Naming Block Structures: A Multimodal Approach

Lynn Cohen · Joanna Uhry

Abstract This study describes symbolic representation in block play in a culturally diverse suburban preschool classroom. Block play is *multimodal* and can allow children to experiment with materials to represent the world in many forms of literacy. Combined qualitative and quantitative data from seventy-seven block structures were collected and analyzed. The observed frequency of symbolism used for three levels of symbolism (1) pre-symbolism, (2) first level symbolism, and (3) second level symbolism was investigated. Results indicated significant differences for first level symbolism or real-world objects. Students reported making homes for Webkinz, indicating an ability to encode *multimodally* the Webkinz computer game played at home to their school block play. The implications from these findings suggest educators should consider both a sociocultural perspective on playing and children's out of-school experiences on learning. A research agenda that includes multimodality as performance is critical to early childhood education.

Keywords Block play · Symbolism · Multimodal literacy · Technology

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Introduction

Among the hundreds of daily verbal interactions young children display in an early childhood setting, the block center is an area where language, literacy and symbolic play can thrive and therefore be observed (Cohen and Uhry 2007; Wellhousen and Giles 2005/2006). Block play is defined as any time a child manipulates proportional wooden blocks, and uses actions, and/or language to represent realistic or imaginary experiences. The most widely known blocks used in early childhood programs are called unit blocks developed by Caroline Pratt.

The past two decades have witnessed a tremendous increase in literacy-play research. Integrative empirical reviews of play (Christie and Johnsen 1987; Fein 1981; Roskos and Christie 2001), focusing on dramatic play or the literacy-play interface, have been conducted with some regularity over the past 25 years. Most of the research on symbolic representation has focused on dramatic play, not block building (Yaden et al. 2000), with the exception of Christie and Johnsen's 1987 review on constructive play, Conrad's (1995) content analysis of 75 empirical and non-empirical articles on block play, and Gura's (1992) research in the Froebel Blockplay Project. Gura (1992) discussed children's use of basic block forms to represent verbal and nonverbal meanings. Conrad (1995) concluded that language flourishes when children use blocks and talk among themselves; comparing, describing, and labeling structures.

Recently, contemporary definitions of literacy and play are beginning to include the term *multimodal* in a social semiotic sense, recognizing that "meaning and knowledge is built up through various modalities" (Vasquez 2005, p. 209). Social semiotics is defined as "a system of meanings that constitute the reality of the culture"

(Halliday 1978, p. 123). In an effort to broaden traditional connotations of symbolism in block play this study is based on the social theories of language (Halliday 1978) from a multimodal perspective. Halliday (1978) emphasizes the child as a meaning maker and social player.

Purpose

The purpose of this research was to investigate the levels and frequency of symbolism in four-year-old children's block play. In this research on block play and symbolism, a multimodal social semiotic theoretical stance (Jewitt and Kress 2003) is adapted to broaden our view of literacy and play. It is an approach to literacy learning that includes a "whole range of modes involved in representation and communication" (Jewitt and Kress 2003, p. 1). Multimodal social semiotics is a perspective that seeks to incorporate the underlying principles for the use of signs that include dance, drawing, gestures, painting, and block building. Dyson (2002) and Whitehead (2004) describe literacy as a broad interaction with symbols and representation. These include "singing, dancing and music-making, drawing and painting materials, dress-up clothes and play artifacts, molding and sculpting media, construction equipment and natural objects" (Whitehead 2004, p. 208). Block play, then, becomes an opportunity for children to create meaning by representing and discussing real and imaginary experiences with unit blocks. It was important to this study for children to name and describe completed block structures to consider the meaning and learning represented through play experiences. Symbolic block play can support past and present definitions of literacy and play as children label and represent ideas with open-ended materials. The research questions were:

1. How frequently do four-year-old children use different levels of symbolism in their block play?
2. How do children use blocks to name and represent meaning about their lived experiences?

Conceptual Framework

Social Semiotics

Traditional semiotic theory is the study of signs which depends on an understanding of the way a sign can be broken down into two parts: (1) the 'signifier' and (2) the 'signified'. "The 'signifier' is the physical form of the sign in words, images or sounds. The 'signified' is the mental concept referred to, its meaning" (Marsh and Millard 2000, p. 78). In contrast, social semiotics sees people engaged in meaning making as producers of signs rather than individuals as users of sign systems (Jewitt and Kress 2003). Halliday (1978) views social semiotics from a language perspective and defines social semiotics as "interpreting language within a socio-cultural context, in which culture itself is interpreted in semiotic terms—as an information system" (p. 2). Halliday offers an account of the nature of language use and text construction, one that takes in the relationship between language, situation and culture. Thus, he explained how language, within any particular cultural and linguistic community, is used for understanding and the linguistic resources used to acquire this understanding (Wells 1999). When children play with blocks (signs) they are producing and communicating symbolic meaning. For example, a child takes several blocks off the block shelf and begins stacking them to make a rectangle-shaped structure (the signifier). The child walks over to a friend and says, "Can you help me build a house?" The child is using language (labeling) to ask his friend if he wants to join him in building a house (signified). From this perspective, a block structure becomes the "*to-be-meant*" as the child is building and his symbolic representation becomes "*that-which-means-it*" (Jewitt and Kress 2003, p. 11).

Multimodality

Block play is multimodal and can allow children to experiment with materials to represent the world in many forms of literacy. In this vein, what counts as literacy is not simply providing books and writing materials in the block area, but also the myriad ways in which children make meaning through the creation of signs, that are themselves made through the multimodal form of block play. A consideration of multimodal early literacy practices is important in the current social and technological climate. Yelland (2007) contends that any consideration of play needs to incorporate various modes of representation including "technology as play, playing with ideas in multimodal ways, and storytelling as play" (p. 49). Within this multimodal approach to language, literacy and learning, signs are a combination of meaning and form (Kress 1997, p. 6) (e.g. the idea of building a castle with blocks); modes are the forms used to construct the signs (p. 7) (e.g. unit blocks). Modes can also include the communication that can occur within the social context of play, such as the interaction and playful conversations that happen as children create block structures.

The focus on much current multimodal research concerns Jewitt and Kress's (2003) contentions that the image has supplanted writing as the most ubiquitous mode in western society. Pahl's (2003) 3-year ethnography documented meaning making across multiple modes with a

child interested in Pokeman creatures. Pahl's account of moving across modes is traced as the child plays with models of Pokemon. The child used cultural resources to "move across modes," (p. 150) from play to cutting out, and then back to construction or model making.

Multimodal literacy experiences can support the learning and language acquisition of English Language Learners. Iddings et al. (2005) and Switzer (2009) have investigated language acquisition of young English learners. Iddings et al. (2005) documented communication and block building between two-third grade English learners in an English-dominant classroom. Both children were able to use semiotic tools to create meaning through interaction with each other. Engaging in multimodal representations "facilitated the children's access to participate with one another as part of the larger goal of gaining access to the social life of their English-dominant classroom" (Iddings et al. 2005, p. 50) .

Switzer (2009) went into the homes of Head Start Brazilian immigrant families. She observed and recorded children in a variety of multimodal practices such as singing, drawing, dramatic and block play. Switzer (2009) identified themes from her analysis of the multimodal literacy events that include: (a) relationship building between parent and child, (b) an attachment to culture and homeland, and (c) the importance of using multiple modes of literacy with families where linguistic ability in English is limited.

Children frequently engage in conversations (a mode) using a variety of conversational strategies throughout the building process (Cohen and Uhry 2007). Therefore, it is crucial to describe children's block building in relation to the way children talk about their buildings and how the buildings are shaped in interaction with a social world.

Modes of Language: Naming Block Structures

A number of scholars (Bailey 1933; Guanella 1934) began to interpret the usage of children's block play in the beginning of the nineteenth century. They observed and documented instances of children labeling or naming their block constructions, giving them representational meaning. This early block research laid the groundwork for others (Gura 1992; Johnson 1996; Reifel and Greenfield 1982; Sluss 2002; Sluss and Stremmel 2004) to adapt these earlier scales to document the changing character of block play as children age and develop.

Naming is unusual for the typically developing 2-and 3-year old child, and evident among 4-and-5-year old children. By age 4 children begin to move from sorting and pushing blocks to constructing and symbolically representing a tree house or a real-world object (Drew et al. 2008; Johnson et al. 2005; Johnson 1996). Johnson (1996)

claims as older children "give names to their structures, the designs take on attributes usually associated with symbolism. A four-year-old may express resemblance in their building or a symbol may stand for a complex structure" (p. 22). Gura's (1992) and Reifel and Greenfield's (1982) research findings suggest blocks are adapted to particular ideas and ideas to blocks. A child's level of skill in using blocks determines *how* rather that *what* is represented and they adapt what they know about their block structures to previous experiences (Gura 1992, p. 67).

Current Research

Previous research Sluss (2002) and Sluss and Stremmel (2004) drew upon the conceptual work of Vygotsky (1977, 1978) in an investigation of block play and symbolic representation. Their model utilized the mode of communication to interview and ask children about completed block structures. Replicating the symbolism scale from previous research (Sluss 2002; Sluss and Stremmel 2004) and expanding upon block play as a multimodal experience, the present study differentiated three levels of symbolism. They were: (a) Level 1—Presymbolism, (b) Level 2—Real World, and (c) Level 3—Imaginary World. Presymbolism, is when a block is used as a block and there is no evidence of symbolism. The child carries or stacks the blocks. The child might say, "I just stacked the blocks."

Second level symbolism (real world) is defined as a reproduction of an observable object, accessible by touch or sight. The child uses the block to reproduce a table in the room, a house, or a school bus. These are objects that a child can see or touch. The child might say, "it's a house or my bed in my bedroom," and there's some representation of the object's shape. Pretense is occurring but it is closely aligned with reality.

Third level symbolism (imaginary) is defined as a reproduction of an unobservable object, not accessible by touch or sight and exists in a world of imagination. The child builds a castle, a space ship, or a candy machine. These structures represent something in the child's imagination that is not aligned to reality. Both second level symbolism (real world) and third level symbolism (imaginary world) are symbolic representations in different modes. Kress (1997) proposed that children engage in the two worlds of imagination and these two worlds are the effects of the imaginative action of the child. Both worlds represent alternatives between a "present practical world and a mental engagement with a distanced world" (p. 27). Therefore, in this study, second level symbolism was the practical real world representations and third level symbolism was distanced and imaginary. Children that built castles and space ships in this study were representing distanced, imaginary structures. Children usually don't live

in castles, this structure was a "mental engagement with a distanced world" (Kress 1997, p. 27).

Method

This design involved qualitative and quantitative data sources gathered in a naturalistic setting in one preschool classroom. A mixed methods design (Creswell 2003) was used to provide empirical and qualitative categories. Quantitative data included coding 77 block structures using a scale for symbolism. Chi-square was used to investigate whether independent observations of categorical variables differed from one another. Qualitative data collection involved observing children in the block area. Digital photographs, audio tapes, and conversations from children were collected to interpret children's symbolic representations and meaning making with blocks.

Participants

The participants for this study were 4-year-old children in a preschool nursery program, with one teacher and two teacher assistants. Of the nineteen students in the classroom, eight were males and eleven were females. Eleven students were Caucasian, one student was Middle Eastern, one was African American, two were Russian, one was Chinese, and three were Korean. Fifteen were monolingual and four participants spoke English in school and a language other than English at home, or spoke another language in combination with English at home. The mean age of the children was 4 years 9 months. All students attended a half day session, 5 days a week.

Setting

The school is a culturally diverse preschool in a suburb in a Northeastern state in the United States. The languages that are and have been most widely represented by the student population are Farsi, Hebrew, Indian languages and variations, and Spanish. The first author had provided staff development on block play and other early childhood curriculum topics prior to the research study. A positive rapport had been established with the director, faculty, and children in this school, therefore the investigation was not intrusive.

The daily curriculum in this school is generated, negotiated, and constructed by all members of the classroom. Children are encouraged to investigate, create, problem solve, and question through planned activity and play settings. There are large blocks of time for play and exploration. The teachers value play and student-to-student interactions and encourage and facilitate children's interactions and social problem solving.

The class chosen for this research offered children 45 min to 1 h of outside time for continued play and movement, and 1 h of inside time for play and activity participation. It was during the 1 h of inside free time that block play observations for this study took place. The classroom was set up with interest centers that included dramatic play, blocks, library area, writing area, art area, math area, and a science center for exploration. The children used a choice board to select their chosen center each day. Six children were allowed to play in the block center. The teachers moved freely around the room, observing all children's participation and offering guidance or additional materials to them when necessary. The teachers did not interact with children in the block center during the 18 days of observation.

Materials

A large assortment of unit blocks, a few hollow blocks, and large planks were stored on a shelf and used in the study. The block area was in the middle of the room on a large carpet and was approximately 70 square feet. This area also served as the meeting area for discussion, story book reading, and calendar activities. The block area in this study was equipped with accessories as well as literacy props. For example, doll house furniture, wooden cars and trucks, puppets, small plastic vehicles, writing tools, paper, and sign making supplies were kept in bins and stored near the block area. At the conclusion of center time, students took apart their structures and returned the unit blocks to the shelf since the building area also served as the whole class meeting area. A digital camera and digital voice tape recorder were also used to collect data.

Procedure

Data were collected for 18 consecutive days during the months of May and June. Block play sessions lasted about 45 min. Students used the choice board and voluntarily played with blocks in the block area. The students built alone, with a partner, or in groups of three or more classmates. Each student constructed the block structure and articulated the meanings to be represented after completion of their building. It was important not to "pressure children to speak of their plan in advance" (Gura 1992, p. 23) so children could manipulate and explore the blocks with enthusiasm. When students completed their constructions, they were asked to name and describe what his or her blocks showed. Students were asked: "Describe what you were building with your hands?" Students' labels and conversations were audio-taped using a digital voice tape recorder and later transcribed. Tape recording was not intrusive because teachers frequently taped recorded

conversations during whole class instruction. Photographs of block structures were taken with a digital camera at the end of the block building session. Photographs were numbered consecutively to match completed block structures throughout the study.

Coding Interviews

Student interview data were recorded on an observation form (Table 1). Labels for block constructions were coded based on the three levels of symbolic representation used in a previous block play study (Sluss 2002; Sluss and Stremmel 2004). Descriptions of their activities with blocks were transcribed and coded for symbolism and representation of meaning (Vygotsky 1978). Children were prompted to elaborate on their descriptions if initial responses did not fit a category. For example, a child would build a boat (practical real world structure) but describe the boat with aliens aboard the boat (distanced imaginary world). This structure would be coded level 3 symbolism or imaginary world because an imaginary element was added to the description.

Data Analysis

Seventy-seven block structures were used for analysis in the study. This was the total number of observations in the

Table 1 Observation form: block symbolism and appropriation of meaning

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Subject Number _____

Date _____

Rater _____

Photograph Number _____

Labels block structure:

1.

2.

3.

Child's audio-taped comments about building:

_____

18 day study. Combined quantitative and qualitative data recorded on the observation form (Table 1) were used to analyze the way students symbolize and represent meaning during and through block play. A one-way Chi-square analysis and interview statements were employed in the data analysis.

Chi-square was first used to investigate whether independent observations of categorical variables differed from one another. The frequency of observed levels of symbolism was tallied as follows: (a) students who did not label or discuss their block structure received a score of 0, (b) students who labeled a real world object, received a score of 1, and children who labeled an imaginary object, received a score of 2. This information was recorded on the observation form as the label for the structure.

Next qualitative data were analyzed to support quantitative frequency counts. All interviews were transcribed and recorded on the observation form and compared to the numbered digital photograph of completed block structure.

Inter-rater reliability for coding levels of symbolism was established with two early childhood classroom teachers. This involved the following (a) researcher and raters initially reviewed and coded levels of symbolism using the observation forms and digital photographs for 5 play episodes from previous research and (b) researcher and raters coded levels of symbolism for 20 randomly selected block structures and compared results. There was 90% agreement among raters.

Results

The results are reported using (a) Chi-square analysis and qualitative data. Frequency of second level (real world) and third level symbolism (imaginary) were calculated for 77 block play structures. There were no respondents for observations of the level 1—presymbolism; therefore level 1—presymbolism was excluded from the analysis. Previous research (Drew et al. 2008; Gura 1992; Johnson et al. 2005; Johnson 1996; Reifel and Greenfield 1982) indicates that by 4 years of age children usually are able to name and describe the structures they built, which was the case with this study. Therefore, it was not surprising that level 1—presymbolism was excluded from the analysis.

Seventy-seven block structures were used for analysis, 74% ($N = 57$) of the structures represented objects that use second level symbolism (real world) compared to 26% ($N = 20$) third level symbolism (imaginary) (Fig. 1). Frequency of second level symbolism (real world) was compared with third level symbolism (imaginary) by using Chi-square tests for categorical data. The difference in the number of real world symbolism versus imaginary world symbolism was statistically significant ($\chi^2 = 17.78$,
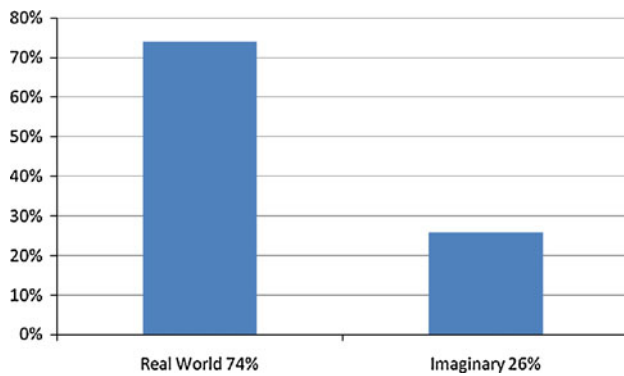
Fig. 1 Labels for block constructions

$df = 1$, $N = 77$, $p < .001$). Cramer's V was large (Cramer's $V = 1.00$; $p < .001$) indicating a strong association between real and imaginary world symbolism.

The observation form (Table 1) was used to record and analyze data collected from child reflections, audiotapes, and digital photographs. The names for second level symbolism included houses, homes for different animals, Webkinz houses, airplane, city, boat, museum, train, grocery store and park. In comparison, names for third level symbolism represented imaginary structures and included a robber's trap, alien jail, unicorn building, castle, and star machine.

The following are examples of qualitative data providing additional support for second level (real world) symbolism. The first text describes a structure of a city built by a dyadic grouping (Fig. 2).

> EB: "Well it's a city and people used to come in it sometimes and then they park their cars. The garbage truck comes and then they clean up all the roads."
> HD: "Um, people are going into the city and, and we built this, um, map so they know where they're going." The children lived near a city, parents worked in the city, and leisure time was spent visiting museums, shopping, and exploring the city. Symbolic representation is occurring but is closely aligned to reality.

The second is an analysis of one child's narration of a parking lot.

NK's reflective comments after building the structure are: "This is a top parking lot and a bottom parking lot." "Over here is an upside-down building on top of each other where they can find stuff." "And over here is a ramp if they want to go down to the boat and go back to their cars."

The following examples of observation data from student interviews and photographs illustrate the third level (imaginary world) symbolism HG and AH, two girls, built a castle. Representation of the blocks included an imaginary king and queen sleeping (Fig. 3).

Fig. 2 Photograph of second level symbolism—a city

Fig. 3 Photograph of third level symbolism—a castle

> HG: "The king and queen are sleeping and need quiet because they are really sleeping."
> AH: "We used the blocks that look like um, uh, bricks."
> HG: "You can't knock the thing down because they're scared of you if it's really loud they're scared."

Another example of third level (imaginary world) is BV's robber trap.

BV labeled his structure a robber trap. BV's reflective comments after building the structure are: "It's a robber

Fig. 4 Photograph of a WebKinz home

trap and when they get what they're looking for, they're looking for money but they don't find it." "It's an underground tunnel."

Of the 74% ($N = 57$) second level symbolism, 23% ($N = 13$) were labeled homes for use with Webkinz pets, 17% of total observations ($N = 77$). A Webkinz is a small stuffed animal with an identification number that gives children access to the Webkinz Web Site. Children go to the Webkinz Web Site, www.webkinz.com. Children can build homes, decorate rooms, and buy clothes for their pets using virtual money (Barr 2007). It is online that children's real-world stuffed animal comes to life in the virtual world. In the analysis, Webkinz houses were coded real world symbolism (Fig. 4). After two observations of Webkinz houses, the researcher questioned the children and classroom teachers about home experiences with Webkinz. Survey data indicated that 90% of the children building a Webkinz computer house with either an older sibling or parent. Thus, children were representing meaning through real world home experiences. The children created structures that had their identity decided before the building started. The idea of building a home for a Webkinz pet "was sustained throughout the observation as was the name which helped organize their thinking and action" (Gura 1992, p. 71).

Discussion and Implications

The children in this study were engaged in a play activity that involved meaning-making and understanding with unit blocks. This study examines children's naming and descriptions of block structures. The class was chosen because teachers valued play, had adequate materials, and allocated time for indoor play daily. Similar to studies conducted by researchers (Sluss 2002; Sluss and Stremmel 2004) levels of symbolism were examined, as well as a broader understanding of literacy and communication to include building blocks as a mode of learning. The study was framed within a theoretical approach that integrates social semiotics (Halliday 1978) with a multimodal theory of literacy and play (Jewitt and Kress 2003; Kress 1997). The findings indicated that children were representing block structures related to personal real life experiences in a social context.

Children in this study labeled structures using a real world symbolism, but were engaged in two worlds of imagination, the practical world and the distanced world (Kress 1997). The house, city, and park structures were real-world representations in the context of imaginative block play. Children do not step from the real world into an imaginary world, but maintain a continuous dialogue between the two (Kress 1997). This study demonstrated the varied sources of knowledge children draw upon and the creative contexts they co-construct. They draw on real world knowledge (they observed boats, houses, cities) and used language and symbols in imaginative ways to convey pretense and meaning. Thought was separated from objects as blocks were transformed in play. Cognitive activity included memory, recall of factual knowledge, communication, and the ability to represent meaning.

Teachers need to value these cognitive abilities and consider a sociocultural perspective on playing, learning and teaching. We need to reconceptualize how play and learning environments are organized and, in particular, how practitioners might provide more adult scaffolding. Gregory et al. (2003) found adult scaffolding in children's zone of proximal development assisted children to create structures of increased complexity. The Froebel Blockplay Research Group (Gura 1992) used an Interactionist Approach that involved adult-child play partnering. Teachers might ask open ended questions or pose problems during or after building sessions to support children's ability to represent blocks at an imaginary level. Teachers might ask: If you build your structure differently, how would you build it? Tell your friends the most important thing you did while building today? What blocks did you use to build your structure? Why?

In addition to teacher scaffolding, more research is needed on the contribution of various modes (e.g. blocks, dramatic play, music, art, and writing) to literacy learning and early childhood curriculum (Jewitt and Kress 2003). The Alliance for Childhood's report, *Crisis in the Kindergarten*: *Why children need to play in school* (Miller and Almon 2009) suggests three main factors working against play (including block play) in kindergarten programs in the US They include: (1) prescribed curriculum; (2) lack of time, space, and funding; and (3) contrary views with administration. It is important more time is provided for quality block play in early childhood programs so children

can represent block experiences. Equally important is to bring blocks back to classrooms by helping administrators understand the role block play has on children's learning, in all areas of the curriculum. A research agenda that includes multimodality as performance is critical to early childhood education in the face of narrowly-focused scripted prekindergarten and kindergarten programs.

This study noted popular cultural influences and the extent to which these emerged in the children's block play, resulting in 17% of the total ($N = 77$) observations labeled homes for Webkinz. This did not change the overall difference in the number of real world symbolism versus imaginary world symbolism, but is worthy of discussion. Popular culture has an important influence on children's acquisition of multimodal literacies and their ability to transform meaning making from one mode to another in play (Pahl 2003). "Children are constantly engaged in decoding the reality in the world around them, interpreting it according to their own sociocultural practices and experiences and then encoding it using whatever range of materials are available" (Marsh and Millard 2000, p. 49). Okita (2004) found 4-and-5 year-old children are able to remember facts and distinguish the differences between a toy character from one medium (a stuffed animal) to another (a computer game). The children building block structures for Webkinz were interpreting the virtual rules after entering the Webkinz World (www.webkinz.com. Children in this research were able to encode multimodally the Webkinz computer game to their play with blocks.

There is limited research on whether technology-enhanced toys have positive (Luckin et al. 2003; Yelland 2007) or harmful effects (Levin and Rosenquest 2001; Linn 2008) on children's play and creativity. Perhaps technology-enhanced toys "may be a catalyst to facilitate imaginative play." (Bergen et al. 2010, p. 2). Children's play with technology-enhanced toys will continue to grow, and children will bring these experiences to school. Teachers may need to find ways to combine technology with traditional play and developmentally appropriate technology practice (Rosen and Jaruszewicz 2009). Additionally, this could widen a gap between what is available in school and what is found out-of-school. Teachers may need to consider the ways electronic toys are used within families and determine the funds of knowledge (Cohen 2009; Gonzalez et al. 2005) children and parents develop as out-of-school experiences in order to link them effectively to classroom block play.

In conclusion, children used the block area to name and symbolically represent ideas in play. Blocks are discussed as a *mode* (Kress 1997; Jewitt and Kress 2003) for literacy learning in which children described and labeled their structures through their own personal histories and interests. The children represented meaning based on home as well as school experiences. Future work and research

would provide a better understanding of ways block play and other multimodal transformations count as literacy in early childhood settings.

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