacy activity was related to the children's ongoing dramatic play episodes: 67% in same-age kindergarten and 71% in the multi-age class. In both groups, much of the functional reading (e.g., reading cookbooks while pretending to bake food), functional writing (e.g., jotting down shopping lists), and reading aloud (e.g., reading books to dolls) activity was connected with play themes.

It is interesting to note that kindergartners were present in 37 out of the 41 play groups in the multi-age class (see Table 2). Seventy percent of play groups in which the kindergartners participated also contained first graders, and 78% involved second graders. Thus, many opportunities existed for the kindergartner to witness the literacy activities of their older classmates.

Duration of literacy activities. Table 1 reveals that the multi-age group's literacy activities lasted longer than those of the same-age kindergartners, but the difference was not very large. The mean duration for the multi-age group's activities was about 2 minutes, compared with 1½ minutes for the same-age group. Thus, the two groups tended to differ more in the frequency of different categories of literacy activity rather than in the duration of these activities.

Predictably, the multi-age group's writing activities and reading-aloud sessions were longer than those of the same-age group. One would expect that the advanced literacy skills of the first and second graders in the multi-age class would allow them to sustain these activities longer than younger students. In addition, the multi-age group's playful assimilations were much more sustained than the same-grade kindergartners' play episodes. This finding agrees with Perlmutter and Burrell's (1995) contention that the play of primary-grade children is more focused and sustained than that of younger children.

Although same-age kindergartners engaged in a much smaller number of recreational reading episodes than the multi-age group, the same-age kindergartners' episodes lasted almost twice as long as those of the other group. This surprising finding may reflect different functions of recreational reading at different ages. When we examined the recreational reading episodes in the multi-age class by grade level, we discovered that the mean duration of multi-age kindergartners' recreational reading was 3 minutes and 15 seconds, compared with a mean duration of 1 minute and 50 seconds for the first and second graders. The kindergartners in both classrooms appeared to get deeply involved in their books, whereas the older children in the multi-age class tended to use recreational reading as a way to pass the time during lulls in dramatic play. As soon as the play got started again or a new child entered the center, the older children tended to put

Table 2. Composition of Play Groups In The Multi-Age Classroom

Grades represented	*Number of play groups*
Kindergarten only	3
Kindergarten and Grade 1	5
Kindergarten and Grade 2	8
Kindergarten, Grade 1, and Grade 2	21
Grade 1 only	0
Grade 2 only	3
Grade 1 and 2	1

down their books and join in the play. Perhaps the more intense engagement by the kindergartners is related to the fact that reading is a newly acquired skill for these children.

Comparing kindergartners in the two classrooms. Many of the above findings may simply reflect the fact that the multi-age group contained 17 first and second graders. One would expect that frequency and duration of the literacy activities of these older students would be higher than those of the same-grade kindergartners. But what about the kindergartners in multi-age classroom? How did their literacy behavior compare with their counterparts in the same-age kindergarten?

Table 3 compares the frequency of the literacy behaviors of the kindergartners in the two classrooms. Two frequencies are reported for the kindergartners in the multi-age class: the actual frequencies and the weighted frequencies, which compensate for the fact that the play groups in the multi-age classroom had, on average, one third the number of kindergartners contained in the same-grade kindergarten play groups.[1]

Although the actual frequencies reveal a slight advantage for the same-grade kindergartners, the weighted frequencies indicate that the kindergartners in the multi-age class engaged in almost three times as much literacy activity as their same-grade counterparts. The weighted scores show advantages for kindergartners in multi-age groups in 9 of the 11 categories of literacy activity, with differences being particularly pronounced in functional reading, recreational reading, reading aloud, reading extensions, functional writing, and recreational writing. These findings suggest that the multi-age grouping arrangement helped to elevate the literacy activity of the kindergartners, the youngest children in the classroom, which is precisely what advocates of multi-age grouping would predict.

1 The mean number of kindergartners in the multi-age play groups was 1.5, compared with a mean of 4.3 kindergartners per play group in the same-age class.

Collaboration

A majority of the literacy in both groups occurred in collaborative social contexts: 53% in the kindergarten and 54% in the multi-age class. We

Table 3. Frequency of Literacy Behaviors Exhibited by Kindergartners in the Two Classrooms

		Multi-age classroom	
	Same-age kindergarten	*Actual*	*Weighted*[a]
Environmental print reading	5	3	9
Browsing	15	2	6
Functional reading	10	14	42
Recreational reading	6	6	18
Reading aloud	5	6	18
Reading extension	0	4	12
Academic reading	1	1	3
Functional writing	8	10	30
Recreational writing	1	7	21
Academic writing	0	1	3
Playful assimilations	11	3	9
Total	*62*	*57*	*171*

[a]Frequency multiplied by 3.0 to adjust for the fact that, on average, the play groups in the multi-age classroom had one third the number of kindergartners contained in the same-grade kindergarten play groups.

identified five different types of collaborative literacy interactions. Table 4 shows how these different types of collaboration were distributed across the two classes. As was the case with literacy activity, a larger amount (almost three times as much) and broader range of collaboration occurred in the multi-age group.

Modeling was the most commonly used strategy in both groups, accounting for two-thirds of the collaboration in the same-age kindergarten and almost one half in the multi-age class. In a typical episode in the same-age classroom, Nina and Brittany were pretending to cook a meal. Brittany flipped through a cookbook, modeling how to use a cookbook as a reference for cooking. Nina asked, "What are you cooking?" Brittany responded, "I'm cooking this," pointing to a picture in the book.

Modeling was also the most widely used form of collaboration used in the multi-age class, often (but not always) involving older children demonstrating literacy activities to younger classmates. Cecilia (Grade 1), Sophia (Grade K), and Jennifer (Grade K) were preparing for a pretend birthday party for Sophia. Celia, who was enacting the role of mother, wrapped up a small book with a piece of paper and then wrote Sophia's name on the package, while the two kindergartners looked on. Cecilia warned Sophia, "Don't open this!" Several minutes later, Sophia wrote her own name on a

Table 4. Collaboration Category Frequency Counts

	Same-age kindergarten	*Multi-age classroom*
Modeling	21	41
Inviting	9	19
Assisting	1	14
Directing	2	5
Tutoring	0	9
Total	*33*	*88*

piece of paper and used it to wrap up a present to herself. Her name ended up on the inside of the package, but she did not seem to notice. Sophia's imitation of Cecilia's label writing was not unusual. In both groups, almost half of the modeled literacy activities were imitated by observing peers.

Inviting, in which a child asks a peer to join in a literacy activity, was the other form of collaboration that was widely used in the same-age kindergarten group. Francis and Shauna were preparing to cook a pretend meal in the kitchen area. Francis browsed though books on the book rail in the center and selected several. Francis asked, "Shauna, would you like to read? Look." She held up a book and pointed to a picture. Both girls used the book as if it were a recipe book, looking at the book and then putting food items in a bowl. Inviting was even more successful than modeling in initiating literacy activity, with an engagement rate of 66% in the same-age group and 75% in the multi-age class.

Three forms of collaboration that were rarely, if ever, used in the same-age group were used frequently in the multi-age class: assisting, tutoring, and directing. Assisting was the most frequently used of the three. In this type of collaboration, one child would help another do a reading or writing activity. In one example, Ginger (Grade 2) was playing the role of mother, and Priscilla (Grade 2) was her daughter. Priscilla began reading *Brown Bear, Brown Bear,* making what seemed to be intentional mistakes. Ginger did her best to help Priscilla read the book.

Priscilla: Brown Bear, Brown Bear what do you ...?
Ginger: What do you SEE.
Priscilla: I see ...?
Ginger: Children.
Priscilla: Children looking at me.

This type of active assistance was very effective (88%) in getting peers to engage in literacy activity.

Tutoring is similar to assisting, in that one child helps another child do

a literacy activity. However, tutoring has a distinctly didactic tone. For example, Priscilla (Grade 2) tried to teach Crystal (Grade 1) and Maria (Grade 2–ESL) how to label pictures in a storybook.

J L R
Christie & Stone

Priscilla: Okay, what do you see? What is this? (She holds the book up, showing it to both Crystal and Maria.)
Crystal: Uhm, ahh, it's a ladybug.
Priscilla: (turns another page) What is this?
Crystal: Ladybug.
Priscilla: No!
Maria: Lady?
Priscilla: What is it? (points to the book)
Crystal: (looks at the book very carefully) That's a parrot.
Priscilla: Parrot. Yes. (turns the page) What is this?
Crystal: (says something unintelligible)
Priscilla: What did you say?
Crystal: I'm going to leave.

We noticed that tutoring was always effective in eliciting the desired literacy behavior (100% engagement rate). However, unless tutoring was connected with a school play theme, the recipients often reacted negatively to this type of didactic instruction, as did Crystal in the above example.

Directing occurred when a child, who is enacting an authoritative role (e.g., parent, teacher), orders a peer to do a literacy activity. In one amusing example, Ginger (Grade 2) and Joe (Grade 1) were pretending to be the mother and father of several baby dolls. Ginger directed Joe to read to the babies. He obediently complied.

Joe: I'll wash the dishes.
Ginger: I'll wash them. You read to the baby. You can sit over there in the chair with the baby or sit in the bed.
(Joe takes the dolls and some books and sits in a rocking chair. He begins reading aloud to the dolls.)
Ginger: (looking over at Joe) Are you reading, Dad?

Sometimes, as in the case of Joe, directing was successful in eliciting the desired literacy behavior. However, just as often, children would simply ignore the orders.

Back-and-Forth Flow Between Experts and Novices

In addition to comparing the collaboration that occurred in the two grouping arrangements, we also examined the nature of the collaborative exchanges themselves. We were interested in investigating the assumption

that collaborative learning is unidirectional, with older, more competent children always helping younger, less competent peers.

Forty-two percent of the collaborative interactions in the multi-age group followed the model, with older students helping younger classmates engage in literacy activity. The incident described previously, in which Celia (Grade 1) modeled how to label birthday presents for Sophia (Grade K) and Jennifer (Grade K), is a good example.

On the other hand, more than half the collaborative interactions did not fit this older-to-younger scaffolding pattern. Thirty-three percent of the collaborative literacy exchanges involved same-grade peers, and 24% involved younger children helping older classmates. Many of these examples fit the zone model, because the younger children appeared to have more expertise than the older students. In one example, Priscilla (Grade 2), Cecilia (Grade 1), and Sophia (Grade K) were sitting at the kitchen table, writing a letter to their teacher, Mrs. O. (The children addressed the teacher in this manner because her last name was very long.)

Cecilia: How do you spell "Mrs. O?"
Priscilla: M
Cecilia: Wait!
Sophia: M, R, S, O
Cecilia: Wait! M (She begins writing.)
Priscilla: M, R, S ... dot ... O
Sophia: Dot O
Cecilia: Dot O (as she finishes writing)
Priscilla: There!

Note how the kindergartner, Sophia, is helping first grader Cecilia write the teacher's name. In this particular instance, Sophia possessed some information that her older classmate did not and was able to give some assistance. In another example, Sophia (Grade K) helped Alma (Grade 2), who had very limited English proficiency, play a hand-clapping game using the text from a picture book. Thus, the directionality of the zone did not always involve older students helping younger ones. Older did not always mean more competent.

We also found that collaborative interactions were not always unidirectional, with one child supplying all the help and the other just receiving assistance. Often, these collaborative interactions were multi-directional and reciprocal in nature. For example, in the same-age kindergarten, Shauna and Cassie were looking at a supermarket advertisement in a newspaper. Shauna pretended to take liquor bottles from the ad and drink them (playful assimilation). Cassie watched and then joined in, proclaiming "I'm drunk!" Shauna initiated the activity by modeling an

assimilative, playful use of items in a newspaper ad, but Cassie did not simply imitate Shauna's behavior. She added a new element to the story – drinking liquor results in drunkenness. Later, at Cassie's instigation, the girls pretended to eat poison cherries from the ad and to turn into creatures with giant claws.

J L R
Christie & Stone

Another good example of a multi-directional exchange involving a newspaper occurred in the multi-age group. Cecilla (Grade 1) was pretending to be Priscilla's (Grade 2) mother. While Cecilla was at the stove preparing dinner, Priscilla was sitting at the table looking at the pictures in a supermarket advertisement in the newspaper.

Priscilla: Mom, Momma? Mom!
Cecilia: What?
Priscilla: Come here!
Cecilia: Wait! (She is taking things out of the freezer.)
Priscilla: Look at the grocery ads. Look at these ads, Mom.
Cecilia: (joins Priscilla at the table and looks at the ads) That will be ten dollars.
Priscilla: Yeah.

Priscilla initiated the activity by inviting Cecilia to look at the ads with her. Cecilia, however, does more than simply look. She reads some information off the ad, modeling newspaper reading for Priscilla. Many of the collaborative interactions in both groups had this back-and-forth type of flow.

We also found that collaborative interactions sometimes had a sequential effect, with the child receiving assistance later helping another peer engage in a similar activity. In the multi-age class, Ginger (Grade 2) and Joe (Grade 1) were pretending to be parents preparing dinner. Ginger modeled the functional reading of a recipe book for Joe, engaging Joe in reading the book. Several days later, Joe modeled reading the same book for Adam (Grade 1). Although these sequences were more common in the multi-age class (11 incidents), we also observed 4 instances in the same-age group.

Discussion

We found that kindergartners in the multi-age class were exposed to a larger amount and broader range of literacy activities in the sociodramatic play center than were their counterparts in the same-age kindergarten class. The multi-age-group kindergartners also engaged in proportionately more literacy activity than the kindergartners in the same-age class. In addition, children in the multi-age classroom engaged in more collaboration connected with literacy and used a broader range of strategies to help their

classmates do reading and writing activities. These findings suggest that multi-age grouping presents children with more opportunities to learn about literacy from their peers in print-enriched play settings than does traditional same-age grouping.

We also found that the ways in which children collaborate were more diverse than common interpretations of the zone of proximal development would lead one to believe. These interpretations of the zone concept are based on the assumption that collaborative peer interactions are unidirectional, with "experts" (children who are older or more capable) helping "novices" (younger or less able children). We found many examples of this type of expert-to-novice helping activity, but we also discovered other patterns. More than half the collaborative exchanges in the multi-age group involved same-grade collaboration or younger children helping older classmates. In addition, many of the collaborative interactions in both groups were multi-directional in nature. Children who received help from a peer would reciprocate by providing assistance to that same peer or another peer. Thus the expert and novice roles were not firmly set; instead, these roles appeared to flow back and forth between children. These findings in no way refute the zone of proximal development concept, but they do suggest collaborative learning is more complex than suggested by this popular concept.

Vygotsky (1978) suggested that "an essential feature of learning is that it creates the zone of proximal development; that is, learning awakens a variety of developmental processes that are able to operate only when the child is interacting with people in his environment and in collaboration with his peers" (p. 90). The zone then is not a clear-cut space that exists independent of the process; rather, it is created in the course of social learning (Tudge & Winterhoff, 1993). We found that the mixed-age play groupings created a natural context for adjusting the zone to the needs of each child. As each child's literacy needs and strengths vary, so does the directionality of the zone. Tudge and Winterhoff (1993), in their work with expert-novice dyads, also found that the relationship of partners in the zone was clearly not unidirectional; both partners changed in the course of interaction, gaining new understandings through collaboration.

Further research is needed to determine if multi-age grouping has similar effects on literacy and collaboration in other classroom settings, such as the library center or in structured cooperative learning groups. In addition, longitudinal studies need to be conducted to determine if the opportunities provided by peer collaboration have a significant impact on actual literacy learning.

Previous research has shown that print-enriched play centers are very effective in eliciting literacy activity at the preschool and kindergarten levels

(Christie & Enz, 1992; Kantor, Miller, & Fernie, 1992; Morrow & Rand, 1991; Neuman & Roskos, 1992, 1997; Vukelich, 1991). Our study showed that these centers also have potential benefits at the primary-grade level when combined with multi-age grouping. Further research is needed to investigate the types of collaborative literacy engaged in by children in same-age primary classes. Perhaps these play settings are beneficial for children from preschool through the primary grades under any grouping arrangement.

The timing of the observations, which took place during April and May, may have contributed to the large amount of collaborative interaction in both groups. The children had approximately 7 months to establish community and to learn to work together. It would be interesting to study the collaborative interactions that occur in similar groups during the first several months of the school year.

The children in this study came from very diverse cultural backgrounds. A basic assumption of the print-enriched play center strategy is that the play settings should resemble the literacy environments children encounter at home and in their communities (Christie, 1994). Research has demonstrated that there is considerable variation in these environments among different cultural groups (Heath, 1982; Purcell-Gates, 1995). Literacy/play advocates therefore recommend that teachers make an effort to stock print-enriched play setting with literacy artifacts from children's homes and neighborhoods (Roskos, Vukelich, Christie, Enz, & Neuman, 1995). We did not detect any effort to do this in the play center that we observed. The setting, which was set up as a generic housekeeping center, contained books, food containers, newspaper, pencils, pens, and blank pieces of paper. We were somewhat surprised that the setting was so effective in eliciting literacy from these diverse children. Perhaps the setting and materials were so generic that they were familiar to all the children. Research is needed to investigate the effects of cultural relevancy on children's behavior in print-enriched play settings.

The gender valence of play settings also deserves future study. The housekeeping center with its kitchen appliances and cooking props was definitely more attractive to girls than to boys. Research has shown boys spend more time playing in centers with non-domestic themes – airport, pizza parlor, doctor's office – than in housekeeping centers (Dodge & Frost, 1986; Howe, Moller, Chambers, & Petrakos, 1993). It would be interesting to repeat the present study using different play themes and then examine patterns of gender participation, literacy activity, and collaboration.

In conclusion, the children in both classes used the print-enriched play as a context for collaborative literacy activity. The multi-age arrangement

resulted in "more of a good thing." The combination of a print-enriched play environment and broader age range of children facilitated a large amount and diverse variety of literacy behaviors from children at all three grade levels. In addition, more collaboration occurred in the multi-age setting. We also found that the collaborative learning that occurred in both grouping arrangements was quite complex and multi-directional, with children constantly changing expert and novice roles. This suggests that opportunities for peer collaboration may have benefits for all children in a classroom.

Author Note

This research was supported by an Organized Research Grant from Northern Arizona University, Flagstaff. The authors thank Francis Oberholtzer, teacher at Scales Professional Development School, Tempe, AZ, for her assistance.

REFERENCES

Bogdan, R., & Biklin, S. (1992). *Qualitative research for education: An introduction to theory and methods* (2nd ed.). Needham Heights, MA: Allyn & Bacon.

Bruner, J. (1984). Vygotsky's zone of proximal development: The hidden agenda. In B. Rogoff & J. Wertsch (Eds.), *Children's learning in the "zone of proximal development"* (pp. 93–97). San Francisco: Jossey-Bass.

Bruner, J. (1987). Prologue to the English edition. In R. Reiber & A. Carton (Eds.), *The collected works of L.S. Vygotsky: Vol. 1. Problems of general psychology* (pp. 1–16). New York: Plenum.

Christie, J. (1994). Literacy play interventions: A review of empirical research. *Advances in Early Education and Day Care, 6,* 3–24.

Christie, J., & Enz, B. (1992). The effects of literacy play interventions on preschoolers' play patterns and literacy development. *Early Education and Development, 3,* 205–220.

Dodge, M., & Frost, J. (1986). Children's dramatic play: Influence of thematic and nonthematic settings. *Childhood Education, 62,* 166–170.

Enz, B., & Christie, J. (1997). Teacher play interaction styles: Effects on play behavior and relationships with teacher training and experience. *International Journal of Early Childhood Education, 2,* 55–69.

Fergus, M. (1990). *Kids can cook.* Crystal Lake, IL: Rigby.

Glaser, B., & Strauss, A. (1979). *The discovery of grounded theory: Strategies for qualitative research.* Hawthorne, NY: Aldine.

Goldman, J. (1981). Social participation of preschool children in same versus mixed-age groups. *Child Development, 52,* 644–650.

Goodman, Y., & Goodman, K. (1990). Vygotsky in a whole-language perspective. In L. Moll (Ed.), *Vygotsky and education* (pp. 223–250). Cambridge, UK: Cambridge University Press.

Graziano, W., French, D., Brownell, C., & Hartup, W. (1976). Peer interaction in same-age and mixed-age triads in relation to chronological age and incentive condition. *Child Development, 47,* 707–714.

Heath, S. (1982). What no bedtime story means: Narrative skills at home and school. *Language in Society, 11,* 49–76.

Howe, N., Moller, L., Chambers, B., & Petrakos, H. (1993). The ecology of dramatic play centers and children's social and cognitive play. *Early Childhood Research Quarterly, 8,* 235–251.

Howes, C., & Farver, J. (1987). Social pretend play in two-year-olds: Effects of age of partners. *Early Childhood Research Quarterly, 2,* 305–314.

Kantor, R., Miller, S., & Fernie, D. (1992). Diverse paths to literacy in a preschool classroom: A sociocultural perspective. *Reading Research Quarterly, 27,* 185–201.

Katz, L., Evangelou, D., & Hartman, J. (1991). *The case for mixed-age grouping in early education.* Washington, DC: National Association for the Education of Young Children.

Martin, B., Jr. (1970). *Brown bear, brown bear, what do you see?* New York: Holt.

Miles, M., & Huberman, A.M. (1984). *Qualitative data analysis: A sourcebook of new methods.* Beverly Hills, CA: Sage.

Morrow, L., & Rand, M. (1991). Preparing the classroom environment to promote literacy during play. In J. Christie (Ed.), *Play and early literacy development* (pp. 141–165). Albany, NY: State University of New York Press.

Neuman, S., & Roskos, K. (1991). Peers as literacy informants: A description of young children's literacy conversations in play. *Early Childhood Research Quarterly, 6,* 233–248.

Neuman, S., & Roskos, K. (1992). Literacy objects as cultural tools: Effects on children's literacy behaviors during play. *Reading Research Quarterly, 27,* 203–223.

Neuman, S., & Roskos, K. (1997). Literacy knowledge in practice: Contexts of participation for young writers and readers. *Reading Research Quarterly, 32,* 10–32.

Perlmutter, J., & Burrell, L. (1995). Learning through "play" as well as "work" in the primary grades. *Young Children, 50* (5), 14–21.

Pontecorvo, C., & Zucchermaglio, C. (1990). A passage to literacy: Learning in a social context. In Y. Goodman (Ed.), *How children construct literacy: Piagetian perspectives* (pp. 59–98). Newark, DE: International Reading Association.

Purcell-Gates, V. (1995). *Other people's words: The cycle of low literacy.* Cambridge, MA: Harvard University Press.

Rogoff, B., & Lave, J. (Eds.). (1984). *Everyday cognition: Its development in social contexts.* Cambridge, MA: Harvard University Press.

Roskos, K., & Neuman, S. (1993). Descriptive observations of adults' facilitation of literacy in play. *Early Childhood Research Quarterly, 8,* 77–97.

Roskos, K., Vukelich, C., Christie, J., Enz, B., & Neuman, S. (1995). *Linking literacy and play: Facilitator's guide.* Newark, DE: International Reading Association.

Stone, S. (1994/1995). Strategies for teaching children in multi-age classrooms. *Childhood Education, 71,* 102–105.

Stone, S., & Christie, J. (1996). Collaborative literacy learning during sociodramatic play in a multi-age (K–2) primary classroom. *Journal of Research in Childhood Education, 10,* 123–133.

Teale, W. (1982). Toward a theory of how children learn to read and write naturally. *Language Arts, 59,* 555–570.

Tudge, J., & Winterhoff, P. (1993). Vygotsky, Piaget, and Bandura: Perspectives on the relations between the social world and cognitive development. *Human Development, 36* (2), 61–81.

Veenman, S. (1995). Cognitive and noncognitive effects of multi-grade and multi-age classes: A best-evidence synthesis. *Review of Educational Research, 65,* 319–381.

Vukelich, C. (1991, December). *Learning about the functions of writing: The effects of three play interventions on children's development and knowledge about writing.* Paper presented at the meeting of the National Reading Conference, Palm Springs, CA.

Vukelich, C. (1993). Play: A context for exploring the functions, features, and meaning of writing with peers. *Language Arts, 70,* 386–392.

Vygotsky, L.S. (1978). *Mind in society: The development of psychological processes.* Cambridge, MA: Harvard University Press.

Manuscript received: August 5, 1997
First revision requested: November 8, 1997
Final revision received: May 29, 1998
Accepted for publication: June 30, 1998