COLLECTIVE ACTIONS OF MATERIAL AND HUMAN ACTORS IN A PRE-KINDERGARTEN BLOCK PLAY AREA

by

SUYUN CHOI

(Under the Direction of Kyunghwa Lee)

ABSTRACT

The purpose of this study is to discover collective actions of material and human actors in a pre-kindergarten block play area by attention to moments when the blocks make any change in a pre-K classroom. To reinvigorate the role of embodied learning and materials in early childhood education (ECE), this study focuses on the field's most representative play material, blocks, and explores the associations of blocks, children, teachers, materials, and discourses in an ECE classroom. As a theoretical lens, I use the perspective of new materialism, especially Bruno Latour's Actor-Network Theory (ANT) and Karen Barad's concept of intra-action. Ethnographic research methods are useful for me to investigate the associations of blocks, children, teachers, and other elements in the daily events of a preschool class. I collected data through field notes, video- and audio-recordings, interviews with a teacher from Spring 2016 to Fall 2016 in an urban elementary school. This research explores collective actions of teacher and material actors during rearranging the block area, intra-actions of blocks and children in the rearranged block area, and distinctive descriptions of the block area from the perspective of humanism, object-oriented ontology, and new materialism. Findings show that teacher's intentional and intuitive mind, and

material actors collectively worked during rearranging the block area. Children and blocks also intra-actively negotiate and perform each other in the rearranged block area. Theoretical experiment with humanism (Piaget), object-oriented ontology (Harman, Morton), and new materialism (Bennett, Barad) presented their own style of description for our insights in ECE. The findings suggest that we need more empirical studies of materiality and collective actions of children, teachers, and things in teaching and learning.

INDEX WORDS: New materialism, Block interest area, Collective action, Association, Intra-action

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CHAPTER 1

INTRODUCTION

Children learn about themselves, other people, and materials around them through their encounters and engagement with them. Drawing on Giddens (1991) and Packer (1987), Leavitt and Power (1997) insisted that "children learn about their bodies and their selves primarily in their day-to-day practical engagements with the object world and with other people" (p. 42). Children's own embodied learning has been emphasized in early childhood education (ECE). In particular, pioneers in ECE demonstrated the essential relationship between children and materials.

Froebel, the father of kindergarten, paid attention to the role of learning materials. He designed educational materials he named "gifts" for young children and applied them to the curriculum. He also suggested "occupations" as intended activities "to train children's eyes, hands and minds and to allow children to work with malleable materials" such as sewing, weaving, drawing, folding and cutting paper (Wolfe, 2002, p. 104). In *Pedagogics of Kindergarten*, Froebel (1896) illustrated the meaning of the ball (the first gift) and the knowledge gained through playing with the ball. He believed that children are able to gain ideas about objects, space, and time as an assembled perception by constantly playing with the ball. Froebel's second gift included the sphere and the cube[1] and he wrote: "the sphere can be considered as the material expression of pure movement; the cube as the material expression of

[1] A cylinder was added later in 1884.

complete rest" (p. 70). In addition, he explicated the designer's intentions of the second gift: "We have therefore attempted, in this second gift of the means of play and occupation, to indicate by movement and word this connection of life and things, the reciprocal life between child and plaything…" (p. 72). He thought of play and occupation as mutual interactions between the child (humans) and the plaything (materials), while pointing out the connection between life and things. Froebel focused on the symbolic knowledge and meaning that his gifts, as educational materials, implied.

Montessori was another ECE pioneer who recognized the significant role of learning materials and developed her own, which she called "didactic materials." Montessori (1965) explained that "for this [human] teacher we have substituted the didactic material, which contains within itself the control of errors and which makes auto-education possible to each child" (p. 371). She thought that children learn most effectively through their interactions with materials, because materials enable them to control errors and learn independently with little adult intervention. Although progressive educators critiqued some of Froebel's and Montessori's ideas because of their lack of imaginary and social play (Hill, 1908), these pioneers' emphasis on the role of educational materials in children's learning was continuously explored in progressivism.

For example, Hill was an American educator who advocated for a progressive philosophy in kindergarten education and who emphasized creative play by revising Froebel's structured programs. Hill also contributed to developing large floor blocks, which were later called the "Hill floor blocks" (Wolfe, 2002). She assumed that small Froebelian materials were inappropriate for young children's development and recommended larger and more cooperative play materials. Hill (1942) explained her floor blocks as follows:

> The new blocks are much larger, some being a yard in length, and are made of heavier wood, in order to call into use the large fundamental muscles of the child's whole body, which must be exercised as an immediate requirement of health. (p. 1966)

According to Hill, her large blocks enabled children to collaboratively construct houses, ships, railroads, and other buildings with their peers. She insisted that, through social cooperation or social projects, children can learn ways of communicating with others.

Due to these pioneers' influences, blocks have become traditional objects in ECE. However, today, blocks are at risk of disappearing from many ECE settings (Hansel, 2015). According to Nicolopoulou (2010), dramatic play, block play, and sand/water play are disappearing from many U.S. ECE classrooms where kindergarteners spend much more time in structured lessons and preparation for standardized tests than in playing with blocks or other materials. The disappearance of play is associated with the disappearance of the body (Tobin, 2004). This trend is contradictory to the traditional philosophy of ECE that stresses embodied learning through materials.

To reinvigorate the role of embodied learning and materials in ECE, this study focuses on the field's most representative play material, blocks, and explores the associations of blocks, children, teachers, and other elements (materials and discourses) in an ECE classroom. As a theoretical lens, I use the perspective of new materialism, especially Bruno Latour's (2005) and Karen Barad's (2007) ideas, which are further discussed in the subsequent chapters. Here, I briefly point out that new materialism pays equal attention to humans and non-humans in complex entanglements and associations. This theoretical framework reproaches dualism and emphasizes entanglements of a variety of actors/actants, including nonhumans (Dolphijn & Van der Tuin, 2012). Bennett (2010), a new materialist, argued: "if the environment is defined as the

substrate of human culture, materiality is a term that applies more evenly to humans and non-humans. . . . It [materiality] draws human attention. . . toward a greater appreciation of the complex entanglements of humans and nonhumans" (pp. 111-112). Drawing on Latour's Actor-Network Theory (ANT), this study makes the argument that things also have agency, like humans, and that networks/associations collectively act with different elements beyond the binary of humans and non-humans through uncertainty and multiplicity.

The purpose of this study is to discover collective actions of material and human actors in a pre-kindergarten block play area. Tracing the associations/entanglements of things, teachers, and children, I inquired about the following:

- How is the teacher's intentional and intuitive decision-making in the rearrangement of block interest area associated with the collective action of material and human actors?
- How do blocks and children intra-actively negotiate with each other in the block area?
- What patterns emerge when looking at a scene in the block area from the perspectives of humanism, object-oriented ontology and new materialism?

Literature Review

I searched for studies on block play with key words, such as "block," "play," and "preschool," "kindergarten." I limited the search to academic journals and dissertations. When I searched by using the key words "teacher perception," "educational material," and "ECE," the search yielded 895 studies from Research Starters, ERIC, and PsycINFO. Among these studies, I chose empirical studies from 1980 to 2017 and reviewed 35 studies here. After reviewing the studies, I categorized them into three themes: 1) block play for social interaction and literacy, 2)

block play for spatial skills and mathematics, and 3) gender differences in block building. I discuss studies relevant to each theme next.

Block Play for Children's Social Interaction and Literacy Development

I introduce studies of block play focusing on social interaction and literacy development and examine some research points that has been missed in these studies at the end of this section. Several studies focused on the relationship between block play and social interactions (e.g., Cohen, 2015; Patè, 2009; Rogers, 1985). For instance, Rogers (1985) observed 20 kindergarteners' block play with unit blocks and large hollow blocks. He found that more group play happened when children used the hollow blocks, while solitary and parallel play occurred more often with the unit blocks. Children also spent more time playing with the hollow blocks than the unit blocks in this study. Rogers considered block play with both unit blocks and hollow blocks helpful for the development of social skills and the practice of positive behaviors. Although he reported that children played differently with unit blocks and hollow blocks, Rogers ignored how the different features of each type of block contributed to the frequency of group, parallel, and solitary play.

Social skills were studied along with language development in block play. For example, Patè (2009) conducted action research by conducting a project on dinosaurs with children in block play. She was a preschool teacher who used English as the classroom language in Italy and tried to enhance the language ability of 3- to 5-year-old children of different native language groups, including English, Italian, Portuguese, Hebrew, Danish, Spanish, and German. Children worked in groups with unit blocks, plastic dinosaurs, and a colored poster board. They made these materials into anything they wanted by using their imagination. Patè allowed the children to save their work to share their work in progress with other friends in the classroom during the

project. Children cooperated with their groups in making a dinosaur park while sharing their block building and communicating verbally. This study showed how English language learners (ELLs) naturally interacted as a group and actively developed their language abilities through the project. Patè recognized the role of blocks and children's work and kept the blocks in the classroom. However, Patè introduced block as "a means" rather than "an end" for children's learning (p. 15). Thus, she implied a dualistic relationship of subject and object between children and blocks: blocks are useful tools that serve as children's representations of their creativity and ideas.

Cohen (2015) explored children's conversations during block play, drawing on Bakhtin's notion of double voicing. This empirical study had 19 five-year-old children as participants in a preschool classroom. She video-recorded children's block play and analyzed their utterances line by line through two episodes: one was building a house with unit blocks, and the other was building a farm with unit blocks, animal figurines, and props. Cohen found that children stylized the utterances of their parents, teachers or peers and that they used parody during block play as a form of double voicing. In addition, when children played with the animal/people figurines and cars, the block play area became a multi-voiced space with those nonhuman voices. She identified how children socially interacted with each other in different double-voiced ways. Cohen's study showed children's unique ways of communicating during block play that extended beyond their expected level of language development. Even though this study examined how children's block play became multi-voiced with unit blocks, animal/people figurines, and other props, the researcher paid attention only to children's utterances, not to the materials' actions.

Meanwhile, many studies have revealed that block play improves children's literacy (Ferrara, Hirsh-Pasek, Newcombe, Golinkoff, & Lam, 2011; Pickett, 1998; Snow, Eslami, & Park, 2015; Stroud, 1995; Wellhousen & Giles, 2005). For instance, in the first-grade classroom, Pickett (1998) conducted an experimental study on the relationship between block play and students' literacy behaviors[2] for three weeks. This study provided children with different settings each week: with only wooden blocks in the first week, with the blocks and literacy materials[3] in the second week, and with the blocks, the literacy materials, and adult's introduction to the materials and modeling of uses of print in the third week. Pickett reported that during the first week, children's conversation was rich, but he could not observe literacy behaviors during block play. He also found that the combination of the adults' guidance and the literacy materials led to the most frequent literacy behaviors during block play. Again, in this study, blocks were a passive aspect of the setting for the experiment, and the literacy materials and human actions of modeling were focused elements for increasing literacy behaviors.

In another study, researchers found that block play at home led to improvements in language acquisition (Christakis, Zimmerman, & Garrison, 2007). The researchers distributed blocks to toddlers' home. After two months later, the researchers examined the toddlers' language acquisition by using development inventories and a behavior checklist. Wellhousen and Giles (2005) also argued that block play contributes to the development of literacy in terms of visual discrimination, use of abstract symbols, and oral language production. These researchers focused on the basic visual and representation skills for reading, writing, and speaking.

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[2] Pickett (1988) defined literacy behaviors as "1) reading or looking through books or consulting other types of text, 2) writing and producing print for any purpose, 3) dictation of text" (p. 227).

[3] Literacy materials consisted of paper, writing tools, alphabet stickers, books, pictures, posters, rulers, and sign-making supplies.

Besides, Ferrara et al. (2011) conducted experimental research about children's spatial language during block play in different conditions: free play with blocks, guided play (following a manual designed by the researchers) with blocks, and play with pre-assembled blocks. The researchers had three- to four-year-old children as participants and assigned them and their parents together in the different settings. Then, the researchers compared the results in the different contexts with other activities that did not include building materials (e.g., lunch time, playing with a ball). These researchers found that parents and children in the guided condition uttered spatial words more frequently than in other conditions. This study focused on spatial words because they are considered fundamental elements in mathematics. Although the researchers argued that guided play yielded the most frequent use of spatial words, the study missed a variety of intra-actions between blocks and children during free play.

Snow et al. (2015) conducted research on literacy during block play by focusing on ELLs in a kindergarten class. The researchers added literacy materials (e.g., books, paper, and pencils) to the block center and observed how the modification influenced the ELLs' writing behaviors during block play. Snow and colleagues concluded that literacy-enriched block play led ELLs to perform better in their writing. To increase children's literacy performance during block play, the researchers insisted that teachers should create a literacy-enriched block setting which includes different types of printing (e.g., posters and labels) and literacy props (e.g., books, paper, and writing supplies).

Recent studies on block play and social interaction focused on the development of children's language and literacy. The aims of those studies were enhancing the academic skills of literacy with the literacy materials and improving spatial words for mathematics with adults' guidelines. In this context, the blocks and the block area were restricted to passive tools and play

setting for the enhancement of academic abilities. Although blocks were part of the experimental settings, the studies also stressed only the role of the literacy materials rather than the actions of the blocks.

Block Play for Children's Development of Spatial and Mathematical Skills

The trend of measuring spatial and mathematical abilities through block construction emerged in 1900's with the widespread use of blocks in preschool classrooms. Since then, block play has been linked to the development of spatial skills (Brosnan, 1998; Ginsburg, 2007; Ness & Farenga, 2007). The children's building performances were connected to spatial visualization and visual-motor coordination, and those spatial/visual abilities in block play were often linked to early mathematical skills (Caldera et al., 1999; Jirout & Newcombe, 2015; Verdine et al., 2014). In this context, most studies have shown a positive correlation between block building performance in preschool and mathematical achievement later on (Burris, 2001; Cheng & Mix, 2014; Ginsburg, 2006; Trawick-Smith et al., 2016; Wolfgang, Stannard, & Jones, 2001). I focus on the research trend of measuring mathematical abilities during block play to examine how researchers viewed the relationships among building blocks, standardized measurements, and academic skill-oriented achievement in their studies. I discuss areas that have been neglected in this research trend at the end of this section.

Guanella (1934) used blocks as tools to evaluate children's construction and spatial abilities. She had 12 children from upper-middle class families and used unit blocks for the study. Guanella reported four stages of block construction: a pre-organized or non-structural stage, a linear stage of building piles and rows, a bi-dimensional stage of building wall-like and floor-like arrangements, and a tridimensional stage of building a more complex structure. The

subsequent studies (Reifel & Greenfield, 1982; Stiles-Davis, 1988) extended the scale and the stages and argued that hierarchical construction becomes complicated with the increase of age.

Using a scale of block building performance, Wolfgang et al. (2001) also conducted a longitudinal study to compare preschoolers' "block performance" (p. 173) and their mathematical abilities from elementary to high schools. They provided 37 three- and four-year-old children with blocks, and a teacher asked the children to build with the blocks in a preschool class. The researchers evaluated children's block construction with a Play Scale, which was designed based on Piaget's classification of play: functional, constructive, dramatic, and games-with-rules play. To rate the participants' mathematics abilities, they also used a cognitive scale to measure children's abilities along with standardized achievement tests. When the participants became high school students, this study lost 10 persons of them and retained 27 participants. The researchers collected the participants' high school records: the number of mathematics courses taken and their mathematics grades. The researchers compared the participants' block performance in preschool with their high school records. Wolfgang et al. found a positive correlation between the earlier block performance and mathematics achievement in middle school and high school.

Based on the results of Wolfgang et al.'s (2001) study, Pirrone, Amata, Cerniglia, and Di Nuovo (2015) carried out an experimental study to see if LEGO block play helped develop mathematical skills. They asked five-year-old children to classify LEGO blocks according to color, shape, and size and to compare different numbers of blocks. The researchers offered children time to recall their performance through drawing and allowed them to play freely with the LEGO blocks for the rest of the time. The study concluded that block play enhanced numerical thinking and reasoning according to an assessment of numerical intelligence.

Distinguished from the previous research asking children to build block construction, Trawick-Smith et al. (2016) video-recorded children's free play with blocks. They studied correlations between children's block building and mathematics learning during free play in preschools. The researchers investigated time spent in block play, the number of structures children built, the children's level of social participation, the frequency of teacher interactions with children, the percentage of building without replica play toys (e.g., small people, animals, and vehicles), and the complexity of the children's structures. The researchers used both Tools of Early Assessment in Mathematics (TEAM) to measure children's mathematical knowledge and a block-structure-complexity scoring instrument to rate children's block construction. They reported that a high level of social participation contributed to the complexity of block building and the improvement of mathematics abilities. This study also revealed that children constructed more creative and complex buildings when they had only blocks than when replica play toys were given.

The studies on block play and mathematical abilities quantified block play according to the complexity of children's structures. When researchers focus on blocks as tools or manipulatives to develop mathematical abilities, they ignore blocks as open-ended materials in free play. In this context, the blocks have a fixed position to researchers and children. Trawick-Smith et al.(2016) conducted their study in free play setting with blocks and identified that block play with only blocks led to more creative block construction rather than with blocks and the replica toys. However, they did not notice how the different combination of materials specifically influenced block play because they did not pay attention to various material actors. In addition, the complexity of block building is not the only significant element we need to focus

in the block area: the block area have a variety of stories from different blocks, pretend-play toys, construction tools, children, a rug, and shelves in everyday play and clean-up time.

Gender Differences in Block Building

Most studies have acknowledged gender differences in block play, spatial skills, and mathematical achievement. Jones (2010) studied the relationships among gender, kindergarteners' block play at home, and their scores on block design tests and mental rotation tasks. This study reported that gender influenced spatial ability. Jirout and Newcombe (2015) also demonstrated that boys were more likely to play with blocks and exhibit better spatial skills than girls. They additionally found that high socioeconomic status (SES) led to better performance on spatial tasks. Tokarz (2008) suggested using various strategies to increase girls' participation in block play.

Meanwhile, Fabes et al. (2014) found that the gender of playmates had an effect on block play, depending on the type of peer group: solitary play, same-sex play, and other-sex play. The researchers compared the rates of each group's block play from fall to spring. Boys' solitary play was consistent throughout the year, and in the same-sex group, the rates of block play increased. In contrast, the rate of block play decreased when boys played with girls. These researchers argued that the presence of boys raised the rate of block play in the peer groups. The gender of playmates can be influential to block play, but this research only demonstrated the rates of block play among peer groups without consideration of the quality of block play and the various relationships of children's characters, features of blocks, and kinds of other materials (e.g. doll house, dolls, garage, cars, construction tools, etc.) in the block area.

Furthermore, in terms of gender discourse, distinctions were found in commercial blocks, specifically two series of Lego blocks. Black, Tomlinson, and Korobkova (2016) compared Lego

Friends for girls and Lego City for boys. They identified that the Friends usually included leisure/recreation activities, such as biking and swimming, while the City products featured jobs related to saving people in danger. According to these researchers' analysis of configurations of play, the Friends products tended to focus more on fashion, whereas the City series stressed function.

In summary, although some researchers (Cohen, 2015; Jones, 2010; Patè, 2009; Rogers, 1985; Trawick-Smith et al., 2016; Wolfgang, Stannard, & Jones, 2001) assumed that relationships existed among teachers, materials, and children, they tended to be more concerned with the teachers' roles, children's abilities/skills, and human-human interactions than with the material actors and nonhuman-human associations. This issue is due in part to the researchers' theoretical lens. Their theoretical frame was limited to constructivism (Piaget and Vygotsky), which focuses on human cognitive development and interactions rather than materiality. This perspective regards humans as actors while considering blocks and other materials as passive settings or tools for particular learning goals and implies the dualism of subject (humans) and object (materials). Most studies have focused on children and teachers as participants, while neglecting the role of materials.

The boundary between subject and object was noticeable in experimental studies (Ferrara et al., 2011; Pickett, 1998; Wolfgang et al., 2001). In these studies, researchers were also subjects who defined the role of blocks in advance and controlled different conditions. They showed results from the artificial conditions/settings (e.g., structured, semi-structured, and free block play). The unidirectional and linear frame of standardized assessment tools also leads to the idea of evaluating building blocks with quantative scales and to the gender differences in block building and mathematics ability. The previous studies delimited blocks as learning tools for

literacy, mathematics, and gender-bound materials and focused on children's abilities. These limitations stemmed in part from the limitatioins of the theoretical framework and narrow academic skill-oriented ECE contexts (e.g., standards, assessment scales, and guidelines). Therefore, I believe new research on block play needs not only to draw on a new theoretical approach, which challenges dualism, the focus on human actors, and linear views of development but to present hidden associations of hybrid actors in ECE contexts. A few researchers have recently started studying children's play in light of new materialism (Boldt & Leander, 2017; Gallacher, 2006; Hackett & Somerville, 2017; Thiel, 2015; Wohlwend, Peppler, Keune, & Thompson, 2017). However, most of their work tended to be theoretical papers, collected data in non-school contexts, and experimental studies with interventions in preschool (see more details in Chapter 3).

To overcome the limitations of the existing studies, in this dissertation study I conducted an ethnographically inspired study of blocks in a pre-K classroom during everyday's routines to explore the association of humans and nonhumans in the block area. I also drew on new materialism as a theoretical frmawork and considered blocks to be actors that could momentarily transform in their relationships with things, people, discourses, time, and space. This framework allowed me to see beyond the dualism of humans as subjects and blocks as objects. Rather using standardized assessment tools for block play, I traced the collective actions of blocks, children, a teacher, and other things in the ordinary block play area in a pre-K classroom. I believe this extended view of actors helps us appreciate associations of all bodies, including humans, nonhumans, and hybrid ones, involved in embodied teaching and learning in ECE.

Methods

An Ethnographically Inspired Study

This study aims to trace the associations among blocks, children, and other elements (humans and nonhumans) by paying attention to moments when the blocks make any change in a pre-K classroom. This study is an ethnographically inspired study. According to Preissle and Grant (2004), an ethnography is "the study of the culture of a group, usually as that culture is revealed, again, through the course of ongoing events" (p. 164). Compared to surveys or experiments, an ethnography describes participants' lived experiences and searches for patterns in everyday life (Graue & Walsh, 1998). Drawing on Latour's (2005) "collective action" (p. 74)[4], I focused on the daily experiences or actions of not only people but also blocks and things in the block area. Ethnographic interpretation also requires thick description and careful analysis of interactions in context (Geertz, 1973; Erickson, 1992). Ethnographic research methods were useful for investigating the associations among the blocks, children, teachers, and other elements in the daily events of a preschool class through thick description.

At some points, the methods used in ethnographic studies—the coding, categorizing, and themes—and the new materialistic perspectives of continuous tracing associations can conflict with each other. However, I considered the uncertainty of ANT and the flexibility of qualitative research as being complementary. According to LeCompte and Preissle (1994), the recursive analytic process in qualitative research refers to "recycling from initial question (hypothesis) formulation to data collection in answer to the initial questions, to reformulation of questions on the basis of new data, and renewed data collection" (p. 155). In the recursive process, researchers cannot pre-decide or fix any question, category, or theme during the research, and they have to

[4] Latour (2005) explained an action that "collects different types of forces woven together because they are different" (pp. 74-75).

continuously communicate with the data. Additionally, as the first source of uncertainty, Latour (2005) also insisted that no pre-fixed group exists: "social aggregates are not the object of an *ostensive* definition—like mugs and cats and chairs that can be pointed at by the index fingers—but only of a *performative* definition" (p. 34, emphasis in original). In light of new materialism, a group continuously changes through the assembled and reassembled associations of heterogeneous elements, and only the performativity of the elements remains. I employed both this uncertainty of ANT and the flexibility of ethnographic research in my research process.

In addition, I refer to Latour's (2005) methodological suggestions for tracing actors or actants. In ANT, Latour argued that we "have 'to follow the actors themselves', that is trying to catch up with their often wild innovations in order to learn from them what the collective existence has become in their hands, . . ." (p. 12). To follow the collective associations, "from now on *everything is data*" (p. 133, emphasis in original). Latour's perspective on studies is similar to the ethnographic method with regard to thick description, because the interpretation of phenomena is impossible without detailed descriptions. I tried to create thick descriptions by documenting a variety of events as well as transformative actors, focusing on the events the blocks modified. In what follows, I introduce the settings and participants in this study.

Settings and Participants

Settings. I collected data in a full-day pre-K classroom for four-year-old children in a public elementary school, Harmony Elementary School[5], which belonged to Hope School District located in an urban area of the northeastern United States from Spring 2016 to Fall 2016. According to the 2016-2017 performance report of Harmony Elementary School, the school had a diverse student population composed of 35.6% Latinos, 32.5% Whites, 19.5% African

[5] All names of places and people in this dissertation are pseudonyms.

Americans, 10% Asians, and 0.7% Pacific Islanders. ELLs made up about 15% of the students in the school, and most ELLs were native Arabic and Spanish speakers.

According to the 2014-2015 annual report of the school district[6], 70% of the students in the school district received free or reduced lunch, and there was a dilemma of flat funding from the state and rising financial obligations. A majority of schools in the district were over 80 years old and their facilities were outdated. In particular, there was a shortage of space for the pre-K, and many schools had classroom trailers for their pre-K programs. The district had 63 trailers for the pre-K children. The Harmony Elementary School I studied also had four trailers for six pre-K and two kindergarten classrooms outside of the main building. Each trailer contained two pre-K classes and two shared bathrooms in the middle of them. The classroom where I observed was also located in one of the trailers (see Figure 2-1).

The pre-K programs were based on High Scope curriculum, which stresses active learners and employs the sequence of plan, work (i.e., play in different interest areas), and recall time and both large and small group activities. The programs provided complimentary breakfast for all children and different types of lunch plan[7] depending on parent's income. In the pre-K classroom where I observed, the block area was the largest space (see Figure 1-1) and consisted

Figure 1-1. Shelves and a rug in the block area.

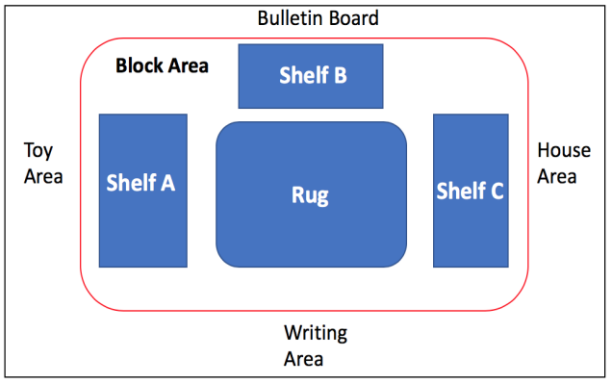


Figure 1-2. Setting of the block area in the spring and fall semester.

[6] This was the latest version about the school district I could access.
[7] The types of lunch plan were complimentary, partial, or full payment according to parent's income.

of three lower wooden shelves A, B, and C and a rug between the toy area and the house area (see Figure 1-2). The shelves had a variety of blocks and props in each semester (see Table 1-1). I made inventories of the spring and fall and traced the moments when blocks acted with other actors and made a modification in the block area. Through this tracing, I could focus on certain types of blocks (e.g., unit block, soft unit block, Mega block, and cardboard blocks) and closely follow their associations.

Table 1-1

Materials in Shelves A, B, and C at the Block Area in Spring and Fall 2016

		Blocks & Props	
		Spring 2016	Fall 2016
Shelf A	Section	Unit blocks, Soft unit blocks, Cardboard blocks, Train track	Unit blocks, Soft unit blocks, Cardboard blocks
	Top Shelf	Play design, Dices, Pattern blocks & design cards, Stones	Books (Mighty Machines, Tools, Pete the Cat-Construction & Destruction, I Read Signs)
Shelf B	Section	Transportation kits, Trains, Animals, Puzzles, Straws and Connectors, People, Measuring tape, Signs	Doll house furniture, Clothing dolls, Trains, Train track, Animals, Tools, People, Measuring tapes, Signs
	Top Shelf	Window blocks, Bugs, Books	N/A
Shelf C	Section	Tinker toys, Lego, Trucks, Roadway Blocks, Tools, Helmets	Transportation kits, community blocks, trucks, roadway blocks, Mega blocks, helmets
	Top Shelf	Community blocks, Mega blocks	N/A

Participants. The participants for this study consisted of one lead teacher (Ms. Moore), an assistant teacher (Ms. Luciana), and 15 children in Spring 2016 and another 15 children in Fall 2016. Ms. Moore had 20 years of experience in the pre-K program of the school. She had worked in the same pre-K trailer classroom and maintained a variety of materials in the same classroom for 19 years. Ms. Moore was Irish American and had blonde hair and a warm smile. She had worked in a private Montessori preschool for 10 years before transferring to this public school. During the first three years at Harmony Elementary School, Ms. Moore taught first, second, and third grade classes and participated in the beginning of the pre-K program in this public school as a teacher after attending workshops on the High-Scope curriculum. During my study, she was the grade level chairperson in the school's pre-K program, which had eight classes. She had weekly meetings with other pre-K teachers in her classroom before children arrived to discuss curriculum and grade level concerns. Ms. Moore worked with an assistant teacher, Ms. Luciana. Ms. Luciana was Latino and guided small group activities as Ms. Moore did. The assistant teacher also helped meal time preparation, large group activities, and communication between Ms. Moore and Latino parents who preferred to speak in Spanish.

As mentioned earlier, Ms. Moore's class was a multicultural group of children. In Spring 2016, four Egyptian, four Latino-American, four African American, one Indian, one Turkish, and one Taiwanese children were registered in her class. In Fall 2016, six Latino-American, four African American, two Indian, two Arabian, and one Pakistani children were enrolled. Most children were from low-income families and attended pre-K when they were three years old. Most of them in the pre-K classroom where I observed for this study were ELLs who spoke Spanish, Arabic, Hindi, and Urdu. The distribution of language group in each semester is summarized in Table 1-2.

Table 1-2

The Number of Children in Language Groups in Spring and Fall 2016

	Language Group						Total
Semester	Spanish	Arabic	Hindi	Urdu	English	Others	
Spring 2016	4	4	1	0	5	1 (Taiwanese)	15
Fall 2016	4	1	2	2	6	0	15

In addition to the teachers and children, I focused on blocks, such as soft unit blocks, unit blocks, cardboard blocks, and Mega blocks (see Table 1-3), according to the amount of time from the starting point of block play on the rug to the moment of putting blocks away of each block in my video data. Those were conspicuous blocks through the spring and fall semester, and the blocks stayed in the classroom during the both semesters even though there were modifications of the setting in the summer, which I discuss in Chapter 2.

Table 1-3

Features of Focal Blocks

	Focal Blocks			
Block Name	Soft Unit Block	Unit Block	Mega Block	Cardboard Block
				
Material	Soft foam	Hardwood	Plastic	Paper
Color	Green, red, blue	Natural wood	Pastel pink, blue, white, red	Red, blue, yellow (brick pattern)
Location	Shelf A	Shelf A	Shelf C	Shelf A
Visibility	412 minutes	222 minutes	216 minutes	205 minutes

Soft unit blocks were the most prominent blocks. They are made of lightweight foam and had the same shapes with unit blocks, including unit, double unit, quadruple unit, cylinder, arch, and so on. The unit blocks are hardwood and had a natural wood color. Mega blocks are interlocking plastic blocks and arranged with a yellow plastic container. Cardboard blocks have brick patterns with red, blue, and yellow colors. Following the guidelines of High Scope (Epstein, 2012), the blocks had their labels with pictures or names on the bottom of the shelves where they were located. Tracing those focal blocks led me to find iterative material actors in the association that appeared in the block area, and they became focal things. As the focal things in the block area, I identified a doll house, a (toy) garage, a farm house, and recyclable things (see Table 1-4).

Table 1-4

Features of Focal Things in the Block Area

	Focal Things			
Name	Doll House	Garage	Farm House	Recyclable Things
Material	Hardwood	Hardwood	Hardwood	Cardboard (paper)
Color	Natural wood	Natural wood	Natural wood	Brown
Location	On the floor	On the floor	On the shelf/floor	Shelf C

The pretend-play toys of the doll house, the garage, and the farm house had stayed in the block area from Spring 2016 to Fall 2016. Ms. Moore prepared those toys in the block area to motivate children's imaginative play. The wooden doll house had an open structure without walls. Children regardless of gender liked to play with it. The wooden garage also had no walls, and most boys liked to roll their mini-cars on it. Children played with the farm house for their imaginative story or used it for their construction. The recyclable things consisted of paper towel rolls and paper boxes and appeared in the block area in Fall 2016. To collect data of the

associations of those participants, I employed participant observation with my field notes and video cameras and briefly describe my video data. For the data collection, I also performed interviews with a lead teacher, Ms. Moore.

Data Collection

Participant observation. I carried out the participant observations to closely follow the lives of the blocks and the children during their daily events (Preissle & Grant, 2004). For the detailed observations, I used my field notes and two video cameras. According to Schaeffer (1995), video recordings offer "necessary detail on the activity of individuals in specific contexts" (p. 277). Video recording was a useful method for capturing specific moments and details about the collective actions of the blocks, children, and other materials.

The data collection was continued during the spring and fall semesters of 2016 to examine the collective actions of humans and nonhumans over the calendar year. I collected data from children's daily routines focusing on planning, work (free play), and recall time in Ms. Moore's classroom. I paid particular attention to the blocks' actions that induced any change and transformed themselves into actants, tracing the connections between blocks and other elements, including the children, teachers, settings, and programs, over 3 or 4 consecutive days a week spanning two months each semester. Any moments were captured in which the blocks induced changes in the state of events according to Latour's (2005) notion of actors, "anything that does modify a state of affairs by making a difference" (p. 71).

The first two weeks of observation each semester included whole school day observations to identify daily routines and to determine the regular events in which the blocks appeared in the classroom. After this period, I focused on observing the block area during planning time (about 10-15 minutes), work time (about 40-80 minutes), and recall time (about 15-20 minutes) in the

afternoon. In the spring, I tried to find the most frequently used blocks and props in the block area to identify the focal blocks. In addition, in the summer of 2016, I participated in rearranging the setting in the block area with Ms. Moore and video-recorded the process. Based on an initial analysis of the spring data, I closely observed the actions of the aforementioned focal blocks (see Table 1-3) and their associations with the children and teachers during the fall semester.

To follow the entanglements of heterogeneous elements, I video-recorded the block center using two cameras: one was for wide shots, and the other was available for wide and close up shots. The former captured the whole block play area, including the different actors (e.g., the blocks, props, carpet, shelves, children, and teachers). The latter was closer to the actors and recorded their sounds and collective actions more vividly. Depending on the situations, the latter camera was used for recording wide shots from a different angle from the other camera's. Those fluctuating cameras, as my eyes, led me to observe both the forests (entanglements) and the trees (actors).

Video Data Description. I visited Ms. Moore's classroom in April 2016 and video-recorded the block area for approximately 900 minutes, focusing on work time in the morning and afternoon. I also observed and video-recorded small group activities using the building materials, a story time about construction, and planning/recall time during the daily schedule (607 minutes) to trace the associations among the blocks, children, and other humans or nonhumans. In Summer 2016, I visited the classroom and helped Ms. Moore rearrange the block area. During this rearrangement, I video-recorded the process and obtained 81 minutes of video data. In Fall 2016, I focused more on the block area during the work time and observed it from September to November. I collected 1,240 minutes of video data of the block area and 480

minutes of video of the orientation about the interest areas, small group activities using blocks, a story time about building a house, and planning/recall time (see Table 1-5).

Table 1-5

Summary of the Corpus of Video Data

	Spring 2016	Summer 2016	Fall 2016
Block Area (during work time)	900 minutes	81 minutes	1240 minutes
Other Routines	607 minutes		480 minutes
Total	1507 minutes	81 minutes	1720 minutes

I used two cameras simultaneously in the block area. I considered video data from the cameras the same if they showed the same moments from different angles. The only case in which I counted the video data separately from the two cameras was when I followed, with one of the cameras, the blocks that were moved to different areas of the classroom (i.e., pipe builders from the block area to the water area), which included one camera in the block area and the other camera in other areas filming concurrently. In the next section of data analysis, I will explain how I analyzed the video data and narrowed it down to a section of data. In addition, I collected interview data from the lead teacher, Ms. Moore.

Interview. In this study, I conducted interviews with Ms. Moore to attain general information about her as a teacher, her use of blocks, and her way of obtaining blocks in a manner that "an interviewer generates talk with an interviewee or interviewees for the purposes of eliciting spoken, rather than written data to examine research problems" (Roulston, 2012, p. 10). I conducted semi-structured interviews in which I, as a researcher, prepared specific interview guides or key ideas implying various questions (Roulston, 2012). Also, I posed open-ended questions to Ms. Moore and followed emerging issues and ideas. The interviews were

conducted three times (April, August, and November) at the library in the school building, over the course of the study for 45-60 minutes per interview. All interviews were audio-recorded and transcribed. In the first and second interviews, I asked Ms. Moore questions related to her teaching experiences (e.g., teacher training background, teaching philosophy), how she selected and provided educational materials, and the reasons to modify the settings or material objects. As the third interview, I asked Ms. Moore more information about her use of the recyclable things, arrangement of the block area, early childhood environment rating scales third edition (ECERS-3, more information will be provided in chapter 2), program quality assessment (PQA) material lists, classroom and school events, and news on some children that I need to check with her. Through this process, I was also able to triangulate my data.

Data Analysis

I conducted a micro-analysis of human and nonhuman actors focusing on the moments when blocks made any change in the events in the classroom, inviting the blocks to be the actors by drawing on Latour's (2005) notion of actors. The analytical method of searching thematic categories and coding may seem to be in conflict with Latour's associations. Latour emphasized the continuous tracing of associations and complex connections rather than separation. Yet, it is hard to follow every agential moment and association within the limited timeline. I employed a more practical method for analyzing the data while tracing the complex associations.

During the analysis, I inventoried the different blocks in the block area each semester. Following each block, I identified the moments when these blocks made any changes in daily events or in the pattern of routines and what other elements (humans and nonhumans) worked with the blocks. Through this process, blocks that became actors in each event were the unit of analysis in this study. Events in this study refer to how blocks make any change in the block

area. This starts with the moment of the modification of the block area and ends with putting the blocks away. In Spring 2016, soft unit blocks, unit blocks, cardboard blocks, straws and connectors, train tracks, Lego blocks, pipe builders, pegs and number boards were units of analysis. In Fall 2016, soft unit blocks, unit blocks, cardboard blocks, Mega blocks, and recyclable things became the units of analysis. I traced those blocks and other actors entangled with the blocks to discover the associations and found recursive human, material (e.g., the doll house, garage, farm house, shelves, and rug), and nonhuman (e.g., High Scope curriculum, ECERS-3, and discourse) actors.

I followed a recursive analysis (LeCompte & Preissle, 1994) during the research process. My initial research question was to explore relationships among the blocks, humans, and other nonhumans in a preschool. When I analyzed the data in Spring 2016, I modified my question to explore the associations among the blocks, children, teachers, shelves, pretend-play toys, High Scope curriculum, ECERS-3, gender, commodified blocks and toys in the block area. In Fall 2016, I tried to collect possible elements' or actors' associations through video-recording the block area, interviewing the lead teacher, reviewing the lesson plans and school district annual reports, and taking photos of the bulletin boards and children's building work. During describing, comparing, and interpreting the associations and actors, I was able to find more active blocks, toys, children, a teacher, and discourses in space and time.

Soft unit blocks, unit blocks, and cardboard blocks were visible things and stayed in the block area throughout Spring and Fall. So, I conducted a micro-analysis on the associations of those blocks and other elements (the doll house, garage, farm house, children, teacher, and other nonhumans) and found patterns of tensions and intra-actions between the children, blocks, and other things (see Chapter 3). Tracing different blocks and their associations with other actors

through Spring and Fall led me to examine how blocks are arranged/rearranged by a teacher between the Spring and the Fall and how blocks and events in Spring influenced the teacher's rearrangement of the block area (see Chapter 2). In this process, I identified straws and connectors and their associations with small group activities, tables, the rug, shelves, and the limited space for saving children's building work in the classroom in the Spring. I also explored the collective actions of the teacher, space, pretend-play toys (the doll house, garage, farm house, dolls, and doll house furniture), discourse, and children in the past and future through the video and interview data from the Spring, Summer and Fall.

During the recursive analysis, the category of blocks was transformed according to their features (i.e., interlocking or not, material), location (Shelves A, B, or C), arrangement in the Spring or Fall, and familiar or new things to the children (e.g., the Mega blocks and recyclable things). I considered the last category of familiar or new things to children significant and wondered how new things—in this case, the recyclable things were new and uncommercial things in the block area—and children re/acted to/with each other. At the same time, I wondered how to describe these associations or moments from a new materialism perspective throughout the analysis process. I read a variety of sources about new materialism, ontology, and other early childhood studies using constructivism and new materialism. Then, I was able to more clearly identify perspective gaps among humanism, object-oriented ontology, and new materialism and to assume different descriptions according to the theoretical lens. After the micro-analysis of associations between the recyclable things and other actors, I found an interesting moment to show the associations among the recyclable things, children, Mega blocks, and unit blocks and attempted to analyze this moment through different descriptions in light of humanism, object-oriented ontology, and new materialism perspectives (see Chapter 4).

Organization of the Dissertation

This dissertation study is about the collective actions of material and human actors at a pre-K block area during the daily routines. In addition, this study is my journey to consider materials (things) as equal actors with children and teachers and to actively discover the association of hybrid actors in an ECE block area. I intend to illuminate the adventures of blocks and identify dynamic associations of things, teachers, and children through the process. I organized the dissertation in the following way:

Chapter 1 presented a review of the research literature on block play and the methods of this dissertation study, including settings, participants, data collection and analysis.

Chapter 2 describes how a teacher's intentional and intuitive decision making in the arrangement and rearrangement of block play area reveals the collective actions of material and human actors. This chapter examines how hybrid actors collectively worked since the spring semester and affected the reorganization of blocks, props, and space beyond teacher's intentionality.

Chapter 3 explores the dynamic association of blocks and children in the rearranged block area by drawing on Barad's (2007) notion of intra-action and intra-active becoming. This chapter identifies how soft unit blocks and children continuously had tensions and negotiated each other in the block area. Doing so, the chapter challenges the developmentalism stressing only human agencies and abilities.

Chapter 4 examines how the same moment of block play can be seen differently when using the lenses of humanism (Jean Piaget), object-oriented ontology (Graham Harman, Timothy Morton), and new materialism (Jane Bennett, Karen Barad). This chapter explores an alternative

to anthropocentric research on blocks through the different descriptions on the same moment by drawing on different theoretical lenses.

Chapter 5 is the epilogue of this dissertation. I summarize the study and explore implications of this study. I conclude the dissertation with my final thoughts and discussions.

CHAPTER 2

MATERIAL ACTORS AND INTENTIONAL AND INTUITIVE MIND IN ARRANGING AND REARRANGING THE BLOCK AREA

Harmony Elementary School had eight trailer classrooms outside of the main building, and they occupied part of the outdoor play space (see Figure 2-1). According to a report on a school construction program of the school district in 2015, the trailer classrooms took away

Figure 2-1. Trailer classrooms, Ms. Moore and children's play in Harmony Elementary School.

from the outdoor space and posed a security risk. The report explained that the school district needed more local funding for trailer renovation and replacement. Ms. Moore had worked in the same trailer classroom as a pre-K teacher for 19 years while waiting for the construction of an early childhood center, which had been suspended by 2016. She felt that her class was disconnected from the main building and hoped to have, at some point, a classroom inside a building. To reach the classroom in April 2016, I had to go through the main building for a

visitor's security check. Students in the main building were taking a college and career readiness test. When I headed outside to the trailer pre-K classroom, I momentary felt free from the testing atmosphere, as the pre-K students were participating in outdoor activities around the trailer classrooms. This was my first impression of Ms. Moore's classroom: the calm before the storm. Ms. Moore was preparing these pre-kindergarteners for the conduct that would be expected of them in academic oriented environments.

The trailer was sectioned into Ms. Moore's classroom, another pre-K classroom and two shared restrooms (one for the boys and one for the girls). Outside the main entrance door, the trailer had a small deck, stairs, and a few windows (see the left side of Figure 2-2). The other walls were solid, and one had a back door that was exclusively used by the teachers. Ms. Moore's classroom contained a variety of educational materials and furniture (e.g., tables, chairs, and shelves) and was divided into different interest areas, including art, books, toys, blocks, household, writing, sand, and water. The block area was in the middle of the classroom and took up the largest space in this classroom. The block area was located opposite to the main door and between the household area (dramatic play) and the toy area (manipulative work) as can be seen on the right side of Figure 2-2.

Figure 2-2. Ms. Moore's trailer classroom (left) and the block interest area in the classroom (right)

The block area had a lower set of shelves containing three shelves, a doll house, a garage,

a farm house, and a large colorful carpet. Because the block area was a larger open space, it also served multi-purposes (see Figures 2-3, 2-4, and 2-5), for morning meetings, games, physical activities, dismissal, and other large group activities, including story time, dramatic play, games or dismissal. As can be seen in Figures 2-6 and 2-7, the block area had three lower storage units with shelves: two movable shelves (Shelves A and C) mounted on casters and one stable shelf (Shelf B).

Figure 2-3. Morning meeting in the block area

Figure 2-4. Games in the block area

Figure 2-5. Dismissal in the block area

Figure 2-6. Shelves A and B in the block area

Figure 2-7. Shelves B and C in the block area

On these set of shelves, different types of blocks (e.g., unit blocks, soft unit blocks, cardboard blocks, mega blocks, and Lego blocks), props (e.g., dolls, animals, trucks, and airplanes), a doll house, a super garage, hats (e.g., firefighter and police officer hats), and construction tools were housed.

Ms. Moore made modifications in the block area between Spring 2016 and Fall 2016. As a researcher and a helper in her classroom, I worked on rearranging and preparing the block area

with Ms. Moore one day during the summer of 2016. During this process, a hybrid association among the teacher's intentional and intuitive decision-making and the material actors was apparent. Particularly, Ms. Moore's intuitive decision-making and actions during re/arranging the block area was insightful for me. The verbal and non-verbal performances of the re/arrangement showed how the teacher's rationality, intuitive mind, actions, and the material actors are associated in the block area.

In teacher education, the intuitive mind is contrary to the disciplinary conceptions provided by teacher-education curriculum (Torff, 1999). The intuitive conceptions can be also explained with "tacit knowledge" that "cannot be put into words" (Polanyi, 1966, p. 4). Polanyi insisted that knowledge that "*we can know more than we can tell*" exists (p. 4, emphasis in original). Researchers in teaching and teacher education has focused on teacher's rationality of intentions and reflections (Atay, 2008; Hatton & Smith, 1995; Posner, 2000; Rhine, 1998) and also pointed out the cognitive limitations of decision-making (Feldon; 2007; Hoffman-Kipp, Artiles, & Lopez-Torres, 2003; Lee & Porter, 1990). The emphasis on teacher's rationality emerged from the assumption of that "a teacher's behavior is guided by his thoughts, judgements, and decisions" (Shavelson & Stern, 1981, p. 457). However, if the assumption is not true, we need to rethink the process of how teachers carry out their actions in the relationship of their rationality, intuitive mind or tacit knowledge, and environments. In addition, preparing and arranging the educational environment is a fundamental element in ECE (Curtis & Carter, 2014), because educators assume that the setup and materials in the environment influence children's activities and learning. With this understanding, teachers' roles and intentional teaching are stressed in ECE, but the role of materials is often not emphasized (Gallacher, 2006). This chapter

sheds light on the collective actions of teacher's intentions, intuitive mind, and material actors involved in the arrangement and rearrangement of the block area.

Researchers who have analyzed the organization of physical environments in ECE classrooms assert how the arrangement of physical environments influences or controls children's behaviors toward teaching goals and instructional success. For example, Field (1980) provided an open space and partitioned smaller spaces and observed how this spatial arrangement influenced children's social behaviors. He found that divided smaller spaces promoted more peer interactions and associative/cooperative play than open spaces. Additionally, Moore (1986) compared children's behaviors in carefully arranged rooms and in randomly organized rooms. The researcher showed that the carefully arranged rooms led to more creative work and social interactions.

In terms of block areas specifically, Pellegrini (1983) conducted an experimental study for preschoolers to determine the relationship between learning centers and children's functional use of language. He observed children's free play through sampling scheduling and coded individual utterances. Pellegrini reported that house and block centers facilitated the most individual and multifunctional utterances. In another study, Kinsman and Berk (1979) observed kindergarteners' play and social interactions in the block and household areas. In the process of the study, they removed the divider between the house and the block areas and observed the children's play. After this modification, they reported decreased same-sex interactions and increased mixed-sex interactions. The results from these studies provided guidelines for teachers when setting up their classrooms. The studies assumed that the physical environment and the children's behaviors were factors that humans as subjects can modify according to their intentions and plans. However, although the researchers prepared these experimental settings,

they did not specifically describe the process of arranging or rearranging the physical environment, because their focus was on children's behaviors at play.

Many studies argued that quality ECE is related to advanced teacher qualifications and that quality ECE environments facilitate children's school readiness and development (Early et al., 2007; Manning, Garvis, Fleming, & Wong, 2017; Mashburn et al., 2008; Sabol, Hong, Pianta, & Burchinal, 2013; Sylva, 2010). In this sense, teachers should be mediators between the environment and children by providing materials according to the children's needs (Hart & Rogers-Warren, 1978). Researchers have argued that children are influenced by "the school's environments and the material, affective situations that teachers construct for them" (Kraftl, 2006, p. 498). However, we have little knowledge about the process of teachers' constructing environments and organizing materials or others' taking part in this process. Few empirical studies have analyzed how teachers actually arrange and modify materials and space in their classrooms. To explore the collective actions of human and nonhuman actors in the arrangement of the block area, this chapter employs new materialist perspectives, specifically Latour's (2005) concept of actors in ANT. Drawing on ANT, this study traces the heterogeneous elements of re/arranging the block area to overcome the dualistic perspective of that environment, to envision the materials housed there as objects that cannot be modified according to our intentions and to reveal the dynamic actions of hybrid actors during this process.

Latour (2005) developed ANT, which acknowledges nonhumans exercising agency in the real world and the collective existence of hybrid actors. Latour critiqued the limited meaning of "social" and contended that the types of actors in a network are much more comprehensive. He thus redefined "social" for ANT as "the name of a type of momentary association which is characterized by the way it gathers into new shapes" (p. 65). In order to make the association

recognizable, paying attention to the collective actions of humans and nonhumans is essential. Latour attributed the tendency to ignore nonhumans to the definitions of "social" and "actors" used by sociologists. He explained that "if action is limited a priori to what 'intentional,' 'meaningful' humans do, it is hard to see how a hammer, a basket, a door closer, a cat, a rug, a mug, a list, or a tag could act" (p. 71). The extended definition of an actor in ANT is an important criterion for distinguishing ANT from a study on social networks. By the 1980s, studies on social networks were pervasive in the social and behavioral sciences. Analyses of these social networks mostly focused on the social relations of individual human actors (Latour, 1996). However, ANT "does not limit itself to human individual actors but extends the word actor – or actant - to non-human, non-individual entities" (Latour, 1996, p. 369). A new definition of actors was suggested by Latour (2005). This is a significant point for supporting methodology using ANT in terms of who and what should be acknowledged as actors during the observation and analysis of this study, which needs to attend to anything that modifies or makes a difference in this pre-K classroom.

To investigate the collective actions of material and human actors in the reorganization of the block center, this chapter traces possible actors that influenced the re/arrangement in video data from Spring and Summer 2016 and the teacher interview data collected in Fall 2016. I video-recorded children's block play/activities in the Spring and the process of modifying the block area in the Summer. I analyzed the data focusing on multiple actors, including human and nonhuman actors, drawing on Latour's concept of actors that modify any event or condition in a classroom. Pre-K programs in Ms. Moore's school were based on High Scope guidelines, an early childhood education curriculum that encourages active learning influenced by constructivism, and the ECERS-3 (Early Childhood Environment Rating Scale, Third Edition), a

preschool program assessment tool. In what follows, I briefly introduce how the ECE contexts stress teachers' intentionality in teaching and learning. Then, to reveal the collective actions of material and human actors in the reorganization of the block area, I illustrate three events, including clearing the tops of the shelving, reorganizing the soft/unit blocks, and rearranging the doll house, garage, and farm house, and analyze the differences these modifications had on the actors in this space, which involved an entanglement of actions among teachers, materials, and children. I focused on the collective actions of the teacher's intentional and intuitive mind and the material actors during the rearrangement of the block interest area with this question in mind:

- How is the teacher's intentional and intuitive decision-making in the rearrangement of block interest area associated with the collective action of material and human actors?

Intentional Teachers in Early Childhood Contexts

High Scope Guidelines

The intentional teacher is emphasized in the High Scope curriculum model, which was adopted for the pre-K programs at Harmony Elementary School. Ms. Moore introduced the *High Scope Preschool Curriculum* (Epstein & Hohmann, 2012) to me as her guidelines for teaching and highlighted those parts indicated by italics in her guide book:

> [The] High Scope Curriculum is still organized around *both child-guided* or *child-initiated* experiences and *teacher guided* or *teacher-initiated experiences*. However, the revised curriculum is now more explicit—*early childhood teachers must be intentional in everything they do. . . . In either situation* [teacher-guided and child-guided learning], *teachers are intentional*—both children and teachers are actively engaged mentally and physically. (p. xii, emphasis added)

As presented above, the High Scope curriculum model stresses that teachers should be intentional in any condition of learning: teacher- or child-guided. In addition, High Scope emphasizes active learning by considering children and teachers primary agents for such learning, as reflected in the content of the curriculum guidelines, such as "what children do in the active learning setting," "what adults do in the active learning setting," and "how adults and children interact in the active learning setting" (p. vii). High Scope stresses the interaction between teachers and children, and materials as supporting tools for this relationship are considered under the control of the children and teachers.

In particular, High Scope emphasizes that the teachers provide children with materials for different interest areas in ways that are accessible and manageable to the children: "The most important idea governing how materials are stored is to make it possible for children to find and return the materials they need on their own" (Epstein & Hohmann, 2012, p. 183). Following these guidelines, Ms. Moore tried to create a classroom setup which helped children easily put materials away when preparing for the new school year, as articulated in the following interview transcripts:

Interview transcripts: 09/23/16

Suyun: What did you consider when you rearranged the setting in the block area?

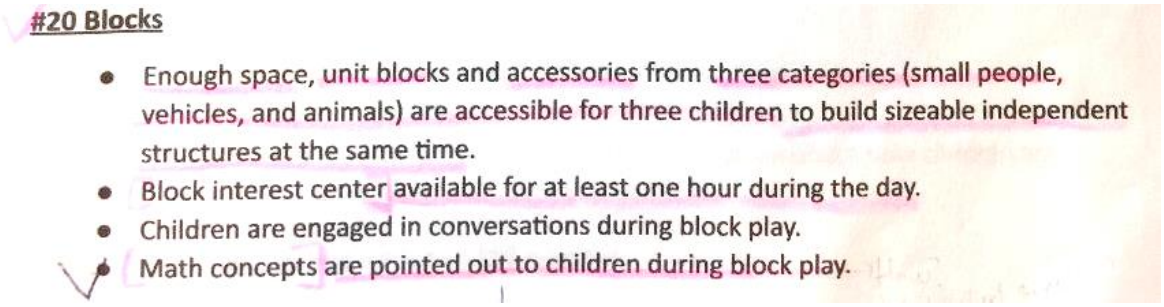
Ms. Moore: Simple things go together. A good sense of order with pictures on the boxes and on the shelves, so that they [the children] can easily put them away. Sometimes, color coding, for example, for the doll house furniture and people. All the boxes are blue. So, it makes it easy for them. They can put the pieces in whatever box they choose, but they know the blue boxes are for the

> doll house things. I tried to make it as simple as possible for children's clean-up.

In this instance, Ms. Moore adopted parts of the curriculum guidelines (e.g., labeling that included pictures, color coding, and container patterns) to provide children with materials in a way that could assist, generally, with classroom management and with children's clean-up.

The ECERS

The third edition of the ECERS (early childhood environment rating scales) was used as an evaluation instrument by the early childhood department in the school district. Thelma Harms and Richard Clifford developed the original ECERS in 1980 to assess the quality of classroom in ECE, and its significant characters are based on "comprehensive or global definition of quality and the reliance on observation" (Harms, Clifford, & Cryer, 2015, p. 1). According to Ms. Moore, an instructional coach from the school district visited the classroom every semester and observed the classroom setting and teacher interactions with students based on the ECERS-3. The mentor teacher provided helpful hints from the ECERS-3, which is a summary of the original scale. Ms. Moore carefully read the standards about the block area and checked each indicator one by one (see Figure 2-8).


#20 Blocks

- Enough space, unit blocks and accessories from three categories (small people, vehicles, and animals) are accessible for three children to build sizeable independent structures at the same time.
- Block interest center available for at least one hour during the day.
- Children are engaged in conversations during block play.
- Math concepts are pointed out to children during block play.

Figure 2-8. Standards about "Blocks" from "ECERS-3 Powerful Interactions Helpful Hints 2015-2016."

The teacher's roles in providing enough space, unit blocks, and accessories and in interacting with the children to encourage their mathematics and language learning are evident here, but the role of materials is subsidiary to the teacher's intentional planning. All ECE teachers in Hope School District are expected to utilize this scale. This universal assessment tool for preschool programs might be useful for the standardization of classrooms, but this human-centered scale fails to consider the vibrant materiality in classrooms. Ms. Moore and I reviewed the summary of the ECERS-3 together during the arrangement of the block area in Summer 2016.

Vignette 2-1. Video transcripts: 08/09/16

Ms. Moore: The top shelf will be open, and they [the children] can display their building. Let's see ECERS-3, what they suggest.

Ms. Moore & Suyun: (reading the part of the block area in the ECERS-3 together)

Ms. Moore: They [the ECERS-3] set animals; people we have. We also have dramatic play people complimented with road. Measuring tapes, rulers, and road signs, trains. What else we can do? Number twenty. Enough space, vehicles, written language. . . I ordered blocks and blueprints.

Reorganizing the block setting, Ms. Moore referred to the information about block play in the guidelines several times and attempted to match each indicator with the condition of her block play area by checking the types of accessories her class had and by ordering new materials (e.g., blocks and blueprints) for math concepts and written language in the block area. Although she continuously reminded herself of the guidelines, the actual rearrangement of the block area occurred according to her previous experiences as well as her intuitive responses to the material actors. In what follows, I describe the association of Ms. Moore's intentional and intuitive mind and the material actors in the arrangement of the block area.

Assemblages of Material Actors and Intentional and Intuitive Mind

Clearing the Tops of the Shelves

Parts of Ms. Moore's rearrangement plans emerged from her previous experiences in Spring 2016 in the block area, including clearing off the tops of the sets of shelves and keeping the train track in the block area. The most notable change was clearing off the tops of the shelves. Ms. Moore thought that it would be possible to display children's building projects on the tops of the shelves, if they were empty (see Vignette 2-1 above). She removed the materials housed on the tops of the shelving, Shelves A, B, and C (see Figure 2-9). However, this decision

Shelf	Spring 2016	Summer 2016 (cleared tops of shelving)
A		
B		
C		

Figure 2-9. Tops of the shelving in Spring and Summer 2016.

was not just based on her own observations but from events that happened in Spring 2016. The action of clearing the tops of the shelves led me to pay attention to children's building projects with straws and connectors (S/C) in April 2016 which influenced this decision.

Figure 2-10. The small group activity of building three-dimensional shapes with S/Cs.

In the spring, the tops of the shelving were full of various things in the block area, and children did not have enough space to preserve their building projects in the classroom. Children usually cleaned up their constructions after play time in the block area. The last week of April 2016, Ms. Moore and Ms. Luciana (a paraprofessional teacher) led a small group activity that included building three-dimensional shapes with S/C (see Figure 2-10), which children did not use in the block area as often. According to Ms. Moore's lesson plans on April 25, 2016, she planned this small group activity to meet a mathematical standard: "Manipulate, compare, and discuss the

attributes of three-dimensional shapes (mathematics 4.4.3b)" (NJDoE, 2014, p. 77), and she chose S/C for the activity. In April, I did not have the opportunity to observe this activity using the straws and connectors, housed in the block area, until this small group activity was complete. After the activity, Ms. Moore's children did not clean up their constructions and kept them in nooks on the top shelves or on the tables in the classroom (see Figure 2-11). The block area did not accommodate children's abilities to keep their S/C work on display, because the teacher and students used the block area for multiple purposes, including morning meetings, reading books, discussions, naptime, and dismissal. The only space where they could keep their work was on the top shelves and on the tables. However, the tops of the three shelving units in the block area were full of different building materials and props.

Figure 2-11. Preserved S/C three-dimensional activities in the classroom (April 25, 2016)

At the beginning of my observation in the Spring, the S/Cs were kept in a very compact area, but when pulled out, they suddenly spread, occupying two tables in the classroom, while the children created 3-dimensional S/C projects on those tables during a small group activity. After this activity, their work was housed all over the classroom. This morning activity influenced block play during the afternoon work time. The presence of the S/C exhibit led the children to share their work and to pay more attention to the building materials. Displaying the S/C projects encouraged the children to continue their constructions with S/Cs during the afternoon work time. The S/Cs worked as material actors in the children's choice of building materials during block play and also acted in Ms. Moore's rearrangement plans of emptying the tops of the shelving to use the space for displaying children's building projects.

Before the 3-dimensional project was introduced, the S/Cs had not been active actors and, instead, were latent actors during block play or other activity times. According to Latour (2005), an intermediary refers to "what transports meaning or force without transformation: defining its inputs is enough to define its outputs" (p. 39). He identified "social" as collective existence or full-blown mediators, which is different from the intermediary: "all of a sudden, completely silent intermediaries become full-blown mediators" (p. 81). In Latour's ANT, the concept of the mediator is significant, because it implies the features of both actors and a network (an assemblage or association):

> Mediators, on the other hand, cannot be counted as just one; they might count for one, for nothing, for several, or for infinity. Their input is never a good predictor of their output; their specificity has to be taken into account every time. Mediators transform, translate, distort, and modify the meaning or the elements they are supposed to carry. (p. 39)

Intermediaries mean the medium or media that produce the predictable inputs and outputs, but mediators refer to actors or the associations between the actors that change status or events in any direction we cannot expect. The S/Cs existed in an intermediary status that were considered as (inactive) building materials in the block area without transformation before the project (see Figure 2-12) but, later, became mediators that were modified into active building materials, changed the children's preferred choice of building materials during the afternoon work time and associated with the teacher's rearrangement of the whole block area over the Summer to accommodate their expansion (see Figure 2-13). I illustrate how the S/Cs as mediators transformed the status of block play during work time and the tops of the shelving with Figures 2-14 and 2-15.

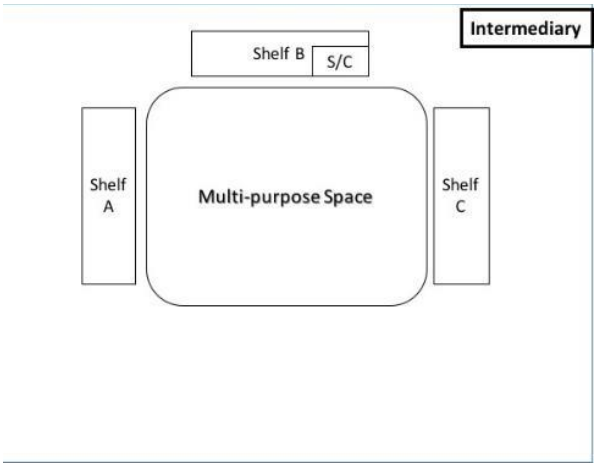


Figure 2-12. Inactive S/Cs as intermediaries in the block area (Spring 2016)

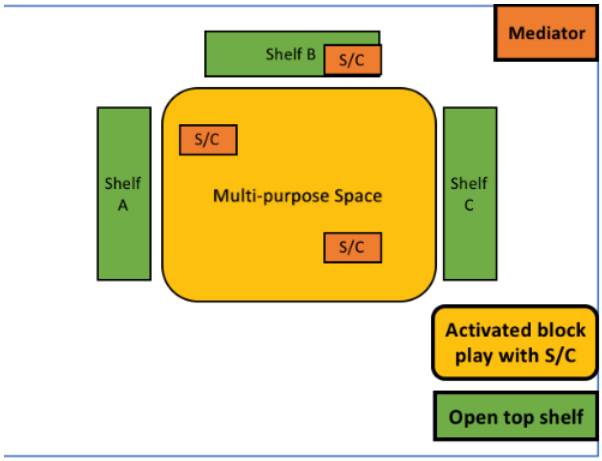


Figure 2-13. Activated block play with S/C (Spring 2016) and cleared tops of the shelving (Summer 2016)

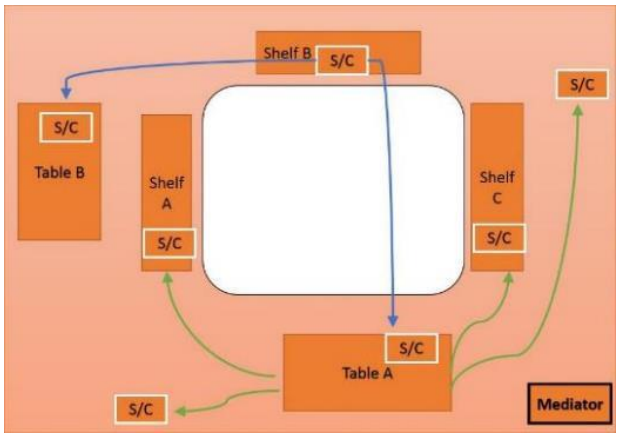


Figure 2-14. Three-dimensional projects with S/Cs (blue arrow lines) and the display of the projects (green arrow lines).

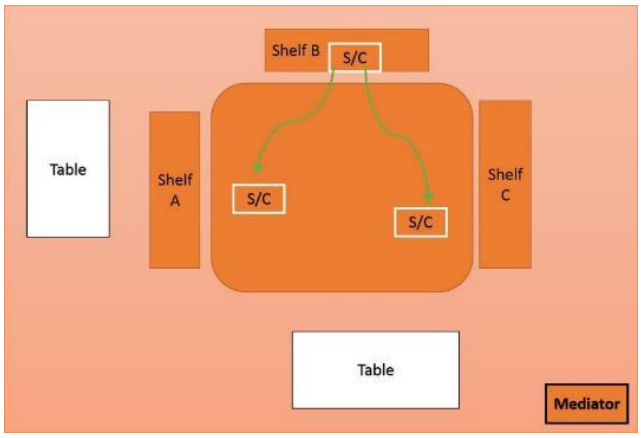


Figure 2-15. Active S/Cs in the block area during the afternoon work time (green arrow lines).

During the three-dimensional project, Tables A and B and the S/Cs allowed children to build three-dimensional shapes individually (see the blue arrow lines of Figure 2-14). The tables became work spaces for the mathematics project. The collective action of the tables, S/Cs, and children dispersed the assembled S/Cs to the tops of the sets of shelving and other tables throughout the block area (see the green arrow lines of Figure 2-14). The three-dimensional projects and the visibility of the shared S/C constructions in the morning modified the status of block play during the afternoon work time: the children actively played with S/Cs to build their own castles on the rug (see Figure 2-15). The S/Cs were able to escape from the shelf during the afternoon work time (see the green arrow lines of Figure 2-15). The project aimed to promote the mathematical concepts of three-dimensional objects using S/Cs. The S/Cs, however, did not remain as mathematical tools, and the meaning of these tools for mathematics transformed to active building materials for free play in association with the tables, shelves, rugs, and children. Latour (2005) contended: "Intentionality, if used to carry meaning as an intermediary, will do less than the more abstract and global 'state of productive forces,' provided that this agency is treated as a mediator" (p. 58). If events in the classroom are composed only by a teacher's intentionality, it is possible to define its outputs as mathematical materials. The collective actions

of Ms. Moore's three-dimensional project lesson plans and the material actors, such as the S/Cs, Tables A and B, shelves, and rug, however, produced the unexpected exhibition of the S/Cs all over the classroom and activating children's block play with S/Cs.

Reorganizing the Soft/Unit Blocks

According to Ms. Moore's observations, the unit and soft unit blocks had so overlapped each other on a single shelf that children could not easily put the blocks away. She decided to move some unit and soft unit blocks to another shelf space, and as a result, unit blocks and soft unit blocks occupied two separate spaces on Shelf A. We reorganized the unit and soft unit blocks, giving them more space, to increase their visibility to children, shape by shape. Ms. Moore recognized that too many unit blocks in the compact space made it difficult for children to put them away. Each block had its own features—its own shape, color, size, and composition. These distinctive characteristics worked as actors in their association with other things and people. The features of the unit blocks, the soft unit blocks, and the wooden shelf worked together as actors in Ms. Moore's rearrangement of the blocks.

The unit blocks and soft unit blocks are the same shape and size; the former is made of solid wood and the latter of soft-form polyurethane. Unit blocks were designed by Caroline Pratt, a progressive educational reformer, in the early 1900s (Hauser, 2006). Since then, they have been considered essential blocks in ECE, and the ECERS-3 clearly specifies the name "unit blocks" in one of the quality environment indicators. As presented in Figure 2-16, unit blocks consist of

1. Half Unit
2. **Unit**
3. **Double Unit**
4. Roof Board
5. **Quadruple Unit**
6. Quarter Pillar
7. Half Pillar
8. Pillar
9. Column
10. Large Column
11. Unit Triangle
12. Small Triangle
13. Ramp

Figure 2-16. Block chart ("Hardwood unit building block set", 2018).

units (1.375 inches/2.75/5.5), half units, double units, and quadruple units, having the same proportion of 1:2:4 (Hauser, 2006). Compared to other interlocking blocks (e.g., Lego or Waffle blocks), unit blocks are wooden pieces that do not affix to one another. The unit blocks' shape and size usually lead teachers to display the blocks by these features directly on the shelf without containers. In the case of other small building blocks, teachers put them all together in containers regardless of shape and size.

As a result, the different shapes and sizes of unit blocks work as significant elements for teachers and children. While increasing the visibility of the unit blocks, teachers arrange the blocks in a way that children can choose different pieces as needed and easily put them away. To this end, teachers need to consider the shapes and sizes of the blocks as well as the space needed for storage. When Ms. Moore decided to rearrange the unit blocks and soft unit blocks, she identified the relationship between the features of the soft/unit blocks and the space on the shelf and then removed some cardboard blocks and the train track set from Shelf A to have more space for the soft/unit blocks.

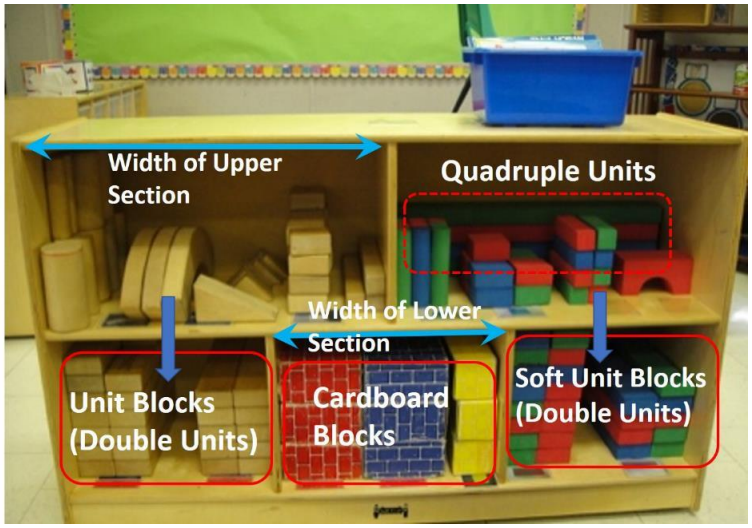


Figure 2-17. The features of the soft/unit blocks and Shelf A (horizontal blue arrows refer to the width of the cubbies, and vertical blue arrows refer to blocks' moving from upper to lower raw).

As presented in Figure 2-17, Ms. Moore and I rearranged the unit and soft unit blocks by considering their features and the size of the shelves' cubby spaces. She thought that the double unit blocks were the right size to easily fit on the lower row and

moved them there (see the blue arrow on the left of Figure 2-17). She thought that the triangle, prisms, and pillars of the unit blocks needed to be placed on an upper shelf to help children easily see, pick out, and manipulate those blocks for building. The upper row of Shelf A was divided into two sections or cubbies and the lower row into three sections or cubbies. The cubbies on the upper shelf had more room than those on the lower shelf. Other unit blocks, except for the double unit blocks, were reorganized in the same upper row cubby that offered more space. The quadruple soft unit blocks needed to be moved down with the double soft unit blocks to avoid crowding the upper row.

However, the quadruple unit blocks would not fit in a lower cubby. Their length necessitated them staying in the upper cubby. Ms. Moore and I put them behind the cylinders, units, and other small pieces, although we predicted the inconvenience of the arrangement to access them and return them to their place according to the guidelines. The size of the quadruple soft unit blocks and the size of the cubbies became actors that required the rearrangement of the upper row of shelving. Ms. Moore responded to the actors due to the size of the blocks and the cubbies.

In addition, I think the concept of affordance can offer us more insights into the actions and roles of material attributes. Affordances refer to material invitatory properties leading to humans' actions (Gibson, 1979). Gibson (1979) explained how humans process visual information or material properties and respond to them with their bodies. For example, while a chair affords us the possibility of sitting down or resting by placing our hips and thighs on the horizontal seat, for a cat, a chair may afford it the possibility of jumping onto the seat to position itself at a higher elevation. Gibson considered affordances stable properties of things:

> The affordance of something does not change as the need of the observer changes. The observer may or may not perceive or attend to the affordance, according to his needs, but the affordance, being invariant, is always there to be perceived. An affordance is not bestowed on an object by the need of an observer and his act of perceiving it. The object offers what it does because it is what it is. (pp. 138-139)

Gibson insisted that the affordance of a thing does not alter according to a perceiver's needs, because the physical properties of a thing are its own uniqueness. Gibson paid attention to how a material's own characteristics invite a perceiver. However, he did not consider objects to be mediators in the association between humans and nonhumans. Despite the limitations to his notion of affordance, his focus on the properties of a thing is helpful for momentarily exploring how different affordances of blocks or other materials worked as actors in Ms. Moore's rearrangement of soft/unit blocks.

The affordances of soft/unit blocks (e.g., different shapes and sizes) led to the individual settings/labeling and required more space on the shelf. The affordances of both quadruple soft unit blocks and Shelf A (i.e., the different sizes of the cubbies) did not permit Ms. Moore (as an observer) to follow her intention of increasing the visibility of the quadruple unit blocks. Ms. Moore rearranged the soft/unit blocks by communicating with the material actors. Although she was continuously reading the ECERS-3 guidelines about the block area, the affordances of the soft/unit blocks and Shelf A suggested to her specific actions, and she responded to them. The rearrangement of the soft/unit blocks was related to the space on the shelf, which was dictated by the association of the features of the blocks and the shelf. If this case was associated with the space between the blocks and the shelf, in the next section, other material actors dictated the reorganization of the space among the pretend-play materials (e.g., the doll/farm houses, the doll

house accessories, and the garage) and furniture in the block area.

Reorganizing the Doll House, Garage, and Farm House

After the rearrangement of the soft/unit blocks, Ms. Moore and I reviewed the section in the ECERS-3 guidelines about blocks to see what we might have missed. Ms. Moore confirmed block indicators one by one on the scale. She kept checking the contents, holding the document while rearranging the setting. Ms. Moore thought that children could build a zoo or habitat with animals in the block play area and wanted to keep the doll house furniture close by. The doll house props (e.g., furniture, Sofia the First figures, and a rag doll family) were on the doll house floor. Everything except the figures were moved onto Shelf B and placed in blue boxes in the block area. Ms. Moore wanted to keep the doll house near its accessories. Thus, she and I relocated the doll house next to Shelf B. As a result, the doll house was repositioned, placed where the garage had been, and the garage took the place the farm house formerly occupied (see Figure 2-17, 2-18). This led Ms. Moore to face the challenge of finding a new location for the farm house, because the farm house did not fit in the original spot of the doll house. I introduce the moment when Ms. Moore considered how to rearrange the farm house in Summer in the following vignette.

Vignette 2-2. Video transcripts: 08/09/16

Ms. Moore stands between a writing desk and a shelf A to see the whole space of the block area.

Ms. Moore: (pointing the spot behind a writing desk) It [the farm house] cannot really sit here because…hmm…(looking around the farm house on the floor outside of the rug on the floor) I want them [the children] to see it [the farm house]. (pointing the doll house with her index finger) That [the doll house] has to

> stay there because I need a plug for the electricity and for the music. Hmm… (looking around the shelves on her left and right and the rug between them) I think we are going to have to maybe put that up. (stepping on the rug and moving her hand from the inside and outside of her) The lower shelves allow you to see children in the whole areas. We can't put it up there [on the side of the bulletin board in the block area] (moving her right hand from the left to the right like sweeping), because we have daily routine cards there. We have to go . . . (looking around the space and lifting the farm house). They [the children] need the farm [house] for the fall. (standing on the rug in the middle of the rug with holding the farm house and slowly turning her body, then encountering the back of the writing desk) Can we go on the floor? Let's see, why not? (putting the farm house behind the writing desk on the rug) They will see it so well. It makes like a little home for them. They can see everything in their perimeter. I think they could get used to this. They still have walking space here [between Shelf A and the writing desk]. If I pull this [the writing desk] back, it [the farm house] is on the bare floor (moving the writing desk back together). That makes it more homey. For Samuel, the child has a seeing issue. We need more open space to walk around.

Ms. Moore was talking with me in the space, but she was also actually communicating with the space. The communication with the space took place in the association among the lower shelves, the writing desk, the farm house, the rug, and the bulletin board. Ms. Moore changed her location from the outside of the rug to the inside of it and turned her body to find a good spot for the farm house. She did not want to put the farm house on the top shelf, because she knew that lower

storage enabled teachers to see children in every area. Ms. Moore considered the access to the plug for a music player while rearranging the pretend-play things. She also remembered the role of the bulletin board (i.e., exhibiting the daily routines) and did not wish to place the farm house on the top shelf to avoid hiding it. Ms. Moore considered the significance of the materials' visibility for children, the appropriate place for the farm house, so it would not hinder their movement, and the influence of the farm house on the rug when children would be sitting on the rug during their large group activities.

Considering those elements, she continuously looked around the space and finally rearranged the farm house and the writing desk. Even when rearranging the farm, the teacher negotiated with the material actors (e.g., the role of lower shelves, the location of the writing desk, the shape and use of the farm house, and the role of the bulletin board) and considered other human and nonhuman actors, including the children's walking space, Samuel's weak eyesight, and the fall theme in the curriculum. Ms. Moore's intuitive decision-making of locating the farm house appeared through the communication among her body, the shelves, toys in the shelves, bulletin boards, the rug, and the writing desk. Her body was more immediately responded to the space and the material actors and made her mind to put it in the back of the music player.

Hayashi and Tobin (2015) explored Japanese preschool pedagogy through "tacit" knowledge implying "the embodied techniques practitioners employ to perform these implicit pedagogical practices" (p. 9). They linked tacit knowledge to the body techniques and identified Japanese teacher's pedagogical performances. Ms. Moore's intuitive decision-making in the block area also emerged as the association of her bodily performances, verbal expressions, the material actors (shelves, bulletin boards, the doll house, the plug, the rug, the writing desk, the

garage), the prospective student, Samuel's weak eyesight and fall curriculum.

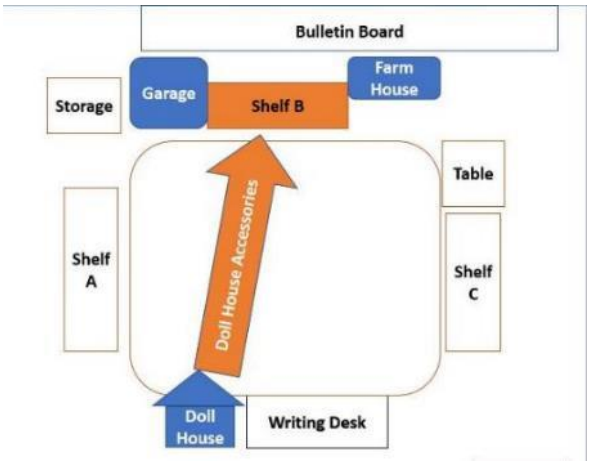


Figure 2-18. Moving the doll house accessories to Shelf B

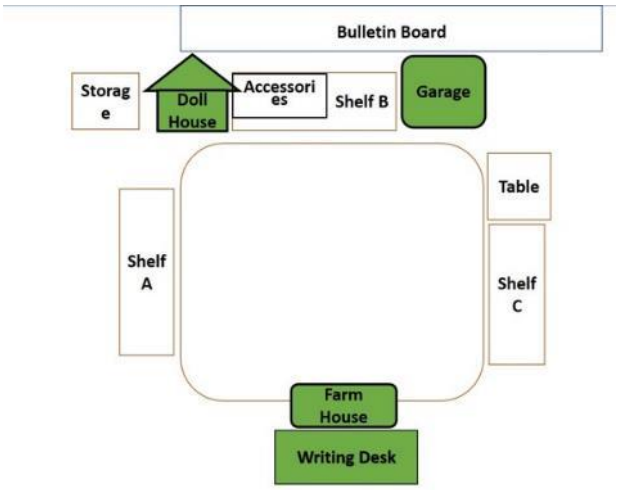


Figure 2-19. Rearranged the pretend-play materials (e.g., the doll house, garage, and farm house) and writing desk

Putting the doll house accessories (e.g., furniture and rag doll family) on Shelf B led to the relocation of the doll house in the beginning. The accessories and Shelf B, where the doll house accessories were moved, were mediators that prompted the relocation of the doll house (see Figure 2-18). The new location of the doll house also led to the reorganization of the garage and the farm house in association with the furniture (Shelves A/B/C, the writing desk, and bulletin board) as well as the rearrangement of the pretend materials (see Figure 2-19). I asked Ms. Moore her reasoning for moving the doll house accessories to Shelf B in an interview.

Interview transcript: 09/23/16

Researcher: In this semester, you moved the doll house and put the doll house things on the shelf in the block area. Do you have any reasons for this modification?

Ms. Moore: I thought putting those doll house pieces in boxes on the shelf led them [the children] to be able to use them in different ways beyond just putting them in the doll house. With unit blocks or train tracks, they can have people. A

> house next to different things, they [the children] can expand their creativity and their imaginations.

According to the conversation with Ms. Moore, she attempted to promote children's creative thinking and storytelling through block play and perceived the doll/farm houses and the garage as appropriate materials for realizing this goal.

The High Scope curriculum model suggests pretend-play materials, such as a doll house, dolls, and furniture, farm vehicles, and cars and trucks, as block area materials (Epstein & Hohmann, 2012). The pursuit of childhood creativity was constructed and continued in be pursued in U.S. ECE through toys, school curricula, and children's museums after World War II (Ogata, 2013). The idea of promoting children's creativity has also been prevalent in early childhood teacher education (Grammatikopoulos, Gregoriadis, & Zachopoulou, 2012). Ms. Moore's plan to organize the doll house seemed to reflect, in part, what she had learned in her teacher education program. Yet, the material actors, including the doll house accessories on Shelf B, also contributed to the actual process of rearranging the doll house.

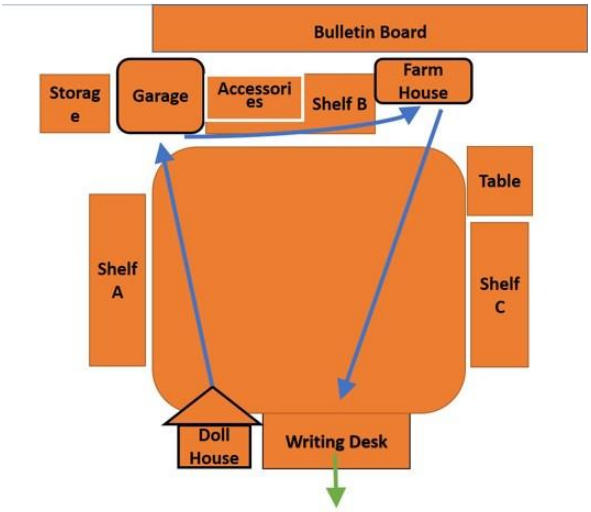


Figure 2-20. Rearranging the doll house, garage, and farm house in communication with other shelves, a table, a storage bin, a writing desk, a bulletin board, and a rug

Ms. Moore's habit of continuously looking around at the shelves, the writing desk, the bulletin board, and the rug illustrated how she communicated with each object and the entangled space of the furniture, floors, and walls (see Figure 2-20). She kept observing the space, verbalizing the ideas momentarily going through her mind, and touching and moving the materials. The communication between Ms.

Moore and the materials in the space was a "collective action" of heterogeneous "forces woven together" (Latour, 2005, p. 74). This is because "the continuity of any course of action will rarely consist of human-to-human connections . . . or of object-object connections, but will . . . zigzag from one to the other" (Latour, 2005, p. 75).

In fact, the entire process of rearranging the block area was a "collective action" that included the teacher's intentional and intuitive mind, material actors, and guidelines for setting up a classroom from High Scope and the ECERS-3. The notion of reflective and intentional teachers has been stressed in ECE. Epstein (2007), the former senior director of curriculum development at the High Scope Educational Research Foundation, emphasized intentional teaching:

> Intentional teaching means teachers act with specific outcomes or goals in mind for children's development and learning. Teachers must know when to use a given strategy to accommodate the different ways that individual children learn and the specific content they are learning. (p. 1)

According to this guideline, early childhood teachers should be intentional and plan the arrangement and rearrangement of the classroom with specific goals or predictable outcomes. However, a teacher with clear intentions is not the only actor. Instead, the materials and her intuitive reactions about these materials also work as actors and mediators in this process.

Latour (2005) used the metaphor of a play on stage in a theater to illustrate distributed actions taken by different types of human and nonhuman actants or actors:

> To use the word 'actor' means that it's never clear who and what is acting when we act since an actor on stage is never alone in acting. . . . Does the audience's reaction count?

> What about the lighting? What is the backstage crew doing? Is the playwright's message faithfully transported or hopelessly bungled? (p. 46)

Drawing on this idea, I argue that a classroom is the stage for a play of distributed actions consisting of heterogeneous elements. At the theater (the portable classroom), the actors (the children and teachers), the lighting (environment), the actor's costumes (educational materials), the crew (assistant and mentor teachers), the (back)stage setting (the block area setup), and the script (High Scope, the ECERS-3, ECE standards, and teacher education programs) all perform actions and matter in this entangled association. Human and nonhuman actors become interdependent, and their actions are "dislocated" (Latour, 2005, p. 46). Collective actions among Ms. Moore's intentional and intuitive mind, the material actors, the curriculum, and the environment rating scale were taken, and what ensued was the transformation and rearrangement of the block area. I liken this to the recent innovation of immersive theater (see Figure 2-21).

Figure 2-21. Collective performances in an immersive theater (i.e., no boundary between the stage, actors, and audiences) photographed by Ryoko Uyama

According to Machon (2013), immersive theater is "a performance form emphasizing the importance of space and design; curating tangible, sensual environments; and focusing on personal, individual audience experience" (p. 66). Immersive theater breaks down the boundaries of traditional theater, which includes a stage, actors, and the audience, and invites tangible materials, open spaces, and audiences to perform in the dynamic play. Like the collective performances of immersive theater, all the elements in a classroom act together and modify each other, blurring the boundaries that divide them.

Discussion

In this chapter, I attempted to reveal how teacher's intentional and intuitive decision-making and material actors worked in the rearrangement of the block interest area and how Ms. Moore, as the classroom teacher, continuously communicated with the material actors in the processes of clearing the tops of the shelving, rearranging the soft/unit blocks, and rearranging the pretend-play materials (e.g., a doll house, a garage, and a farm house). The S/Cs acted as mediators through the 3-dimensional project and led to the activation of children's building with S/Cs during block play and to the empty tops of the shelving units. The affordances of soft/unit blocks and the lower shelf influenced Ms. Moore's actions to rearrange the blocks on the shelf. Ms. Moore continuously communicated with the pretend-play materials, the furniture, and the guidelines for the setting. All the collective actions of heterogeneous elements are essential in ECE classrooms. I discuss some implications for researchers and educators.

First of all, we need more research about space and materiality in classrooms in terms of the dynamic associations among teacher, child, and materials. Ms. Moore re/arranged materials and the physical environment during the Summer, referring to guidelines from High Scope and the ECERS-3. However, the trailer classroom, bulletin boards, tables, rug, blocks, pretend-play

materials, and children also collectively participated in the re/arrangement. Organizing settings and materials is not uni-directional but a multi-directional performance of people, things, and space. The event of re/arranging the interest areas and materials can happen any time during a school year as well as during a vacation period. Researcher can explore how a teacher communicates with materials, the space, the children, assistant teachers, standards, and scales and how the elements would collectively perform in a classroom. Some researchers (Kuntz, 2016; Nordtømme, 2012; Slater, Jones, & Procter, 2016) attempted to rediscover the relationships among space, materials, and people in bathrooms, hallways, and cafeterias beyond the classrooms in a school. I believe these attempts will help re-approach any space and materiality in a school setting and recognize the dynamic performances of the hybrid actors from new materialists' perspectives.

This chapter also encourages early childhood educators and researchers to revisit the field's emphasis on teacher's intentionality and to rediscover teacher's tacit knowledge and body movement in the association with material actors. Although teachers' intentional pedagogy is critical to high-quality teaching and learning (Epstein, 2007), we cannot explain teachers' decision-making and art of teaching without intuitive parts and body movements even in the preparation time. As shown in the collective actions in Ms. Moore's classroom, the teacher's intentional mind did not act alone. Material actors, guidelines, children, and space also participated in the events of the rearrangement of the block area. As Hayashi and Tobin (2015) revealed Japanese preschool teacher's tacit knowledge and technique of body through a lens of culture, researchers and educators can better identify intuitive and embodied teaching through the relationship with material actors and other nonhuman elements (e.g. discourses, curriculum, history). I contend that we need more studies exploring teacher's intuitive mind and actions

through the association of heterogeneous elements in ECE teaching and learning beyond teachers' intentionality.

In addition, I believe, teachers' sensitivity toward material and nonhuman actors does not emerge naturally. Teachers will acquire intuitive or tacit knowledge through experience and having opportunities to engage in communication with the things and settings in their classrooms. In teacher education, teacher candidates are encouraged to observe their mentor teacher's interactions with children, develop their lesson plans, and teach children based on their plans. However, not many teacher candidates have opportunities to participate in re/arranging classrooms. By encouraging teacher candidates to work with their mentor teachers to arrange and rearrange the classroom setting, they will be able to observe how an experienced teacher intentionally and intuitively arranges materials and furniture through their communication with things and spaces. Teacher education needs to facilitate pre- and in-service teachers' appreciation of the "zigzag" (Latour, 2005, p. 75) connections between human and nonhuman actors in teaching and learning.

CHAPTER 3

INTRA-ACTIVE BECOMING OF BLOCKS IN A PRE-K CLASSROOM: INTRA-ACTION OF BLOCKS AND CHILDREN

"Objects are not already there; they emerge through specific practices." (p. 157)
-Karen Barad (2007) in *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning-*

Preschool classrooms are filled with a variety of materials in the U.S. Preschool classrooms contain different play areas (i.e. block, house, art, and book), small-sized furniture, bulletin boards, and a variety of objects (e.g., blocks, dolls, figures, crayons, pencils, construction paper, white boards, puzzles, mathematic manipulatives, pictures, puppets, picture books, and rugs). It is challenging to identify all the materials in a typical classroom. Recognizing the presence of objects is important not because materials are discernible, but because they affect us implicitly and invisibly (Miller, 2010). Materials might be visually prominent but ontologically hidden, even though they affect children's daily routines and activities at school. Materiality implies heterogeneous connections between objects and people. Dant (2005) explained that "the materiality of society is usually engaged with on an individual basis because it is *the meeting of body and object that constitutes the relationship*" (p. 3, emphasis in original). Bennett (2010) also noted that materiality "draws human attention . . . toward a greater appreciation of the complex entanglements of humans and nonhumans" (p. 112). This study investigates the materiality and entanglement of children and blocks in a pre-K classroom.

Materiality has been a significant element in early childhood education (ECE). Early education pioneers, such as Friedrich Froebel, Maria Montessori, and Patty Smith Hill, designed their own educational materials, such as gifts, didactic materials, and Hill floor blocks (Curtis & Carter, 2014; Wolfe, 2000). Their emphasis on object-based teaching and learning has had an impact on today's ECE materials, especially blocks. In this sense, blocks have become representative materials in ECE, and they occupy a large space in many preschool classrooms. In particular, unit blocks were designed by Caroline Pratt, a progressive educational reformer, who provided children with her own hand-made blocks in her two-month experimental program in Greenwich Village in 1913 (Hauser, 2006). Pratt (1948) described what she was thinking about materials when she was preparing to begin the program:

> So, with whatever restrictions, I had my floor space. Next was the crucial point in my plan, the materials. Crayons, paper and scissors and paste were obvious. What I sought was something so flexible, so adaptable, that children could use it without guidance or control, I wanted to see them build a world, I wanted to see them re-create on their own level the life about them, in which they were too little to be participants, in which they were always spectators. (p. 28)

Pratt considered the materials to be a vital element in the children's program and wanted to make child-centered materials. She designed her unique unit blocks and called them "free materials" to differentiate them from the blocks developed by Froebel and Montessori, stating that "they [unit blocks] are not designed for some specific educational purpose of an adult, but are incident to child life and child purpose" (Pratt & Deming, 1917, p. 13). Since then, unit blocks have remained common and representative materials in preschool programs to this day. Although the

aforementioned pioneers did not directly designate or acknowledge material agency, they implicitly recognized the importance of materials in young children's learning.

However, most studies of block play have focused on only children's agency and ability within the developmental frame. Many researchers have studied children's learning and development through block play, considering blocks as educational materials from a human-oriented perspective (Andrews, 2015; Aoyama, Suzuki, & Sasaki, 2015; Bullock, 1992; Casey et al., 2008; Christakis, Zimmerman, & Garrison, 2007; Cohen & Emmons, 2016; Ferrara et al., 2011; Jirout & Newcombe, 2015; Patè, 2009; Piccolo & Test, 2010; Tepylo, Moss, & Stephenson, 2015; Trawick-Smith et al., 2016; Verdine et al., 2014; Wolfgang et al., 2001). As I discussed block play research in Chapter 1, block play has been emphasized as a developmentally appropriate source for the emergence of children's agency and mathematical learning. Few studies have explored how blocks as active and vibrant things become actors and entangled with children's bodies and intentions. There has been little research on the materiality of materials and children in the daily life in ECE classrooms (Gallacher, 2006; Lawn & Grosvenor, 2005).

In Chapter 2, I focused on how Ms. Moore and material actors collectively worked in the rearrangement of the block play settings during Summer 2016. This chapter explores the entanglements of blocks and children in the rearranged block settings during Fall 2016. I employed Karen Barad's (2007) notions of intra-active becoming and intra-action in agential realism, "ontoepistemological framework" (p. 44). She employed the term, "ontoepistemological" that is a compound word of ontology and epistemology and that refers to "the inseparability of ontology and epistemology" (p. 409). With this framework, for Barad (2007), phenomena mean "the entangled material practices of knowing and becoming" (p. 56).

She also used the expression of "intra-active becoming" when she explained the concept of matter; "matter is substance in its intra-active becoming—not a thing but a doing, a congealing of agency" (pp. 183-184). In this sense, intra-active becoming ontoepistemologically implies ongoing performances and entangled status. Drawing on the concept of intra-active becoming, this chapter examines the intra-active becoming of blocks in the block area to illustrate how blocks and children associate with each other (encountering tension and negotiating) beyond a developmental framework and the dualistic categories of human and nonhuman. In doing so, I intend to reconceptualize the meaning of an object-based curriculum in ECE and revalue all the bodies of materials and children. I introduce Barad's (2007) concept of intra-action further.

Barad's (2007) notion of intra-action shows dynamic associations between humans and nonhumans. She explained intra-action as signifying "the mutual constitution of entangled agencies" (p. 33). Intra-action postulates that "agencies are only distinct in relation to their mutual entanglement; they don't exist as individual elements" and distinguished from interaction, which "assumes that there are separate individual agencies that precede their interaction" (p. 33). The ontological inseparability is an essential point in the notion of intra-action. Barad elaborates:

> Each "individual" always already includes all possible intra-actions with "itself" through all possible virtual others, including those (and itself) that are noncontemporaneous with itself. *That is, every finite being is always already threaded through with an infinite alterity diffracted through being and time*. (Barad, 2015, p. 401, emphasis in original)

Barad (2007) also emphasized the ontological indeterminacy of intra-action: "Intra-actions are nonarbitrary, nondeterministic causal enactments through which matter-in-the-process-of-becoming is iteratively enfolded into its ongoing differential materialization" (p. 179).

In Barad's (2015) notion of intra-action, the ontological indeterminacy and inseparability are complementary and indistinguishable:

> Indeterminacy is an un/doing of identity that unsettles the very foundations of non/being. Electrons, for example, are inherently chimeras—cross-species cross-kind mixtures—made of virtual configurations/reconfigurings of disparate kinds of beings dispersed across space and time in an undoing of kind, being/becoming, absence/presence, here/there, now/then. (p. 401)

The indeterminacy and inseparability of ontology lead to the dynamics of intra-action and entanglement: "to be a part is not to be absolutely apart but to be constituted and threaded through with the entanglements of part-ing" (Barad, 2015, p. 406). Blocks and children are not separate and independent actors but they become entangled beings. In the light of the concept of intra-action, blocks in teachers' lesson plans and standards are not blocks. Neither are blocks on shelves themselves blocks. Blocks and children are entangled actors and agencies, and the blocks acquire meanings only through entanglements with children and other matter. The moments of intra-activity between blocks and children are significant because they reveal dynamic relationships as "hybrid actors," which are neither human nor nonhuman in associations (Latour, 1999, p. 180).

Researchers holding a new materialist perspective have recently studied children's play, such as block play, dramatic play, literacy, and child's body movements. Some of them collected data in non-school contexts, such as home, museum, or community center (Boldt & Leander, 2017; Hackett & Somerville, 2017; Thiel, 2015), and Wohlwend, Peppler, Keune, and Thompson (2017) studied in a preschool makerspace with a planned program. Meanwhile, Gallacher (2006) attempted to uncover the materiality of ECE in her geography article, *Block Play, the Sand Pit*

and the Doll Corner, drawing on the lenses of new materialism and post-structuralism. Drawing on Latour's (1993) concept of mediators, Bennett's (2001) notion of the liveliness of matter, and Deleuze and Guattari's (1988) idea of becoming, Gallacher's attempt to provide less determined subjectification through rediscovering the ECE materiality was meaningful to future ECE materiality studies but approached block play theoretically not based on empirical data. With empirical data, Boldt and Leander (2017) reassembled the association of materials, narratives, and discourses through a young boy's Lego play with his father at home, drawing on Deleuze and Guattari's (1983) notion of the break and showed how things, time, and stories produce differences in the boy's block play. Their study concentrated on the child's literacy and conversation with his father at home. Thiel (2015) and Wohlwend et al. (2017) used Barad's concept of intra-action in their respective studies: the intra-action of fabric and children in children's literacies at a community center and the intra-action of materials (playdough electronics kits), bodies, and space in emerging literacy at a preschool makerspace. Nevertheless, Thiel illustrated special activities in an after-school program of the community center, and Wohlwend et al. also offered particular materials in a preschool makerspace for the study. We also need empirical studies tracing intra-actions of children, things, space, and curriculum in interest areas filled with a variety of materials and people without experimental interventions to reveal the materiality of play and learning in ECE.

There are few in-depth studies of intra-active play of blocks and children based on empirical data in the natural preschool setting. I attempt to close this gap in the research literature by using video data on block play in a preschool classroom. Presenting vivid moments of blocks, children, and other materials from the daily routines of the classroom, this study

attempts to contribute to the materiality study in ECE and to the reconceptualization of object-based curriculum and experiential learning/teaching.

My ethnographically inspired study of blocks is based on the video observation and teacher interviews conducted in a Northeastern urban pre-k program during Spring, Summer, and Fall 2016. Through the period, I could observe the rearrangement of block settings in the summer and how children and the reorganized materials mutually intra-acted during block play in the fall. Based on the analysis of how much time particular blocks acted in the block area, I found that soft unit blocks were the most visible materials in the spring (80 minutes) and the fall (332 minutes) from about 55 hours video data. To focus on the iterative intra-action of blocks and children, I selected the video data of the soft unit blocks and analyzed it by paying attention to the moments when blocks and children had tensions and negotiated with each other as entangled agencies/actors. In particular, the fall data of the soft unit blocks clearly showed how children encountered the reorganized settings as well as how the blocks and children were dynamically intra-acting in the beginning of a new school year. In this chapter, I focus on the most frequently used soft unit blocks and two children (Tim and Robert) who were most often associated with these blocks in the fall. I trace repetitive entanglements and intra-actions of the soft unit blocks and Tim and of the blocks and Robert to understand how the blocks and the children iteratively entangled in the block area.

Intra-Actions of Soft Unit Blocks and Children

The intra-action of soft unit blocks and Tim emerged in the beginning of the school year. Tim was a Hispanic boy and only child and had a shy smile with limpid eyes. He was particularly interested in a doll house in the block area. He played with the doll house on the first day of school, and his attention to the doll house continued during his construction with soft unit

blocks. The association of soft unit blocks, Tim, and the doll house was frequently observed during work time. In the intra-action of soft unit blocks and Tim, I explore the process of tension and negotiation between them in their association with the doll house and a toy garage.

Tension and Negotiation Between Tim and Soft Unit Blocks

In the association with a doll house. On the first day of the school year, the children in Ms. Moore's class had two opportunities for block play, in the morning and the afternoon. In the morning, their parents visited the classroom and watched the children's free play. In the afternoon, the children had about 50 minutes of work time without their parents, and their exploration of blocks and other materials in the block area just began. The tension between Tim and soft unit blocks occurred in block play next day, as described in the following vignette.

Vignette 3-1. Video transcripts & Field notes: 09/09/16

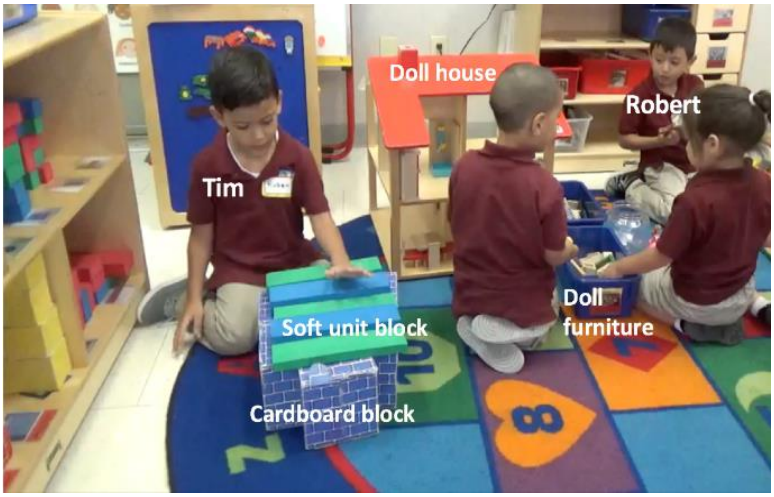


Figure 3-1. Building of soft unit blocks, cardboard blocks, and Tim.

Since yesterday (the first day of school), Tim has played with the doll house and dolls in the block area. He takes blue cardboard blocks with brick patterns and builds with them on the rug. He grasps colorful soft double unit blocks and puts them on the cardboard, building like a cover or roof (see Figure 3-1). Tim keeps looking at other kids' play with the doll house and touches the furniture in the doll house (see Figure 3-2). He adds yellow cardboard blocks and red soft unit blocks between the doll house and his building blocks (see Figure 3-3).

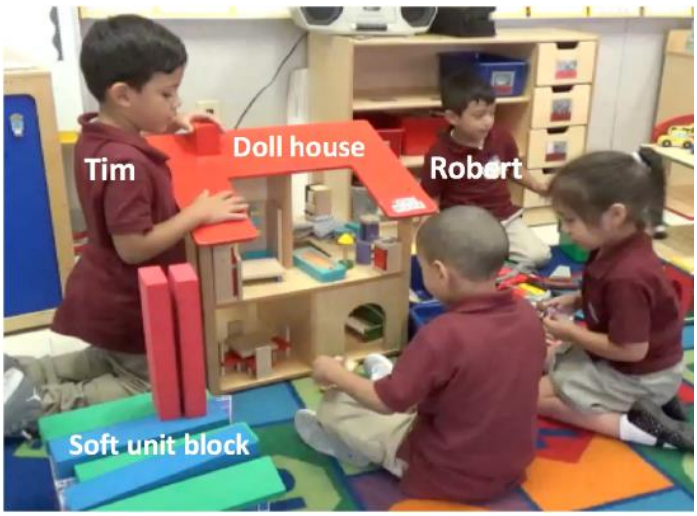


Figure 3-2. Tim's interest in the doll house.

Figure 3-3. Adding yellow cardboard blocks.

Tim suddenly starts blocking one side of the doll house with quadruple and double soft units, and it becomes the wall of the doll house (see Figure 3-4 below left). The issue is that soft unit blocks can easily fall down because they are light and not interlocked. Tim adds more pieces of soft unit blocks to support the new wall on the doll house, and Robert also brings cylinder soft unit blocks to the wall to help Tim (see Figure 3-5 below right), but the wall of soft unit blocks soon breaks down. Tim keeps changing the direction of quadruple and double units of soft unit blocks that are leaning on or inserted

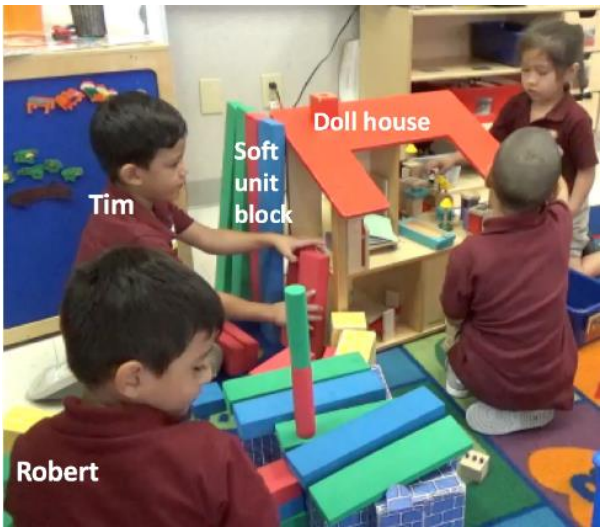


Figure 3-4. Building a soft unit block wall on the doll house

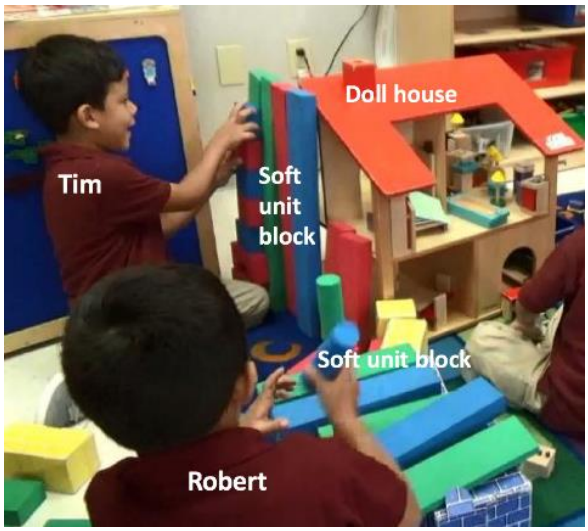


Figure 3-5. Adding extra soft unit blocks to the wall

into the doll house. The open structure of the doll house allows soft unit blocks, Tim, cardboard blocks, and Robert to work as a team for renovating the doll house (see Figure 3-6).

Figure 3-6. Reconstructing a block/doll house building

Tim started building cardboard blocks and soft unit blocks while watching other friends' doll house play and leaning on the doll house. Tim's hands and interest toward the doll house intra-acted with the blocks (again, see Figure 3-3). The intra-action finally extended to building a wall of the doll house by combining soft unit blocks and the doll house. The intra-action of Tim and the soft unit blocks broke the boundary between the doll house and the soft unit blocks, and the soft unit blocks became a part of the doll house as a construction material.

At that moment, the soft unit blocks rejected being a wall and fell down. Soft unit blocks are made of soft foam and not interlocked. Tim's first trial of leaning soft unit blocks on the outside of the doll house failed. Tension arose between Tim's intention and the soft unit blocks. Tim recognized the features of the soft unit blocks and tried rebuilding them in a different way. He put cardboard blocks into the doll house and changed the direction of the soft unit blocks (again, see Figure 3-6). The lowered center of mass of the soft unit blocks led to a more stable construction, and just the end of the blocks leaned on the doll house. The cardboard blocks stayed on the doll house as the wall. The tension and negotiation between Tim and the soft unit

blocks were the beginning of "ongoing materialization" and "iterative becoming" (Barad, 2003, p. 151). The tension and negotiation between them continued in a different way in the garage that I explain in the next section.

In the association with a garage. A week later, the association of Tim, soft unit blocks, Robert, and the doll house accessories (e.g., furniture, animation figures) transformed the garage into a house or home-like space. This results from iterative intra-actions of Tim and soft unit blocks in the block area, but the tension/negotiation was different from the entanglement in the doll house in the following vignette.

Vignette 3-2. Video transcripts & Field notes: 09/16/16

Figure 3-7. Moved garage and Robert.

Robert lifts a heavy wooden garage and puts it next to the road track he and Tim built together (see Figure 3-7). Tim puts a yellow truck on the top of the garage. He visits the doll house with his mini-car and plays with the furniture in the doll house. Emily shouts to him, "No boy is allowed!" Tim leaves the doll house with a wooden closet and puts it on the garage. He brings two small pillars (soft unit blocks) and a half unit to the garage and attempts to insert the pillars into the garage (see Figure 3-8). However, their height does

Figure 3-8. Soft unit blocks and Tim in the garage (right side).

not fit inside the garage. Tim keeps changing his grip on the blocks and puts pressure on them. The pieces of soft unit blocks react to his force. The block pieces slip off the garage. The cycle of Tim's action and the blocks' reaction repeats for a while (see Figure 3-9).

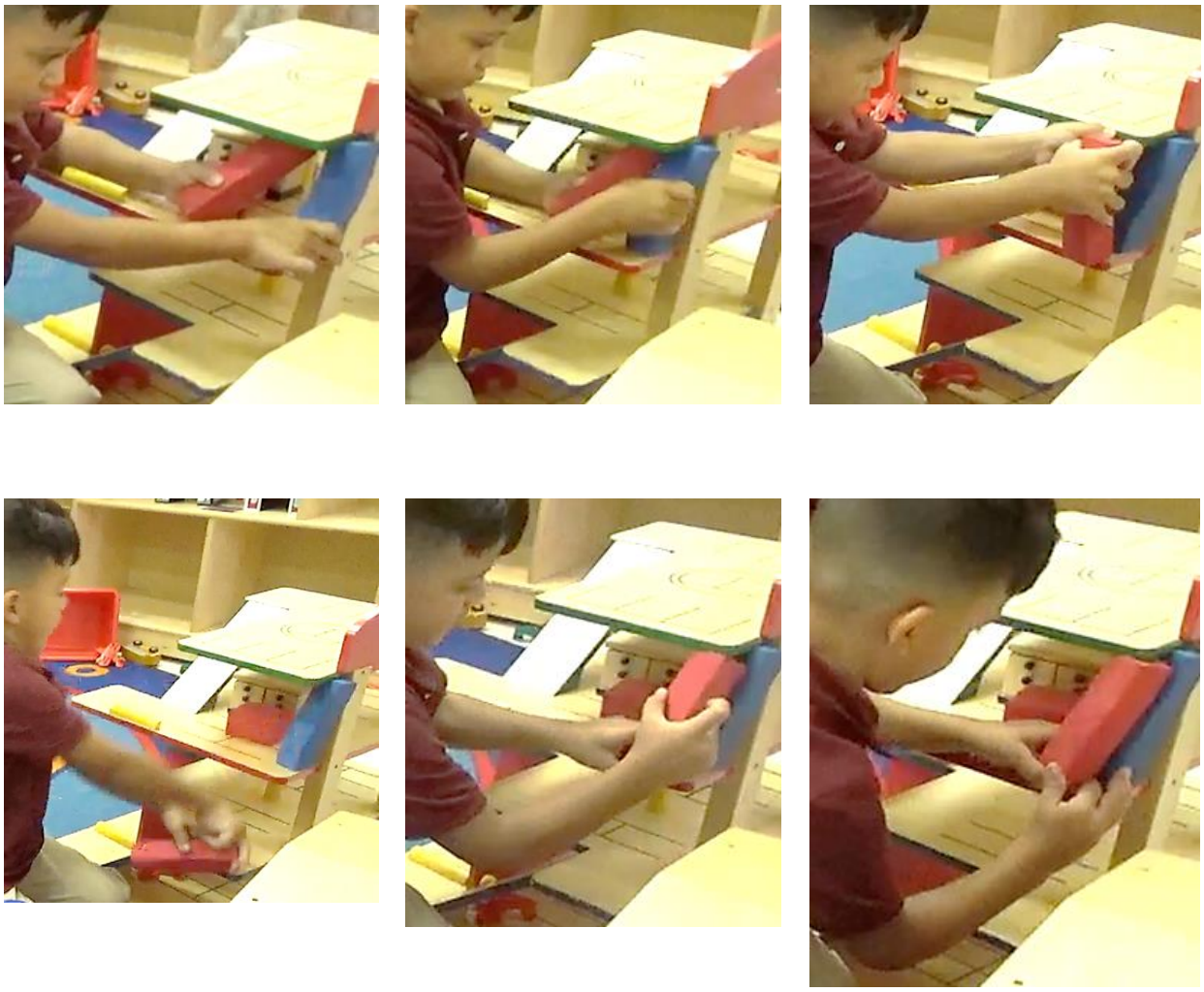


Figure 3-9. Actions and reactions between Tim and soft unit blocks in the garage.

The slightly bent pillars finally become the wall or the pillar of the garage (see the picture on the left of Figure 3-10). Tim adds the half unit next to the pillars. He brings a family of rag dolls (e.g., daddy, mommy, baby) to the floor of the garage (see the picture on the right of Figure 3-9). Tim lays the half unit down and puts the baby rag doll on it. Later, Robert brings a refrigerator, a table, and chairs of the doll house furniture to the top of the garage (see Figure 3-11 below left). He tries to put a soft unit block on the shower booth as a roof and puts a baby doll in the cradle and pretends to cry. Robert finds a rectangular cloth and puts it on the table and puts a flower pot on the tablecloth (see Figure 3-12 below right).

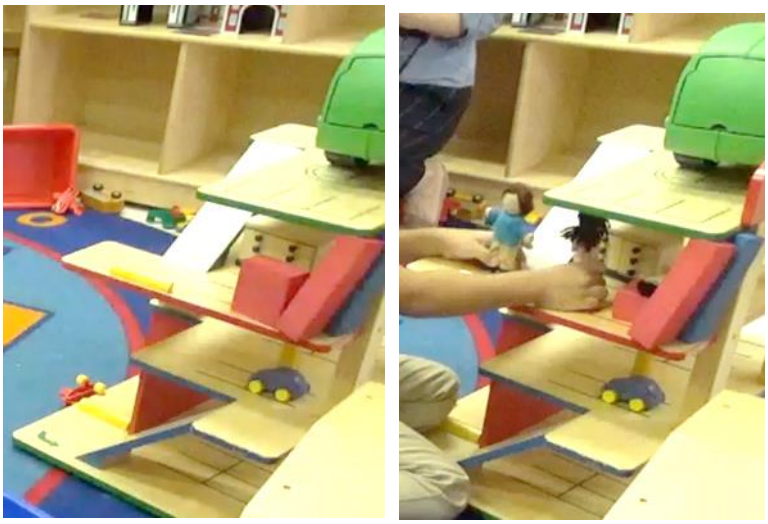


Figure 3-10. Becoming pillars of the soft unit blocks in the garage (left) and family rag dolls in the garage (right).

Figure 3-11. Robert (left) and Tim (right) arranging the furniture in the garage.

Figure 3-12. Setting the tablecloth on the table.

The intra-action of soft unit blocks and Tim appeared as actions and reactions in the garage. Tim wanted to build a wall or a pillar with soft unit blocks at the garage in a similar manner that he built the wall on the doll house. However, the pillars did not follow his intention and slipped out from the garage. In the process of negotiation between the pillars and Tim; his hands, pressure, the pillar's elasticity, and the structure of the garage were entangled. This was not just about Tim's fine motor skills in block play but rather about the entanglement of the soft unit blocks and Tim in the garage. Barad (2007) explained the notion of entanglement as follows:

> To be entangled is not simply to be intertwined with another, as in the joining of separate entities, but to lack an independent, self-contained existence. Existence is not an individual affair. Individuals do not preexist their interactions; rather, individuals emerge through and as part of their entangled intra-relating. (p. ix)

Barad used the term "individuals" to refer to all bodies, including humans and nonhumans, because "all bodies, not merely 'human' bodies, come to matter through the world's iterative intra-activity—its performativity" (p. 152). Tim (human body) and the pillars (soft unit blocks) performed together in the garage, losing their own independence in that moment. The inclined pillars in the space of the garage showed the effect of the intra-action of Tim and the soft unit blocks toward the garage. The association of the pillars, Tim, and the closet transformed the garage into a house and invited the family of rag dolls, Robert, and doll house furniture into the transformed garage. Tim was rejected from the doll house play by Emily, but the intra-action of Tim and soft unit blocks in the garage offered him another home space in which he was able to play with the dolls, the furniture, and Robert.

Ms. Moore paid attention to the pretend-play of Tim and Robert in the garage and asked them about their decoration and play. Before this new school year, she had rearranged the

location of the doll house and its accessories into the block area, anticipating children's creative mixed-up play. The unexpected combination of the garage, the dolls, and the doll house furniture caught her attention. She wrote down the conversation of Tim and Robert and documented their play in the garage. However, she did not acknowledge how their pretend-play emerged in the garage and how soft unit blocks and Tim modified the garage.

The intra-action of Tim and soft unit blocks among the pretend-play materials continued. One day in October, Tim and Robert played with trucks, doll house furniture, and figures in the doll house. Tim added some soft unit blocks on the open sides of the doll house, and Robert put the long soft unit blocks on the roof (see Figure 3-13). Tim inserted different shapes of soft unit blocks into the sides of the doll house, and they became the walls for trucks on the first floor and for the dolls and the furniture on the second floor. Robert and the blocks extended the roof of the doll house. Tim and the soft unit blocks once again performed together and invited Robert to the renovation of the doll house. Their performativity also appeared in the construction of internal and external walls of the doll house. The agency of Tim and the soft unit blocks was revealed as "the enactment of iterative changes to particular practices through the dynamics of intra-activity" (Barad, 2003, p. 827). The repeated entanglements of Tim and the soft unit blocks showed the dynamics of the hybrid agency and intra-activity. This different building work did not belong only to Tim, but to Tim, the soft unit blocks, and Robert because they do not exist as independent beings. Barad (2007) argued that

Figure 3-13. Intra-action of Tim, soft unit blocks, Robert in the doll house (October 7th, 2016)

"humans are neither pure cause or pure effect but part of the world in its open-ended becoming" and that "[things] are agentially enacted and become determinately bounded and propertied within phenomena" (p. 150). Children are not pure subjects in block play, and blocks become building materials only in their ongoing intra-action and performativity with children (see Figure 3-14).

Figure 3-14. Hybrid construction of soft unit blocks, Tim, the doll house, and Robert on the rug (after Tim and Robert left).

Tension and Negotiation between Robert and Soft Unit Blocks

In the events in which the soft unit blocks became building materials in the association with pretend-play materials (e.g., the doll house and the garage), Robert was also involved. He was a Hispanic boy having a younger sister. While observing the classroom, I could hear Ms. Moore's calling his name very often. The way that Robert used his body was different from the way Tim used his body. Robert often intra-activated his body with blocks by using large

movements, gross-motor skills, and strength compared to Tim, who sat down with the blocks. The soft unit blocks in the intra-action with Tim appeared as building materials transforming the doll house and the garage, but the same blocks in the intra-action with Robert became other materials. The performativity of Robert and the soft unit blocks showed experimental intra-actions during work time and clean-up.

Experimental intra-actions during clean-up. I describe a continuing story after what was described in Vignette 3-1 (September 9, 2016) here. After transforming the doll house with the soft unit blocks, Tim started putting them away, and Robert helped him. Robert's head suddenly crashed into the soft unit blocks and the cardboard blocks, and the building was broken. I present this continuous event in the following vignette.

Vignette 3-3. Video transcripts & Field notes 09/09/16

Robert picks green quadruple units (soft unit blocks) up from the doll house. Instead of putting them away, he lifts them high and makes them bump against each other several times. The blocks make a loud sound, "Pop! Pop!" (see Figure 3-15). At the same moment, the sound beep from the speaker for announcements from the main building on the wall is added to the blocks' popping sound. The classroom becomes very noisy. Ms. Moore says (looking toward the block area), "Easy! Easy!" Tim keeps putting the blocks away on the shelf.

Figure 3-15. Soft unit blocks' bumping in Robert's hands (in the middle).

Robert slips the quadruple units under his arms and bent them with his hands, bending his legs (see Figure 3-16).

Figure 3-16. Intra-action of soft unit blocks, Robert's hands, arms, and legs.

Figure 3-17. Jumping intra-action of Robert, soft unit block, and the floor.

Figure 3-18. Momentarily becoming an arch construction of the soft unit blocks.

The flexible blocks are straightened up by themselves but are still slightly bent and bounced out of Robert's hands. He holds them again and begin jumping (see Figure 3-17 above left). Robert puts their sides together, and the blocks stay as an arch construction for a short time and then fall down (see Figure 3-18 above right).

The body of the soft unit blocks is soft and flexible because the blocks are made of soft polyurethane foam. This is the feature that distinguishes soft unit blocks from the original wooden unit blocks designed by Pratt. When the soft blocks bump into each other, the sound is much milder than that of wooden unit blocks. Although the flexible blocks resisted Robert's pressure by bouncing out of his hands, the softness of the material allowed Robert to hit, bend, jump, and arrange them as if he were exploring his own body. Robert's hands/arms and the flexible soft unit blocks became one intra-active body.

Barad's (2007) perspective toward bodies—including human and nonhuman—rejects the distinction based on bodily boundaries because these boundaries do not exist according to the concept of intra-action. To redefine the notion of body, she used the example of Merleau-Ponty's blind man's stick that he uses to investigate his surroundings:

> Phenomenologists like Foucault's teacher Maurice Merleau-Ponty argue that the successful performance of everyday bodily tasks depends on the mutual incorporation of the instruments used to perform a task into the body and the dilation of our "being-in-the-world" into the instrument, thereby undermining the taken-for-granted distinction between the inside and outside of the body. (p. 157)

Merleau-Ponty (1962) explained that the cane was no longer an auxiliary instrument for the blind man because it became "transplanted" and "incorporated" into his body (p. 143). Robert and the soft unit blocks intra-acted, and the blocks became not just educational materials but "an integral part" of Robert's body (Barad, 2007, p. 158).

The intra-action of Robert and the soft unit blocks can be seen as inappropriate behavior during clean-up time. The pre-K program at Eagle Elementary was based on the High-Scope curriculum and guidelines. Ms. Moore followed most of the guidelines and emphasized the cycle

of find-use-return when I observed her rearrangement of the block area in the summer of 2016. The moment of the intra-action occurred during Tim and Robert's voluntary clean-up, not requested by a teacher. Had it occurred during the official clean-up time, Ms. Moore would have stopped Robert's actions with the blocks (not just saying, "Easy! Easy!"). At the beginning of each new school year, teachers specifically explain how clean-up goes and usually stress the importance of building a classroom rule for the clean-up. In the following vignette, I describe Ms. Moore's usual directions for children during the clean-up time.

Vignette 3-4. Video transcripts & Field notes 09/21/16

Ms. Moore announces to the class, "Freeze, boys and girls. Put your arms at your sides. Arms out. Eyes on me. I don't like lots of shouting. I want you quietly to look at the picture on the shelves and to put your work away. If you are in the sand and water, wash your hands. Computer area, go to the table and prepare recall time." Then, Robert kicks the soft unit block building (see Figure 3-19 below left) and swipes it with his body lying down (see Figure 3-20 below right). Ms. Moore does not notice this moment. Dina says, "Uh oh!" Tim copies Robert's action and swipes it, too. The blocks are scattered on the rug.

Figure 3-19. Kicking soft unit blocks.

Figure 3-20. Swiping body.

Ms. Moore's directions for cleaning up signified how the children needed to control their bodies, voices, and toys. The High-Scope curriculum encourages children to put toys and other objects away according to the pictures on the shelf (Epstein & Hohmann, 2012). Children have the responsibility to put them back and learn about organizing, sorting, and matching through the process. During this time, teachers try to regulate children's bodies in a way that they consider appropriate. However, children might appear to resist complying with teachers' direction because their bodies are engaged in the intra-action with materials in space and time (Rossholt, 2012; Taguchi, 2014).

When considering the dynamic intra-actions between Robert and the soft unit blocks in the new school year, I find it difficult to simply distinguish appropriate from inappropriate behavior in the block area based only on the classroom rules. The actions, which emerge from dynamic intra-actions of blocks and a child, might be the resistance of the child and blocks or the experimental performativity of the child and the materials. When the vibrant matter and a child's body meet, their integrated body explores an unexpected phenomenon. And I believe this exploration leads to the genuine embodied/experiential learning that ECE has stressed but that has been neglected in today's academic skill-oriented early childhood classrooms (Tobin, 2004; Tobin, 2008).

Barad's (2007) perspective on experimentation and performativity is parallel to embodied and experiential learning. Barad as an agential realist has critiqued pervasive representationalism and emphasized performativity. However, she does not devalue theorizing or creates a boundary between theorizing and experimenting because they are connected as "material practices" (p. 55). She argued that "theorizing and experimenting are not about intervening (from outside) but about *intra-acting* from within, and as part of, the phenomena produced" (p. 56, emphasis in original).

Robert and the soft unit blocks were theorizing and experimenting their intra-active body as the part of embodied/experiential learning. In the next section, I present more experimenting performances of Robert, blocks, a farm house, Ms. Moore, mini-cars, and Emily.

Intra-active becoming in construction and pretend-play. The experimenting and performative intra-actions of Robert and the soft unit blocks were ongoing in the construction of a ramp and in pretend play. Vignettes 3-5 and 3-6 show dynamic intra-active becoming of the soft unit blocks and different children (Robert, Lucas, and Sarim). Barad (2007) explained matter: "matter does not refer to a fixed substance; rather, matter is substance in its intra-active becoming—not a thing, but a doing, a congealing of agency" (p. 151). Matter is not a stable thing but a performative doing in its intra-active becoming. The intra-active becoming signifies "iterative intra-activity" or "ongoing intra-activity" in the materialization of phenomena (p. 210). I describe the intra-active becoming of Robert, soft unit blocks, a farm house, Ms. Moore, mini-cars, and Emily in the following vignette.

Vignette 3-5. Video transcripts & Field notes 10/12/16

Figure 3-21. Leaning the quadruple block to a farm house.

Figure 3-22. Adding a small rectangular prism on the slide as a bump.

Robert makes quadruple soft unit blocks lean on a farm house and rolls a red car on them (see Figure 3-21 above left). He adds a small rectangular prism on the slide as a bump (see Figure 3-22 above right) and keeps adjusting the location of the bump and rolling the car several times.

Figure 3-23. Rolling a red car on the quadruple soft unit block.

Figure 3-24. Removing the gradual slope (the blue block).

Ms. Moore: What did you make?

Robert: (not responding, but just rolling a red car on the leaned blocks) (see Figure 3-23)

Ms. Moore: Is it a ramp or a hill?

Robert: (again just rolling the car on the blocks)

Ms. Moore: How can it go faster?

Figure 3-25. Building a ramp (farm house, Emily and soft unit blocks).

Robert takes out the gradual block and makes the slope steeper (see Figure 3-24). He rolls a car on that piece. The ramp also invites Emily and lets her build another ramp next to Robert's (see Figure 3-25). She tries rolling a car on the ramp several times and then goes to the shelf and plays with cardboard blocks. [the end of Vignette 3-5]

In this vignette, the farm house worked as an actor which makes the soft unit blocks lean on it and become a foundation for inclined ramps. Robert attempted to build the ramp by using the farm house and to play with his car on it. The performativity of Robert and the soft unit blocks caught Ms.

Moore's attention, and she asked Robert a question which encouraged him to modify the slope of the blocks. Depending on the angle, the car could run fast or slow. The intra-active becoming of the soft unit blocks, the farm house, the car, and Robert invited Emily to play together in the ramp. In this performative doing, the soft unit blocks became the construction matter for the ramp. Intra-active becoming of soft unit blocks and children continued in the subsequent vignette.

Vignette 3-6. Video transcripts & Field notes 10/13/16

Figure 3-26. Intra-active becoming of the soft unit blocks and Robert: swinging body.

Figure 3-27. Bumping of Sarim and soft unit blocks.

On the next day, Robert holds several of quadruple units with his arms and lifts them high. He hits the floor with the blocks. He pretends to fight with them (see Figure 3-26 above left). Sarim also picks two quadruple units and makes them bump against each other (see Figure 3-27 above right). Robert thinks Sarim joins his sword play and attacks him with the blocks. Sarim comes to me (observing block play outside of the rug) and says that Robert hit him.

Figure 3-28. Intra-active becoming of the soft unit blocks and Robert: jumping. body

Figure 3-29. Intra-active becoming of the soft unit blocks, a hammer, and Lucas: hammering.

Robert says to me, "We were fighting with swords." He is jumping while holding the blocks he called “swords” as support sticks on the rug (see Figure 3-28 above left). Ms. Moore calls to him, "Robert, sit down! Sit down!" Robert sits down and piles long quadruple units for Lucas to hit with hammers (see Figure 3-29 above right). When Robert and Lucas leave the block area, Sarim takes the blocks and starts making an airplane with the soft unit blocks (see Figure 3-30). [the end of Vignette 3-6]

Figure 3-30. Intra-active becoming of the soft unit blocks and Sarim: airplane

The intra-active becoming of the soft unit blocks and children (Robert, Lucas, and Sarim) was ongoing. Robert continuously conducted intra-actions with soft unit blocks by using his arms, hands, and legs. Through the performativity of he and soft unit blocks, Robert experienced the features of the soft unit blocks and continued intra-active becoming play. The performativity of Robert and soft unit blocks

also invited Sarim to make the blocks bump in his hands. The integrated body of Robert and the quadruple soft unit blocks became the pretend-bodies, and the blocks became the swords. This pretend-action emerged from the intra-active becoming of Robert and the soft unit blocks: swinging, bending and jumping body. However, transformative performativity of Robert and blocks was stopped by Ms. Moore's body direction, "Sit down!"

In the subsequent intra-active becoming, the soft unit blocks became things to hit with the hammer when they met Lucas. When Sarim returned to the block area after Robert's and Lucas's departure, the soft unit blocks became the construction materials of the airplane. As shown, the soft unit blocks and the children became different things through their performative intra-action. Thus, the blocks are not already blocks or educational materials. Instead, "they emerge through specific practices" with children and other things (Barad, 2007, p. 157). As a "book" and an "author" have "intra-actively" written each other (Barad, 2007, p. x), blocks and children "intra-actively" perform in ECE classrooms.

Discussion

In this chapter, I explored how blocks and children were entangled in the block area. The relationship between most frequently used soft unit blocks and the two focal children was not simply about educational materials and users/learners. The blocks and the children engaged in intra-active becoming beyond the dualism of subject/object and human/nonhuman. Blocks transformed themselves and their meaning, depending on "specific practices" (Barad, 2007, p. 157) with different children and things, such as the doll house, the garage, the farm house, and the hammer. In this section, I further discuss the dynamic intra-actions of blocks, children, and things to suggest some ideas about how we can actively invite a "thing-power" (Bennett, 2010, p.

6) into the ECE classroom and how we can reconceptualize object-based teaching and embodied learning.

First of all, this chapter encourages early childhood educators and researchers to move beyond considering blocks passive tools for children's learning and construction. As I discussed in Chapter 1, most studies on block play have focused on children's learning and development while ignoring blocks' active performances. The NJ department of education to which Harmony Elementary School belongs suggests the alignment of the preschool standards with High Scope's preschool key development indicators. According to the state's preschool standards, children's activities with blocks are linked to the development of "language, literacy, and communication" (e.g., comprehension, writing) and the learning of "mathematics" (e.g., shapes, spatial awareness) (NJDoE, 2016). As I described in this chapter, however, blocks do not exist as passive learning tools but continuously transform in the association with different children, props, other objects, space and time. For example, through the intra-actions of Tim, the doll house, the garage, Robert, and the farm house, the soft unit blocks transformed as the wall of the doll house, the pillars of the garage, the body part of Robert, and the construction matter of the ramp.

Second, we need to revalue the experimental performativity emerging from the intra-action of all the bodies. According to the daily routine (e.g., planning-work-clean up-recall time) in High Scope, children should act and communicate with other people and things in appropriate ways by following the rules or norms in the association of bodies, time, and space. For instance, during planning time, children usually need to sit on the table and to represent their plans through drawing or writing. During work time, we expect free play, but the bodies of children and things are also bounded in the discourse of Developmentally Appropriate Practice (DAP),

creativity, and academic skill-oriented achievement. During recall time, children again should sit at the table or on the rug and reflect/represent how they played. To be flexible for the experimental performativity requires to blur the boundary of representing and experimenting. Barad (2007) argued: "Reflection is insufficient; intervention is key" (p. 50). In other words, to think carefully something is not enough, and we should get involved in a situation with our bodies through experimentation.

Third, the emphasis on providing children with a variety of materials in itself may not be enough for teachers to appreciate the role of material actors in their intra-actions with children. To facilitate teachers' awareness of such intra-actions, I believe, video-recording can be a useful tool. Several states have mandated a teacher performance-based assessment called edTPA. For this requirement, teacher candidates video-record their teaching for the assessment of their practice. Although edTPA may encourage educators to recognize the significance of the embodied teaching and learning (Xiao, 2016), attention tends to be paid only to human actors, including teacher candidates, children, and interactions between them. In addition, because the assessment of the teacher candidate's performance recorded in video is conducted by external evaluators, who have little to no knowledge about the unique context of each teacher candidate's teaching, this performance-based assessment has been controversial in the field of teacher education (Sato, 2014). Nonetheless, video recording analyzed from a new materialist's perspective may help teachers appreciate all bodies, including humans and nonhumans, involved in teaching and learning.

Fianlly, blocks (and other objects) cannot be pre-determined with their roles or functions. Blocks become blocks only through intra-actions with children, teachers, space and time. Block centers in many early childhood classrooms include a variety of materials produced by

commercial manufacturers. Those can be building blocks (e.g., unit blocks, soft unit blocks, LEGO blocks, Mega blocks, waffle blocks, Tinker toys, etc.), figures, tools, and various props. Websites or brochure of school supplies introduce each product as a beneficial learning material by linking each material to some areas of child development (e.g., numbering, sorting, creativity, geometry). Guidelines for curriculum models, such as High Scope, also encourage teachers to have "well-defined interest areas that offer visible and accessible storage of materials" for children's active choices and easier access to the materials in the classroom (Epstein, 2012, p. 172). However, the experimental intra-actions of materials and children momentarily emerge in ways that may not be predicted by the manufacturer's manual, curriculum guidelines, or by the teacher intention. In fact, I argue that the guidelines with pre-determined functions of blocks can delimit the vibrant performativity of materials and children. Instead of assuming the certainty, teachers need to create space and time with the open-mindedness that will allow them to engage in new and different (albeit momentary) becomings through the intra-actions of children and materials.

CHAPTER 4. THEORETICAL EXPERIMENTATION ON A BLOCK PLAY SCENE: THROUGH LENSES OF HUMANISM, OBJECT-ORIENTED ONTOLOGY AND NEW MATERIALISM

> The only true voyage of discovery…would be not to visit strange lands but to possess other eyes, to behold the universe through the eyes of another, of a hundred others, to behold the hundred universes that each of them beholds…(p. 160)
>
> -Marcel Proust (1929), *Remembrance of Things Past*

Things are alive in the relationship between people and matter. To discover the vibrant liveness of things, we need a special lens, because we have neglected things for a long time. As Proust mentioned, to discover something, we can attempt to see the world through the eyes of others, including nonhumans. Then, we might experience extended new worlds that we have not lived in before. This chapter attempts to look through the eyes of humanism, object-oriented ontology, and new materialism and to discover what materiality, "the meeting of body and object that constitutes the relationship," (Dant, 2005, p. 3) on a block area scene can emerge from the different perspectives in early childhood education.

A countless number of things in Ms. Moore's trailer classroom were packed like sardines. This was my first impression when I visited her classroom to study materiality in the block area in Spring 2016. In Fall 2016, Ms. Moore repeated interest area orientations in small group activities and during planning time. At the beginning of the new school year, preschool teachers tend to provide children with orientations about daily routines, class rules, interest areas,

materials, and clean-up time. I found the pattern of Ms. Moore's questions addressed to the children during orientation, planning and recall time interesting; her questions inquired about materiality in the different interest areas. The preschool program was based on the High Scope curriculum and followed the curriculum's daily routine, including the "plan-do-review" process, which "enables children to express their intentions, carry them out, and reflect on what they have done" (Epstein & Hohmann, 2013, p. 5-6). Ms. Moore worked with a paraprofessional teacher, Ms. Luciana, who was Latino and often helped translate between Ms. Moore and Latino parents who preferred to speak in Spanish. During planning and recall time, the teachers took charge of a small group of children and asked them several questions. I illustrate the teachers' questions to the children during planning time in the following vignette.

> Vignette 4-1. Video transcripts & Field notes: 09/09/16
>
> Today is the second day of school. During planning time, Ms. Moore and Ms. Luciana asked children these questions: "Where do you want to go?" "What do you want to play with?" "What do you want to try?" Children can choose in which area they want to play and with what toys they would like to play. These questions are repeated in recall time (after work time): "Where did you play today?" "What did you play with?" "How did you play?"

Ms. Moore and Ms. Luciana's questions intentionally linked specific objects or things to certain interest areas (e.g., blocks and the block area, a tea pot and the house area, puzzles and the toy area). Ms. Moore's lesson plan for the second week of September also included materiality, and she identified the goal of her orientation as "becoming familiar with classroom area content (thing)." Children needed to learn what materials belonged to what interest area. Ms. Moore's educational goal and questions assumed the presence of things in her classroom.

The High Scope curriculum, which was adopted by preschool classrooms at Harmony Elementary School, emphasizes well-defined interest areas and material sources (Edwards & Knight, 1994; Mac Naughton, 2003). In the High Scope's daily routines and settings, "children learn about their bodies and their selves primarily in their day-to-day practical engagements with the object world and with other people" (Leavitt & Power, 1997, p. 42). Although children's bodies, things, and learning are inextricable with each other, little research has been conducted about the materiality and the connection among them in ECE settings. To close this gap, I aim to explore what insights manifest through the experimentation of comparing each description of a block area scene based on humanism, object-oriented ontology and new materialism in this chapter.

Things are not salient but ambivalent (Dant, 2005; Miller, 2010; Trentmann, 2009). People live with and in things that seem to be physically obvious, but most of the time, we are not conscious of the influence of things on our lives, bodies, and thoughts. Human beings have been viewed as subjects with agency, and nonhumans as objects. For instance, constructivism is a pervasive humanistic framework in ECE. Constructivists argue that "humans construct knowledge and meaning from their experiences" (Bada & Olusegun, 2015, p. 66). From the perspective of constructivism, children are active learners in attaining knowledge. Jean Piaget is a prominent constructivist and theorized the concepts of assimilation and accommodation. Piaget (1952) explained intelligence in terms of assimilation and accommodation:

> Intelligence is assimilation to the extent that it incorporates all the given data of experience within its framework. . . . There can be no doubt either, that mental life is also accommodation to the environment. Assimilation can never be pure because by incorporating new elements into its earlier schemata the intelligence constantly modifies

> the latter in order to adjust them to new elements. . . . intellectual adaptation, like every other kind, consists of putting an assimilatory mechanism and a complementary accommodation into progressive equilibrium. (pp. 6-7)

According to Piaget, children construct intelligence or knowledge through intellectual adaption between assimilation and accommodation. They actively modify and extend their schema toward an equilibrium status. Piaget (1955) argued that the learning process develops with children's ages and suggested stages of cognitive development: sensorimotor (0-2 years, the process of acquiring object permanence), preoperational (2-7 years, limited abstract thinking), concrete operational (7-11 years, utilization of senses to know), and formal operational (adolescence to adulthood, theoretical and hypothetical thinking). His theories have had a significant impact on contemporary teaching and learning in schools (Ojose, 2008).

To overcome humanism or the hubris of humans, new theories appeared: object-oriented ontology and new materialism (Leach, 2016). Both schools revalue the presence of objects or things beyond the dualism of subjects and objects. Graham Harman (2011) coined the phrase "object-oriented philosophy" in his 2002 dissertation, contending that "objects are ontologically prior to their relations" (Morton, 2012, p. 205). Harman (2011) argued that there are two types of objects: "the real object that withdraws from all experience, and the sensual object that exists only in experience" (p. 49). The former is autonomous and unapproachable from a human perception, while the latter is discoverable by perception through experiences and senses. Morton (2012), another prominent object-oriented ontology scholar, suggested an interesting example that illustrates an ontological stance, Aeolian harps:

> In A Defense of Poetry, Percy Shelley argues that humans are like Aeolian harps (wind harps). It's an extraordinary claim, influenced by materialist philosophers of sensation

> and identity such as John Hartley. Sentience, on this view, is vibrating in tune with (or out of tune with) some other entity: sentience is attunement. . . . Shelley sneaks in a still more radical claim: "perhaps all sentient beings" are like wind harps. . . . If a sentient being is like a wind harp, and if, moreover, sensation and thinking are ontologically similar to one another, then we can invert the image. Wind harps *are like sentient beings.* (p. 205, emphasis in original)

Morton replace humans with Aeolian harps in the sentence; Wind harps are like sentient beings. Object-oriented ontology's stance is more radical in this point than new materialism's stance of extending the range of actors from humans to nonhumans.

In new materialism, Latour (2005) insisted that objects (nonhumans) also have agency like human beings and work as actors or actants. He argued that we should consider heterogeneous associations of a variety of actants beyond the binary division of humans and nonhumans. Bennett (2010) also attempted to unveil the liveness of things and the agency of the assemblage of hybrid actants. However, object-oriented ontology and new materialism have different stances on relationism. New materialists have emphasized assemblages of actors involved in social, economic, physical, and environmental issues, relieving material actors that were bounded as objects from subject-object and human-nonhuman binaries (Coole & Frost, 2010; Dolphijn & Van der Tuin, 2012). On the contrary, object-oriented ontology is based on "non-relational metaphysics" (Harman, 2016, p. 17) against relationism. According to Harman (2009) and Morton (2011), objects are not reducible to relations. They argued that relationism cannot explain the specific uniqueness of objects. Harman rejected putting relations first and argued that an object is "in and of itself apart from any relations" (p. 187). He also criticized the concept of actors in new materialism:

> To claim that reality is reducible to material factors is to make a dogmatic decision about what the primary qualities of actors really are, replacing the permanent mystery of actors with a dogmatic model of actors as extended solid things. In other words, a one-dimensional *idea* of actors replaces their reality, which is always partly surprising and opaque. (Harman, 2009, p. 110, emphasis in original)

Harman did not agree with that reality is reducible to materials or others. His arguments of new materialists' leaner aspect to actors shows how new materialism and object-oriented ontology differently approach objects or actors: as traceable and searchable ones or as withdrawn ones from our senses.

On the opposite side, most new materialists had concerns about this object-oriented approach. For example, Bennett (2012) had a skeptical view of Harman's idea that things can act alone against a frame of things-operating-in-systems. She found it contradictory that Harman theorized the relation of objects while denying relationism. Latour (2004, 2005) was also critical of stressing object and object-object relations over an association. He stressed the need for "a multifarious inquiry launched with the tools of anthropology, philosophy, metaphysics, history, sociology to detect how many participants are gathered in a thing to make it exist and to maintain its existence" (2004, p. 246). Latour (2005) also argued that most actions consist of heterogeneous connections, not of homogeneous associations:

> ANT states that if we wish to be a bit more realistic about social ties…we have to accept that the continuity of any course of action will rarely consist of human-to-human connections (for which the basic social skills would be enough anyway) or of object-object connections but will probably zigzag from one to the other. (p. 75)

As we can see in Bennett and Latour's stances, new materialists are skeptical about the anti-relationism of object-oriented ontology. The ontological stances between object-oriented ontology and new materialism are still controversial, but object-oriented ontology scholars and new materialists have continued their discussions and shared ideas about ecology (Grusin, 2015).

I present different types of vignettes reconstructed from my observation data collected through fieldnotes and videos in the block area using the distinct lenses of humanism, object-oriented ontology, and new materialism. To adopt a humanistic writing style, I extracted a part of Piaget's (1952) observation notes, which included an experiment about a lesson he taught to his child, Jacqueline, about the connection between a container and the contents using hollow blocks:

> Jacqueline receives a toy consisting of hollow blocks which fit into each other and which we separate before her eyes and scatter about. The problem is to know how she will learn to put the little blocks into the large ones. 1. Jacqueline begins by manipulating eight blocks of different sizes by trying to put the little ones in the big ones and the big ones into the little ones, varying the combinations. . . . She finally grasps a large block with one hand, a small one with the other and looks for the opening of the former in order to place the second one systematically in it; hence the experiment is accompanied at this time by a sort of reflection or mental concentration. . . . 4. Jacqueline's attempts lead to satisfying results on the whole. She no longer tries to put large blocks inside small ones, she takes account of the position of the angles and succeeds in extricating the enclosed blocks by sliding them out with her index finger. These three behavior patterns have consequently been acquired due to directed gropings and the progressive correction of the initial schemata. (pp. 316-317)

Piaget's observation shows how Jacqueline solves the problem with hollow blocks through her senses (e.g., groping) and the accommodation of her schema. She actively learns the relationship between parts and wholeness through trial and error. Piaget also vividly described Jacqueline's hand movements to present how she actively performed her experiments with the blocks. He considered her learning experiment the rational process of cognitive ability (e.g., "reflection" and "progressive correction of the initial schemata").

For an example of an object-oriented ontology narrative, I chose Harman's (2010) "metaphysical" writing (p. 5), *Circus Philosophicus*. Askin (2016) contended in *Narrative and Becoming* that the metaphysical narrative of object-oriented ontology "occupies itself with transformations of contents, disregarding the permutations of form" relying on metaphor (p. 182). Harman's piece implied his object-oriented ontological ideas and fictionalized life stories (Bateman, 2011). I present the first part of his book, Ferris Wheel, to describe how a ferris wheel's movements influence the ground, people, things, and air:

> Imagine a gigantic ferris wheel of many miles in diameter. The wheel would be lodged in a massive trench in the earth, with the hub at the ground level. At all times half of the wheel would be above ground and half beneath the surface. Over the course of twelve or fourteen hours, the wheel would make a complete circuit high in the air and deep beneath the soil. It would carry thousands of separate cars, each of them loaded with carious object. . . . Above ground thousands of people would live in the vicinity of the wheel: some applauding it, others terrified by the sight, with a few insensitive souls bored by the wheel as by a commonplace. . . . Finally it is clear that the rotating objects will have a profound effect on the crowd in the streets, harming or pleasing them on various occasions. The higher the objects move toward the summit of the wheel, the less visible

> they are to the townspeople. But when they first emerge from the earth, and again when descending to a point near the ground, they are recognized even by children. (pp. 1-4)

Harman presented this vivid image of a huge object, a ferris wheel, through its relationship with the earth, ground, air, soil, cars, people, and town. Focusing on the object, he showed possible realities in micro- and macro-levels. The possibility was toward the future because objects were withdrawn from one another, while the relation translated each other (Harman, 2011; Morton 2012).

In the case of new materialistic decriptions, I referred to Bennett's (2010) descriptions where she illustrated insights that emerged from nonhuman bodies (a dead rat, a work glove, pollen, a stick, and a plastic bottle cap):

> Glove, pollen, rat, cap, stick. As I encountered these items, they shimmied back and forth between debris and thing—between, on the one hand, … stuff that commanded attention in its own right, as existents in excess of their association with human meanings, habits, or projects. In the second moment, stuff exhibited its thing-power: it issued a call, even if I did not quite understand what it was saying. At the very least, it provoked affects in me: I was repelled by the dead (or was it merely sleeping?) rat and dismayed by the litter, but I also felt something else: a nameless awareness of the impossible singularity of that rat, that configuration of pollen, that otherwise utterly banal, mass-produced plastic water-bottle cap. (p. 4)

This scene illustrates debris. Bennett shed light on a pile of trash (e.g., a glove, pollen, rat, cap, and stick) and their vitality. As she introduced herself eco-materialist in the conference of "the nonhuman turn" (2012), Bennett described how the vitality of things influenced her ideas and feelings and how we can view today's ecological and environmental issues through

rediscovering the vitality of the debris. I deployed these points in my vignettes in light of new materialism portraying the associations of different actants through writing and images.

To reveal different patterns of block play depending on theoretical lenses, I select a moment of block play with recyclable things in Fall 2016 and show how the vignettes illustrate the same moments according to different lenses: humanism (i.e. Piaget), object-oriented ontology (i.e. Harman, Morton), and new materialism (i.e. Bennet, Barad). Recyclable things were provided by Ms. Moore and me in the block area to encourage children to play with non-commercial materials. Daniel, Lily, and Dina explored cardboard boxes and paper towel rolls. In this chapter, I explore the moment from different perspectives to inquire about the following:

- What patterns emerge when looking at a block play scene from the perspectives of humanism, object-oriented ontology and new materialism?

Three Types of Descriptions about the Block Area

At the beginning of the new school year, Ms. Moore's classroom did not have any area for recyclable things. During my observation of the block area, I realized that children sometimes wanted to keep the buildings they made, but there was not enough space or building materials to do so. The block play area was a multi-purpose space, used for morning meetings, large group activities, and dismissal, and there was no extra space when children were sitting on the rug. Even though the children could have kept their building projects, they would not have been able to make new things because of the limited pieces of building materials. This situation made me think about making recyclable things available so that children could keep their work. I discussed this issue with Ms. Moore, and we decided to provide children with recyclable things in the block area. I describe a moment of block play with the recyclable things, Mega blocks, and

unit blocks in light of three different lenses: humanism, object-oriented ontology, and new materialism. Then, I explain what insights can be attained from this exploration.

From Humanism

Two weeks after the recyclable things were introduced in the block area, Daniel started building with them. Daniel is an African-American boy, and his mother was an assistant teacher in another pre-K class at Harmony Elementary School. Lily and Dina who are African-American girls joined in his building activity later. Lily usually played with the doll house and figures, but on this particular day that I describe below, she played with the new things in the block area. In Vignette 4-2, I present the moments of block play that involved the recyclable things, Daniel, Lily, and Dina by drawing on a humanist perspective:

Vignette 4-2. Video transcripts and fieldnotes from a humanist perspective: 10/07/16

Right after planning time, Daniel begins by looking around the block shelves and goes toward the recyclable things. He pulls out the container of recyclable things without hesitation, takes out a cardboard box and puts it on the rug. Daniel grabs two cardboard boxes with his hands and stacks them up one by one. (see Figure 4-1). He takes out a paper towel roll and glances at its bottom hole. Daniel seems to put it on his building, but he returns it back to the container. Then, Lily comes over to the container and says to Daniel, "Can I play with you?" He takes another box and puts it on the top of his building, and it falls down. The middle box also falls down

Figure 4-1. Daniel's picking up the container of recyclable things (left) and Danie's building with them (right).

simultaneously. Lily adds one box to the bottom box, and Daniel puts on another box, but it immediately falls down. Daniel abruptly throws another box toward the building, and the building collapses. His experiment continues by mental concentration, and his new behavior pattern emerges due to the accommodation of the previous schema. Lily keeps trying to add more boxes, trying to balance them. Dina joins in their play, and Daniel says, "I am making my house" and makes a "T" shape with two boxes. Daniel soon leaves and plays with soft unit blocks and a car.

In Vignettes 4-2, Daniel chose the recyclable things that Ms. Moore and Ms. Luciana encouraged children to play with. From a developmental perspective, Daniel's building action indicated his good fine motor skills and hand-eye coordination in their physical development as well as spatial skills related to mathematical ability (Aoyama et al., 2015; Jirout & Newcombe, 2015; Verdine et al., 2014). Daniel tried several trials with the cardboard boxes with his fingers and two hands. According to Piaget's developmental stage, Daniel belongs to preoperational stage, in which symbolic thinking is possible, and dramatically he can develop his language ability. Based on Piaget's explanation, Daniel showed his cognitive development by using symbolic thinking (i.e. symbolizing the building of the cardboard boxes as his house). From the humanist perspective, children's choices and abilities are prior to things' vitality because the things are objects that are supportive tools for children's learning/development and passive objects waiting for children's choices and manipulations. Nonhumans cannot have power out of human manipulations.

Vignette 4-1, which described the introduction of interest areas, showed how educational goals (e.g., becoming familiar with classroom interest areas) and teacher's intentions (e.g., helping children identify materials with specific interest areas) are embedded in and stressed in the daily routines. Ms. Moore repeatedly offered the orientation about each interest area and

things that belonged to the area. The plan-do-review system of High Scope emphasizes the idea of active learners, stating that children should choose interest areas, work there and review their activities later (Epstein & Hohmann, 2012). According to Epstein (2007a), the active learner is a key concept as Piaget emphasized it and described as the learner who makes his or her own choice (plan), work based on the choice, and review the work through representation (e.g., drawing a picture, verbalizing words, or writing words). Children's choice and initiative are emphasized in these routines and goals. Although free play seems to have open-ended pedagogy and to imply able children, but it is intentionally calculated and limited within the discourse of child/development (Gallacher, 2006).

In addition, teachers' intentional plans and preparations for educational materials and settings are stressed in High-Scope. Teachers should always be intentional in their plans, activities, preparation for materials and settings, and interactions with children (Epstein, 2007; Epstein & Hohmann, 2012). Ms. Moore considered imaginary and pretend play significant in the block area and added the doll house accessories (e.g., furniture, figures, family rag dolls) to the block shelf. In the setting prepared with the teacher's intention, Daniel and Lily chose the recyclable things and explore them. In the case of Piaget's observation notes, he provided Jacqueline with intended hollow blocks in the experimental settings. However, Piagetian scholars cannot explain how Daniel and Lily chose the recyclable things at that moment beyond the experimental settings and how Daniel's behavior of throwing the box toward other boxes can be understood in a developmental framework. While Piaget pays attention to human cognitive development, Harman emphasize the object's essence that humans cannot reach and assumes that the object can exist beyond the relation with others. I describe the same moment in the block area by drawing on Harman's ideas and narratives in the next section.

From Object-Oriented Ontology

Following Harman (2010)'s writing style, I describe the same scene with object-oriented ontology in the following vignette.

Vignette 4-3. Video transcripts & fieldnotes from an object-oriented ontology perspective: 10/07/16

Figure 4-2. Magnified shelf C and recyclable things in the blue container (right below).

Figure 4-3. Recyclable things in the blue container (red line square) in shelf C and Daniel's walking toward the things.

Pay attention to the cardboard boxes and paper towel rolls in the blue plastic container (see Figure 4-2). The recyclable things occupy a small space on the lower shelf in the block area. They belong to Ms. Moore's trailer classroom at Harmony Elementary School in a busy city with traffic and a multicultural population. Children aged four in the city can register for this pre-K program and play or walk or build with the recyclable things. The appearance of the recyclable things captures Daniel's attention (see Figure 4-3). Daniel pulls out the container of boxes and paper towel rolls and picks up two boxes. The recyclable things would become Daniel's house, a fire truck, art, a musical instrument, a mother, and a friend. When Daniel tries to add one more paper towel roll to the boxes, he finds its empty body and return it to the container. The paper towel roll might have come from someone's kitchen or a public restroom or a classroom or a restaurant. Daniel takes another rectangular box from the blue container and puts it on the top of the other boxes. The recyclable things collapse on the rug. Lily snatches them and tries to connect them as

a vertical line. The recyclable things would be scattered on the ground on which the trailer classrooms are set, and on the asphalt-paved ground (see Figure 4-4), children would kick the things, run, laugh, or take the things to their homes or throw them on the streets in the city. Daniel finds soft unit blocks and leaves the scattered cardboard boxes.

Figure 4-4. Trailer classrooms on the asphalt-paved ground.

Drawing on Harman's narrative and object-oriented ontology, the vignette on the same scene manifests how the recyclable things can have relations with other objects. The objects become "any entity whatsoever: symphonies, grass, poems, wind, nebulae, wind harps, plays, humans, spools of thread, porpoises" (Morton, 2012, pp. 205-206). In this sense, the recyclable things in the classroom would become a fire truck, art, even humans. Although the recyclable things have relation with Daniel, Lily, the container, and rug, we cannot know where the recyclable things came from and designate the identity of the objects. Harman (2011) insisted that objects themselves exist regardless of human thoughts:

> . . . there is still another way to look at the problem, for it is false to hold that "tree outside thought" means the same as "thought of a tree outside thought." In the first case I refer explicitly to the tree apart from my thinking of it; here, its qualities remain mysterious and at least partly unknown. By the contrast, in the second case everything is

> already there for the taking: for I am speaking of the accessible thought of a tree, not of a tree hidden outside that thought. (p. 66)

Harman argued that objects are not under the control of human thoughts. Objects have their own qualities and characteristics that humans cannot fully access through human senses and perceptions. The recyclable things also have their own qualities we cannot fully acknowledge and understand.

In the humanist description (Vignette 4-2), objects were described as passive tools in the divide of subject (humans) and object (non-humans), and they were considered media for developmentally appropriate building activities. However, the stance and narrative of object-oriented ontology is leading us to acknowledge objects outside anthropocentric meanings, such as building, mathematical materials, non-commercial, or even open-ended materials decided by human perceptions and intentions. This approach allows us to rediscover the qualities/beings of the recyclable things and relations among them beyond the idea of intended materials. While the qualities of the objects and the relations emerged from the observer's observations and sentience, the objects have more qualities and possibilities beyond what the observer knows.

The recyclable things have relation with Daniel, Lily, shelves, rug, trailer classroom, asphalt-paved ground, trash can, and the city. I did not video-record these all relations around the recyclable things, but I cannot assure that the relations did not emerge. The recyclable things with their own qualities we cannot know had an impact on Daniel, Lily, the container, the trailer classroom, the ground, people in that area, and the city. The objects showed "butterfly effect" well. It means chaotic phenomena: "a butterfly flaps its wings in China and sets off a tornado in Texas. Small events compound and irreversibly alter the future of the universe" (Boeing, 2016, "Unpredictable Systems: The Butterfly Effect" section). Within the boundary of our experiences,

we cannot perceive the relations between the recyclable things and other objects, but the qualities of the recyclable things have the chaotic possibilities in realities. In the next section, I present another vignette from the perspective of new materialism.

From New Materialism

The recyclable things were added by me and Ms. Moore to find out how children would respond to the non-commercial materials. The recyclable materials also enabled children to keep their own work, because they could be replenished at no cost; the other blocks required cleaning-up because of the issue with limited block pieces and space in the block area. In light of new materialism, things can be traced through their associations with heterogeneous actors (people, things, space, time, and discourses) rather than being unreachable by human senses and rationality. Drawing on new materialism and Bennet's narrative, I describe the same scene in the block area in the subsequent vignette.

Figure 4-5. The presence of recyclable things (above), building of boxes, a paper towel roll, Daniel, and a blue container (below).

<u>Vignette 4-4. Video transcripts & fieldnotes from a new materialist perspective: 10/07/16</u>

The recyclable things consist of empty boxes and paper towel rolls and are in the shelf C. I wonder how children would find them and how the recyclable things would act to the children and then, how children would react to them. Daniel promptly pulls them out and carefully piles them up one by one (see Figure 4-5).

Figure 4-6. Light-weight boxes' falling down.

Figure 4-7. Intra-action of light-weight boxes and Lily.

Lily joins in the building. Daniel, the boxes, and Lily act together. The light-weight boxes are slightly wavering and easily fall down on the rug (see Figure 4-6 above left). The action of Daniel, the boxes, and Lily cause Dina to join their building. Lily concentrates on building the boxes with her eyes wide and a gentle, careful touch (see Figure 4-7 above right). The boxes and the rolls weakly collapse, and Daniel leaves the boxes and goes to the soft unit blocks (see Figure 4-8). Lily and Dina take out a Mega block container and put the recyclable things away.

Figure 4-8. Collapse of boxes (red line) and meeting of Daniel and soft unit blocks.

As described in the above vignette, the objects are not objects (i.e., objects of the study) from a new-materialist perspective, but rather, they are vibrant things that are "in movement, as distinct from objects" (Ingold, 2012, p. 439), undergoing transformation in the association with people, things, and discourses.

The recyclable things became open-ended or bounded, depending on the entanglement with Daniel, rug, the container, Lily, and Dina. When they were intentionally provided by the teachers and me in the block area, they were defined as building materials or non-commercial things. Daniel, Lily, and Dina worked hard building with the boxes and the rolls. The light-weight boxes easily fell over several times and defied the children's will to build them in a vertical way. At that moment, the recyclable things became vibrant things, distinct from the other building materials. According to Bennett (2010), the vitality of nonhuman bodies refers to "the capacity of things…not only to impede or block the will and designs of humans but also to act as quasi agents or forces with trajectories, propensities, or tendencies of their own" (p. viii). The vitality of the boxes and rolls blocked children's desire to build them vertically because of their light weight. This vitality led Daniel, Lily, and Dina to choose different blocks, the soft unit blocks and Mega blocks.

The block area was filled with a variety of building toys (the soft unit blocks, the cardboard blocks, a train track, and a road building set) and toy props (dolls, figures, doll house furniture, and plastic cars). In Vignette 4-4, the Mega blocks and recyclable things met as different types of materials: the Mega blocks are commercial building toys, and the recyclable things are non-commercial things. Exploring the tension between the Mega blocks and the recyclable things was my intention in the beginning. The Mega blocks are made by Mega Brands Inc., which produces large interlocking brick building sets and is ranked second in sales of construction toy sets after Lego. Mega blocks are distributed in Europe, the U.S., and Canada though major commercial chains. The Mega blocks were designed as developmentally appropriate mathematics materials for instructive purposes and also for children's creativity. Atkinson (2015) insisted that "toys are embedded with developmental ideals, and how they are

used thus becomes a measurement of developmental skills" in ECE settings (p. 58). In addition, the well-defined block area in Ms. Moore's classroom faithfully followed the guidelines of High Scope and the ECERS-3. When rearranging the block area in Summer 2016, Ms. Moore checked each item of the block area according to the ECERS one by one several times. In the classroom, implying the discourse of High Scope and the ECERS (normal development and universal measurement), the Mega blocks, Daniel, the boxes, Lily, Dina, the paper rolls, Emily, the figures, and the furniture collectively performed and continuously transformed each other.

In the commodified block area, providing the recyclable things was a new experience for Ms. Moore as a teacher. Through discussions with the teacher, I prepared the reusable things as non-stereotypical/open-ended materials children could use in their work. At that time, I aimed to reveal people's blind faith and assigned meanings toward commodified products by adding the empty boxes and paper towel rolls and to rethink the commodification of the block area in ECE. The issue of commodification is related to the restraint of things as objects, "completed forms" not in movement (Ingold, 2012, p. 439). In this sense, I thought if the block area included recyclable things (non-commercial and open-ended materials), we could observe more dynamic energy between the vibrant things and children in block play. However, through the moments of intra-actions of children the recyclable things, I realized that things become open-ended or bounded only in momentary association with nonhumans, humans, discourses, and hybrid actors. We cannot tell the open-endedness in advance or without the associations. Rather than critiquing the commodification of materials in the block area or in ECE classrooms, it is noticeable that the becoming of open-ended things relies on the entanglements among the different elements: recyclable things can be stereotyped, or commodified toys can be open-ended, depending on their associations with others.

Ms. Moore had the material list of the program quality assessment (PQA) from the High Scope. It suggests open-ended materials (e.g., recycled materials, natural materials, *blocks*, dolls, etc.), real materials (e.g., steering wheels, telephones, tools, cooking utensils, etc.), non-stereotypical materials (e.g., *blocks*, figures of people, tools, dress up clothing, etc.), and multicultural materials (e.g., menu, *blocks*, family photo albums, money from different countries, etc.). In this context, blocks are considered open-ended (non-predetermined), non-stereotypical, and multicultural materials. Nevertheless, many studies on toys, including blocks, contended that toys impart specific messages about creativity, development, and academic achievement since the baby boom in America (Atkinson, 2015; Ogata, 2004; Wohlwend, 2009). Building blocks, "constructed by postwar toy manufacturers, educators, psychologists, and parents who sought to direct children's play towards productive ends" have also been associated with "instructive rationality and free-form expression," connecting children and creativity (Fanning, 2018, p. 89). The blocks or any other open-ended materials in the list of PQA are not purely open-ended, and they are already bounded in the discourse of creativity, development, and academic achievement. However, the collective performativity of the recyclable things and children produced different and distributed meanings of things.

Discussions

This chapter attempted a theoretical experiment through comparing descriptions based on different lenses of humanity, object-oriented ontology, and new materialism. Through the comparison, I aimed to explore emerging phenomena and materiality in the block interest area in which the discourse of child development (e.g. High Scope, ECERS-3, and commodified toys) was embedded. The description from the humanistic perspective revealed children's cognitive development through the interaction with the recyclable things within the intended settings.

Object-oriented ontology lens showed the qualities of recyclable things we cannot define and offered an opportunity to rethink the meaning of open-ended materials in the block area. A new materialist lens presented vibrant recyclable things and trash in the association with heterogeneous actors. I discuss a few implications for early childhood research and practice.

For Early Childhood Research

We need more research about things rather than objects in ECE contexts, drawing on theories (object-oriented ontology or new materialism) relieving us from the humanist perspective. Object-oriented ontology will enable us to have humble minds toward things and to appreciate their presence because it assumes that we cannot reach true objects beyond our senses and knowledge. In the case of new materialism, it will lead us to revalue materials in movement in the association with children, other materials, teachers, and the setting and the collective actions of things, children, teachers, and space. New materialists have distinguished things from objects (Bennett, 2010, 2012; Brown, 2003; Ingold, 2012; Trentmann, 2009). Things have been regarded as "prior, more authentic, and less polluted than objects" (Trentmann, 2009, p. 289). Bennett (2012) also argued that "thing" is a better term than "object" since it avoids the dichotomy of subjects and objects and we cannot delimit the vitalities of nonhumans or things. People attempt to assign values to things and to make them objects, but things are a "gathering of materials in movement" and in assemblages (Ingold, 2012, p. 439). Considering the meaning of things distinguished from object's, we need in-depth research about vitality of things and materiality in ECE settings where discourses on developmentalism are dominant. Most ECE classrooms are divided into interest areas with different materials, but few studies have carefully examined the materiality and things in each interest area or whole areas. To close this gap, we need more research drawing on new materialism in ECE.

Researchers need to contemplate a good match between theory, descriptions, and images. Drawing on the key ideas of each theory, I presented different style of descriptions with relevant images. The humanistic vignette presented how children actively interacted with things and constructed their knowledge in the prepared settings. The object-oriented ontology description and images showed unexpected spaces and possible relations with or without the objects. The new materialistic descriptions and images revealed the vitality of things in the heterogeneous associations in the block area.

For Early Childhood Practice

We need to rethink the meaning of open-ended materials in ECE beyond they are treated in the general guidelines of High Scope, ECERS, PQA, manufacturers or other programs/assessment tools because things can perform. The guidelines of the High Scope, the ECERS, and the PQA suggest well-defined interest areas and the educational roles of materials to meet academic goals. They also categorize types of materials, such as real objects, open-ended objects, and multicultural objects. However, as I described before in this chapter, things continuously change in the association with humans, nonhumans, and hybrid ones, or things exist beyond our perception and sense. Becoming of open-ended materials momentarily happens in the association with the others. Our attitude toward things needs to be open-ended and flexible. With a perspective of object-oriented ontology, the recyclable things were not really open-ended in the humanistic environment. They were already defined by the teacher as building blocks for children's creative work. The object-oriented ontology encourages us to see recyclable things as being undecided and withdrawn from our perceptions and intentions. From this ontological perspective, knowing the full meaning and purpose of the recyclable things is impossible because the real objects are hidden from humans.

I also think that Bennett's (2010) narratives toward trash, ecology, and ethics helps us revisit environmental education in ECE. To teach recycling and reusing things is common in preschool. After the recyclable things emerged in the block area, Ms. Moore also prepared a recycling bin in the classroom and introduced how to divide trash and recyclable things and how to put them away into trash and recycling bins. However, this common practice for environmental education is missing the thing-power of the trash: how the trash leads to destructive environments for animals, plants, and humans, or how the trash occupies our everyday life (e.g. plastic straws, disposable cups and dishes, and food wrappers). We should reuse the recyclable things in various ways, but at the same time we have to teach children how the vibrant trash can attack us in unexpected ways based on children's experiences and life. Scholars in environmental education have introduced environmental sensitivity as a fundamental element of the environmental education (Hungerford & Volk, 1990; Metzger & McEwen, 1999; Sivek, 2002). The researchers defined the environmental sensitivity as "an empathetic perspective toward the environment" (Hungerford & Volk, 1990, p. 261) or as "having empathy for or relating to other living things or ecosystems" (Sivek, 2002, p. 157). This empathetic mind or perspective toward living nonhumans can be developed through applying new materialistic attitudes for ecology into daily activities in preschool. For instance, teachers can compose a short story of plastic straws and polar bears based on current issues and reports and have a story time with children by using plastic straws, puppets, and background pictures. The story telling by using the nonhumans' voices and narratives can introduce children the nonhuman's own stories of history, suffering, and hope and motivate the children to empathize with their stories and situations.

CHAPTER 5

EPILOGUE

My journey through this dissertation study offered me several unique experiences: recognizing coordination between material actors and Ms. Moore's responsiveness in the rearrangement of the block area, tracing intra-actions of blocks and children in the block area, and looking at the block area from three lenses of humanism, object-oriented ontology, and new materialism. Understanding different ontological stances makes me realize that my thinking and viewpoint has been deeply human-oriented and that I am just a novice at identifying material agencies. The whole research process has been intra-actions of me, the theoretical lens, video-cameras, fieldnotes, video and audio data, blocks, Ms. Moore and her classroom, children, my advisor and her guidance, space, time, computer, and so on.

In Chapter 1, I provided a literature review on block play and the methodology for exploring materiality in a pre-K block interest area. Chapter 2 shed light on both the material actors that participated in the rearrangement of things and settings and the teacher's reactions and sensitivity to them in the block area to show their collective actions. Chapter 3 followed the rearranged blocks and other things in the block area and illustrated the intra-actions of the blocks and children to reveal how blocks became blocks through the intra-actions and the performativity. Chapter 4 explored the same moment of block play from humanism, object-oriented ontology, and new materialism in order to get insights from the theoretical experiments. In each of the preceding chapters, I discussed the implications of my exploration for research and

practice in ECE. In this chapter, I conclude this dissertation with the overall implications of the study for early childhood research and practice and with my final thoughts.

Implications

For Early Childhood Research

I think humility toward things and nonhumans can lead to a more harmonious way of approaching the issue of embodied learning in ECE. Trentmann (2009) asserted that "adopting a more humble caring attitude to things will make for a more realistic, ecologically safer way of dealing with problems in human-nonhuman relations" (p. 292). Traditionally, ECE research has focused on children and teachers from humanist perspectives. However, the human-oriented views and studies have failed to recognize collective actions of humans and nonhumans and to account for how children's bodies are continuously intra-acting with things, people, and hybrid actors. I also point out that new materialism does not reduce the role of human actors by focusing solely on or exaggerated nonhuman actors. I believe research drawing on new materialism can reveal various phenomena in ECE that have not been studied before and that require reassembling. Examining material actors and materiality will also contribute to reinvigorating and reimagining experiential and embodied learning promoted by the field's pioneers, such as Froebel, Montessori, Hill, and Pratt.

A theoretical framework beyond developmentalism and other humanistic perspectives is critical to recognizing materials in classrooms as vibrant matter (Bennett, 2010). In the previous studies on block play, most researchers drawing on the theory of Piaget or Vygotsky have paid attention only to children's learning and development without recognizing the collective actions of things and children. I believe recognizing dynamic intra-actions between children and things

might be a way to appreciate material and other non-human bodies as "an integral part" of children's experiential bodies (Barad, 2007, p. 158). Play happens not due to children's actions alone, but through the intra-actions of things, children, space and time.

In addition, I think materiality emerging from the research process is an area that warrants more attention. In qualitative research, an observation tool can be a significant actor. In this study, I used two video-cameras (one for wide shots and the other for both close-up and wide shots) and two tripods (one mini-size and one regular size). I tried to keep them from interrupting activities in the block area by adjusting their positions. However, children were aware of the presence of the cameras and tripods. During observations, for instance, the intra-action of Dina, Mega blocks, Emily, and paper towel rolls prompted me to move one of my cameras, and then Dina responded to the camera by explaining what she had built even though I did not ask her any questions. I constantly worried about how to capture moments with two cameras to reveal both material actors and the association of hybrid actors while collecting data. I realized how I had gotten used to focusing on human actors and needed to consciously practice following material actors with my eyes and video-cameras. This concern continued as I contemplated how to effectively visualize my data and analysis results from the perspective of new materialism. These processes led me to recognize that the angle, location, type of video-cameras and the type of tri-pods had become actors. Depending on the video-camera's angle, location, and type, I encountered different video moments and audio data. The types of tripod (e.g., mini or regular size) also led me to move my body in different ways during observations. Thus, this study reflects the intra-actions of me as a researcher, Ms. Moore, children, things in their classroom, video-cameras, tri-pods, the data, laptop, theories, literature, and the guidance of my advisor and committee members.

For Early Childhood Practice

I believe research drawing on new materialism helps educators reinvigorate free play and embodied learning by recognizing the vitality of things and their intra-actions with children. Free play is unique to the curriculum of ECE, and embodied learning is also a fundamental element in ECE settings (Taguchi, 2014). Although children are supposed to freely choose where and how they want to play during this period of time, their choices are delimited within the discourses of child development and academic achievement as well as the commercialization of materials (Gallacher, 2006). According to these discourses, children need sensorimotor and experiential learning for their cognitive development. Based on a humanistic perspective, these discourses assume the active role of the child. However, a new materialistic perspective reveals that neither humans nor nonhumans are everlasting subjects or objects and that children and things are repeatedly doing intra-actions because phenomena reflect "entangled material agencies" (Barad, 2007, p. 56). The new materialist perspectives encourage us to accept that "all bodies, not merely 'human' bodies, come to matter through the world's iterative intra-activity—its performativity" (p. 152) in free play and embodied learning. Barad (2007) contended that "knowing is not a bounded or closed practice but an ongoing performance of the world" (p. 149). Free play or embodied learning does not happen in a unidirectional way of humans, by humans and for humans, but in a "dislocated" way (Latour, 2005, p. 46) through collective actions among different actors beyond the boundaries of subject/object and humans/nonhumans.

I believe that the collective actions of humans (e.g., teachers, children, families), nonhumans (e.g., things, curricula) need to be discussed with teacher candidates and professional teachers. Although intentional teaching has been stressed in ECE (Epstein, 2007), having an orientation about thing-power and the sensitivity toward the intra-actions of heterogeneous actors

will promote teachers' appreciation of the performative meaning of knowing and becoming. To this end, I propose shifting the focus on teachers' conscious reflection and intentionality to their appreciation of embodiment, materiality, and collective actions.

Final Thoughts

Figure 5-1. A photo of Joe Fig's artwork, "Pollock #1 (2002)" (Retrieved from Joe Fig's website)

A myriad of paint buckets, brushes, canvases with an artist standing in the middle catch our attention in Figure 5-1. This photo presents not a real person and things in his studio but a sculpture of the artist's studio. An artist and author, Joe Fig (2015), made the sculpture and introduced his artwork as "an investigation into the creative process of the artist and the space where art is made" (p. 8). When I encountered his artwork and a short film about his artwork process through his website, I felt like I could hear the voices of a variety of things from the art

piece. This photo led me to realize that a canvas on the wall of a gallery in itself would not make it artwork. Instead, the iterative intra-actions of matter and an artist become true artwork. The space of the artist's studio offered the artist various insights, and Fig could start his project of *Inside the Artist's Studio* (See Figure 5-2).

Figure 5-2. Joe Fig's working on a sculpture of an artist's studio (Retrieved from Joe Fig's website)

From a perspective of new materialism, Fig's project is a study of the materiality of the studio where matter and humans collectively work and transform each other. As Barad (2007) contended that "objects are not already there; they emerge through specific practices" (p. 157), things become artwork through the intra-actions of things and an artist. As most people pay attention only to the canvas (outcome) in a gallery rather than the intra-actions of things and the

artist, we focus on children's development or academic achievement rather than on performative intra-actions of things and children. I, as a researcher studying materiality in a pre-K classroom, have deep sympathy with Fig's project as a journey to explore the vibrant materiality of the studio.

Through this dissertation study, I have contemplated how humans and nonhumans can transform themselves with other beings and continuously extend their worlds through relationships (associations, assemblages, intra-actions, and collective actions). This process required me to reflect on my own stances and perspectives as a human, educator, and researcher and to challenge my familiar way of thinking by inviting material actors into my analysis and putting myself in things' shoes. Marcel Proust (1929) depicted the experience of looking through other eyes and the effort and pain it takes to do so in *Remembrance of Things Past*:

> The only true voyage of discovery, the only fountain of Eternal Youth, would be not to visit strange lands but to possess other eyes, to behold the universe through the eyes of another, of a hundred others, to behold the hundred universes that each of them beholds, that each of them is; and this we can contrive with an Elstir, with a Vinteuil; with men like these we do really fly from star to star. (p. 160)

The journey of discovery asks us to look through the eyes of others. To have others' eyes means to hold their different universes. Among those universes, I hope to say more about having humility toward things. When we appreciate things and nonhumans, we can appreciate our bodies and beings in their ecological environment. As nonhumans and humans are entangled in the world; things, children, and teachers in ECE are connected and associated. We are required to care not only for people but also for nonhumans in those connections.

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