Spatial influences on socialization in preschool classrooms

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Spatial influences on socialization in preschool classrooms

by

Zina Nabeel Alaswad

A thesis submitted to the graduate faculty
in partial fulfillment of the requirements for the degree of

MASTER OF FINE ARTS

Major: Interior Design

Program of Study Committee:
Lori B. Stone, Major Professor
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Iowa State University
Ames, Iowa
2013

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ABSTRACT

Understanding the influences of the physical environment on social interaction of preschool children is essential for creating classroom environments that provide for social development. This research hypothesizes that providing an "Intimate Space" within the preschool classroom can lead to decreased classroom interruptions and contribute to sustaining longer attention spans, which eventually improve the quality and duration of social interactions between children. The study proceeds into performing a quasi-experiment within a preschool classroom to evaluate the physical attributes of its environment. It also evaluates child behavior through observation before and after introducing the "Intimate Space" as a new activity center. Results of the experiment are analyzed to prove the hypothesis and conclude modifications to the classroom layout and design.
CHAPTER 1. INTRODUCTION

The first three to five years of a life lay the foundation of each individual's personality, belief systems, and way of seeing and being in the world. As novelist Barbara Kingsolver writes: “We can see, if we care to look, that the way we treat children, all of them, not just our own, and especially those in great need--defines the world we’ll wake up in tomorrow.” Because children are in the course of developing physical, cognitive, social, and emotional skills, their interactions with the physical environment can have long-lasting effects. Understanding the milestones of child development and their relation to the physical environment of the child is fundamental in creating spaces that provide children with opportunities to blossom and advance at a young age (Bunker-Hellmich, 2003).

Children's development is strongly influenced by the presence of a supportive child care environment. The design of a child care center can either promote or discourage contact between child and caregiver. It can create a pleasant work environment that eases the task of care-giving or it can add to the burdens and exhaustion of a caregiver. The design of a child care center can also encourage children to initiate social interaction with their peers and adults in the classroom environment. Providing for predictable, consistent, and intimate care for each child needs to be a significant concern in all design related decision-making (Olds, 2001).

For many children, preschools are places where they encounter interactive styles and practices of engaging with others that are different from those they experience at home. These can be challenging experiences for young children who are just beginning to develop social skills and relationships. Recent research suggests that rather than focusing on the general quality of preschool programs, it is important to refocus on the social and emotional climate of the program (Howes, 2011). After going through multiple resources, little research has been conducted to examine the between the spatial planning of the physical environment
within a classroom and the social development manifested in social interaction of preschoolers.

The main purpose of this research is to understand the direct and specific effects of the physical environment of the preschool classroom on children's social interactions. The physical environment consists of several elements. However, this research focuses on understanding the direct correlation between the provision of private spaces in the preschool classroom and the level of children's social interactivity with each other.

The motivation behind this research is multi-sourced for a personal interest in child care spaces has developed after approaching the topic from a designer's point of view when visiting multiple child care centers in Jordan to be able to develop a proposal for a new center. Another source of motivation in the social development of children in such spaces is the fact that in later school years, children do not get the chance to focus on their social expression and interactivity as an individual since the main interest of elementary education is their academic development. Therefore, this research is a step to create guidelines for designing preschool classrooms with emphasis on children's social interactivity.

Many questions have been raised regarding the understanding of social development and the latest research done on the subject of social interaction in preschool's classrooms. However, the main question of this research is "How does the provision of Intimate Spaces in the preschool classroom effect children's social interaction?". The "Intimate Space" is a spatially well defined behavior setting, within which a group of 2-3 children can interact socially. Therefore, the hypothesis of this study suggests that providing an "Intimate Space" within the preschool classroom can lead to decreased classroom interruptions and contribute to sustaining longer attention spans, which eventually improve the quality and duration of social interactions between children (Moore, 1994).
Evidence-based design is the main methodology of this research. Within a quasi-experiment, children 3-5 years old in a preschool classroom are observed before and after introducing a minor design intervention to collect data on how minimal changes in the physical environment can affect children's social interaction. Evidence based design makes it possible to design a classroom that can measurably improve children's behavior since it is the process of basing decisions about the physical environment on credible research to achieve the best possible outcomes. Several studies over the past years have established links between specific design characteristics and children's development (Tomasi, 2010). The spatial organization and the behavioral settings of the physical environment of children are initially rated according to a modified version of a scale developed by Gary T. Moore (Moore, 1994). The scale of organization and character of individual rooms or areas is used in this study to analyze the characteristics of existing activity centers in the preschool classroom. An evaluation of the existing physical and behavioral settings can aid the process of decision-making required to suggest a proper location and rationale for introducing the "Intimate Space". Children's behavior is also observed before and after the introduction of the intimate space. Behaviors are recorded through using a modified version of a behavior observation schedule developed by Gary T. Moore for early childhood environments (Moore, 1994).

Unfortunately, this study is performed in one preschool classroom and on one group of children. This causes for less reliable results since different classrooms and groups of children may introduce other variables within the physical environment and the behaviors of children. Also, this study cannot be guaranteed to provide valid measures if performed among children with physical or intellectual disabilities since these populations are not studied within this research.
CHAPTER 2. LITERATURE REVIEW

The research focuses on understanding the direct correlation between the provision of intimate spaces in the preschool classroom and the level of children's social interactivity with each other through implementing a quasi experiment where children 3-5 years old in a preschool classroom are observed before and after the introduction of a minor design intervention.

The areas of the literature review have been examined to provide the following steps of this research with a background that also plays a role in setting the stage for where this study fits within the knowledge available. The literature review includes three main areas; Children's Social Interaction and Development, Preschool Classroom Design, and Environmental and Behavioral Scales for Child Care Center Evaluation.

The first area starts with defining social development and clarifying its' importance to children's growth. It proceeds into discussing the manifestations of social development through social and emotional competencies and the role of social interaction as one of the tools for such development.

The second area of the literature review provides a short historical introduction of classrooms design considerations, and discusses the environmental needs of children and how the physical environment can meet them. It then proceeds into clarifying the importance of the physical environment and its' organization to children's development in general and to their social development in particular. General guidelines for child care design are also discussed to review existing classroom design ideas for social development. Finally, it provides a detailed review of particular design elements in the classroom and how they influence children's interactivity and development in the space. The importance of this last portion is to clarify the design elements that are not well studied so far and how this research can help add to the existing knowledge of the field by addressing these elements. The third
and final area of the literature review explicitly explains the different contents of scales and schedules used in the administration of the research experiment.

**Children’s Social Interactions and Development**

**Definition and importance of social development.** At the preschool level, social and emotional competence includes the ability to effectively express and regulate emotions, establish positive relationships with peers and adults, and solve interpersonal problems (Voegler-lee & Kupersmidt, 2011). The Collaborative for Academic, Social and Emotional Learning (CASEL, 2003) provides a framework of five core competencies of social and emotional learning. A brief description of each competency is provided in Table 01.

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<tr>
<th>Competency</th>
<th>Definition</th>
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<tr>
<td>Self-awareness</td>
<td>Understanding basic personal emotions</td>
<td>Being able to articulate that one is sad, happy or angry.</td>
</tr>
<tr>
<td>Social awareness</td>
<td>Understanding other’s thoughts and feelings and expressing empathy</td>
<td></td>
</tr>
<tr>
<td>Self-management</td>
<td>Development and use of emotion regulation skills to manage emotions</td>
<td></td>
</tr>
<tr>
<td>Relationship skills</td>
<td>Develop positive relationships with peers and adults</td>
<td>Displays willingness for cooperation and sharing</td>
</tr>
<tr>
<td>Responsible decision-making</td>
<td>Skills for solving common social problems</td>
<td>Being able to waiting for something/ someone or having something taken away</td>
</tr>
</tbody>
</table>

Early social-emotional learning during the preschool years is important for several reasons. First, preschool is a time for rapid growth and development in both of these domains. Many new social and emotional skills are first being developed, tried and tested outside the home environment with both peers and teachers, often in a classroom context (Voegler-lee & Kupersmidt, 2011). Preschoolers have the chance to practice different social skills such as
sharing or waiting for their turn which will lay the foundation for more complex social interactions that will be encountered with peers and teachers later in school years.

Second, children are less likely to face problems socially, academically, and behaviorally in early elementary school if they are successfully prepared for the transition to kindergarten. As children enter their early elementary years, behavioral and social demands increase as interactions with peers and adults require more refined social skills. Also, as children grow it becomes harder to intervene or modify their social, emotional and behavioral skills.

Recent studies have shown that most states in the US adopt early learning standards which strongly emphasize cognitive and language skills and devote much less attention to social and emotional skills of children. However, significantly different expectations are expressed by teachers and parents. Statistics have shown that communication skills and enthusiasm to learning new activities are among the most important qualities for early learning (Thompson and Goodman, 2009).

Researchers argue that children enrolled in programs that instruct them in social-emotional skill development are more connected to teachers and school, more engaged in learning, more motivated to learn, less likely to engage in problem behavior, and better able to perform on achievement tests and obtain higher grades in later years (Zins, Weissberg, Wang, & Wallberg, 2004).

**Manifestations of social development.** By age 3, children start expressing their likes and dislikes firmly as well as new ideas about themselves. Initial notions of morality become well revealed in their conversations, first friendships start forming, and they learn that their own desires for companionship and toys are best met when they consider the needs and interests of others (Berk, 2005). Preschoolers’ social tasks include managing emotional arousal within interaction while coordinating social play.
**Social and Emotional Competencies.** Child's ability to express emotions in keeping with his/her goals and social context is extremely important for developing social competence. Emotional and social competencies include expressing emotions in a way that is advantageous for moment-to-moment interaction and relationships over time. First, an effective message should be contextually appropriate. The second step is for children to learn which expressions of emotion facilitate their goals in a given social context. Third, after determining a contextually appropriate effective message, children must also send it convincingly, in terms of method, intensity, and timing. Fourth, one must adhere to pro-social and self-protective display of rules in sending affective messages. Finally, unique characteristics of situations and interaction partners must be considered.

Children's social and emotional lives become quite complex during their preschool years. They can express all basic emotions vibrantly and also begin to show social emotions that require a sense of self and of others, including empathy, shame, guilt, and contempt. Preschoolers also develop basic awareness that there are important contextual differences about what to send or not to send. They begin to use, but not completely understand, display rules and dissembling emotions (Susanne Denham et al., 2011).

An indicator of well developed social-emotional skills is children's positive relationships with their peers. These children are usually cooperative, they resolve conflicts politely, have competent social problem-solving skills, and have good communication skills (Voegler-lee & Kupersmidt, 2011).

**Social Interaction as a Development Tool.** Peer relations and interactions constitute the primary social world for children especially in preschool where a large amount of their days is spent with their peers (Underwood & Rosen, 2011). Interaction with peers in early childhood years can be employed as a tool for social learning. In social learning, children affect each other by imitation and feedback. According to Albert Bandura’s theory of social
learning, in order for children to learn new behaviors, it is important that they observe other people performing these behaviors (Bandura, 1977). Social play, which is central to the lives of children, is one of the many forms of social interaction. When engaged in social play, children are embedded in an interactive social context. Developmental theorists have written about the importance of play, and it has been the focus of considerable research. Socio-dramatic play and social play involve two major forms of play: social constructive play (e.g. block construction) and dramatic play (e.g. dress up). Research by Power showed how socio-dramatic play differed from other forms of social object play in terms of more positive and negative effect, longer behavior sequences, more activity talk, more attempts to influence another's behavior, and more shared play focus.

Several European researchers compared how children's behavior during free play differed from behavior during teacher structured activities (Power, 2011). These studies showed that child behavior was more sophisticated during free play. Children showed more verbal interaction; multiword expressions, interrogative clauses, and negative clauses; regulatory speech; and intermediate and high level verbal and non verbal distancing. Reviewed studies show that social coordination of play increases during the preschool years such as planning, meta-communication, information getting and sharing, and verbal responsiveness.

Play has significant effects on children's social development. According to Power (2011), experimental studies have provided strong evidence that play contributed to the development of children's perspective-taking abilities, sustained attention, empathy, peer acceptance, and social competence. Play provides a useful and enjoyable way for children to acquire a range of skills including social and emotional competence.

As children progress along their social development to gain social awareness and competence they develop the following skills (Kostelnik, Soderman, & Whiren, 2011):
- Develop play skills; initiate play, join group at play, make suggestions, take
  suggestions, recognize ways to deal with unpleasant social situations and the emotions
  associated with them, and learn to play productively.

- Develop friendship skills, including initiation, maintaining, and terminating
  interactions and relationships constructively.

- Develop awareness of other people's opinions, viewpoints, and attitudes.

- Negotiate conflicts in peaceful ways by compromising, bargaining, and standing up
  for one's rights.

- Develop empathy for others (recognize other's emotions, respect others’ emotional
  responses)

- Perceive adults as sources of gratification, approval and modeling.

- Conform to reasonable limits set on behavior, play space, materials use, or the types
  of activities in which they are involved.

- Cooperate (work with others toward a common goal)

- Help (share information or materials, give physical assistance, offer emotional
  support)

- Recognize their place in the physical environment and how they and others orient
  themselves.

**Preschool Classroom Design**

In the early 1970s when the expansion of early childhood education was in full swing,
training programs for caregivers emphasized creating a home away from home. Early
childhood programs and environments in the twenty-first century have drifted away from
basic but essential guidelines suggested by Elizabeth Prescott and Sybil Kritchevsky:
providing an environment that responds to the child. Current early childhood spaces are
steered in a direction of commercial interests causing children to be tense, stressed, or emotionally strained in group environments (Curtis & Carter, 2003).

**Environmental needs of children.** According to Anita Olds (Olds, 2001) children have environmental needs for movement, comfort, competence, and control. An environment that encourages movement allows for children to locate themselves freely in space, create their own boundaries, access diverse territories, and explore their abilities. If children are too restricted within their environment, they become frustrated and their attempts to learn are diverted into inappropriate expression which in turn may lead to suspecting behavioral problem within the child such as hyperactivity, poor motivation and attention deficits.

An environment that supports comfort allows children to explore materials or events around them. Comfort levels should be reached within an environment not only through times of sleep or relaxation but also while children are moving and playing. Dramatic fluctuations in stimulation level can be frightening and disorienting. However, moderate variations in patterns of movement help maintain optimal levels of responsiveness and make us feel "comfortable."

Comfortable settings provide neither too much contrast, nor too much sameness. There are many ways in which a center can provide children with an environment that is balanced and harmonious. Among the most important are variation in architectural elements such as scale, floor height, ceiling height, lighting, variety in texture of finish materials, and the presence of soft elements such as carpets, couches and pillows. Also, an environment can include a variety of "places" for children to engage in different activities: warm and cozy; hard and sterile; dark or light; noisy or quiet. Such variety prevents boredom, and provides children with levels of stimulation that suit their mood (Olds, 2001).

In order for an environment to foster competence, children need to feel supported to fulfill their own needs, accomplish tasks easily, manage their own tools and materials, and
control their own movements from place to place. A designer needs to keep in mind the following factors that enhance children's ability to work competently:

- Task variety to assure that children can find things in which they can succeed and reveal themselves.
- Place variety to decrease the scale of the space by providing smaller yet multiple places for children to accomplish different tasks.
- Objects and place accessibility and organization to encourage child use, help focus attention, and support opportunities for innovation and accomplishment.

It is very necessary for children to be able to control their immediate personal environment by being able to have some privacy, to make predictions, and to orient their bodies in space. Children's opportunity for privacy is often neglected for the favor of providing adults with full view and ready access to them especially in child care settings. Unfortunately, due to this neglect children often suffer when they can't find a place for their retreat and individuality. Certain design strategies can maintain equilibrium between a child's privacy and the caregiver's visual and physical access. Window seats, platforms, cubby-holes, fiberboard barrels with cutouts, and small enclosures provide ideal spots for a child to get away from it all (Olds, 2001).

A well-designed child care center is "legible" to a child. In unpredictable settings, children enter a state of unease and loss of control. Predictability and legibility of a space can be enhanced by using interior windows or walls of glass, by keeping boundaries low and partially transparent, by well-modulated lighting and sound, and by bold graphics.

For children to experience a feeling of safety and control, they need to sit in a room's most protected places with their backs facing a wall or a solid element and their faces oriented towards the events happening around them (Olds, 2001).
Importance and organization of the physical environment. The physical environment speaks to children in early childhood programs. It influences what they do, how they behave, and how successfully they achieve their goals. Increase in density within the classroom is linked to increased aggression, decreased social interaction, and noninvolvement with tasks. The arrangements and provisions in the physical environment create the context for social-emotional climate and quality of interactions among children in the classroom. The physical environment should create an inviting, inclusive community that generates its own energy and involvement (Kostelnik, Soderman, & Whiren, 2011).

Physical development of children is a critical aspect of cognitive, social and emotional development. Children explore space and materials using their bodies. It is very important for both designers and educators to realize that learning is a physical activity. If we limit their activity, we limit their learning. Early childhood classrooms should provide enough places for children's active bodies to jump, run, slide and crawl within the indoor environment (Olds, 2001). Using transparent dividers to separate spaces within the classroom can offer quiet, focused time for small group or individual activities. Since relationships are central to learning and development, then specific places where they are fostered should be part of an early childhood environment.

Furniture pieces like couches, love seats, rockers, and other pieces can help create a unifying comforting effect. The spatial complexity added to the space through the use of lofts, risers, and ramps can provide children with infinite scenarios of play and social interaction and creates more options for groupings and activities. Creating play spaces at different levels, heights and angles in the classroom creates an out-of-the-box experience for children. Looking around the room from different heights helps children see things from different points of view and experience their bodies in different dimensions (Curtis & Carter, 2003).
The organization of the physical space is a predictor of the program's quality and children's interactions within because the physical environment affects what children can do, determines the ease with which they can carry out their plans, and affects the ways in which they use materials (Kostelnik, Soderman, & Whiren, 2011). Table 02 demonstrates that different kinds of spaces within the classroom have various effects on children development.

These spaces require separation by clear, physical boundaries which can be created using furniture arrangements, pathways, low dividers or even storage units. However, imaginary boundaries, such as pretend lines, are not as effective. Children naturally expect to interact with neighboring individuals. Also, pathways between areas within the classroom allow children to move easily and readily without interrupting other activities or children. These pathways should be planned to accommodate children's movement smoothly and efficiently (Kostelnik, Soderman, & Whiren, 2011).

<table>
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<tr>
<th>Space</th>
<th>Physical Definition</th>
<th>Developmental Influence</th>
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<tr>
<td>Vertical Space</td>
<td>Defined by walls, the backs of storage units, bulletin boards, and windows</td>
<td>Supports children's learning as surface for pinning or creating interactive word or picture activity</td>
</tr>
<tr>
<td>Private Space</td>
<td>Under a table, soft corner, and can be created by individual children (hiding under a blanket)</td>
<td>Children can work independently or gain control of their thoughts and feelings</td>
</tr>
<tr>
<td>Small Group Space</td>
<td>A space for two to six children, where children are in close proximity (2 feet)</td>
<td>Encourages quiet interaction, cooperative and helping behaviors, minimizes wandering, running, and fighting over materials.</td>
</tr>
<tr>
<td>Large Group Space</td>
<td>Open but defined floor area.</td>
<td>Encourages gathering and listening to stories, singing, engaging in games and sharing whole-group instruction.</td>
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</table>
**General guidelines for child care design.** In designing early childhood classrooms, it is important to designate learning centers for specific child development activities. Children and adults alike benefit from having a visual logic to the room. However, far too often teachers become rigid in the way they think about and control the space in a classroom. Designers and educators need to keep in mind that early childhood classrooms are ultimately designed for children, and they usually come up with thoughts about how they want to use materials or space. In many cases this is different than what the teachers and designers originally envisioned for the purpose of the space (Curtis & Carter, 2003).

It is necessary to arrange quiet spaces for children to work together in small groups. Being in loud, large group environments constantly can add to a child's stress, sense of invisibility, and difficulty concentrating. Protected areas away from the larger classroom allow children to have focused discussions and work cooperatively. Individuality within the classroom is a critical aspect for supporting children's development especially in full-day programs (Kostelnik, Soderman, & Whiren, 2011). Early childhood environments need to provide restful places to gather emotional and physical replenishment. Children need get away places for small groups to explore their relationships and ideas without interruption.

Perhaps, spaces should be designed initially with more flexibility to better accommodate the different needs and activities of children without corrupting the system of the classroom. The flexibility built into the design of the space keeps the children's agenda the focal point of the classroom. Flexible space, furniture and materials encourage children to engage in a range of activities that foster their development and learning. They develop specific skills, self-awareness, alertness and respect for others around them (Curtis and Carter, 2003).

**Elements and qualities of child care design.** The design of child care centers and environments includes several factors and elements, each of which plays a significant role in
the creation of an environment that supports child development and growth. The following are some of the elements that several resources mention as foundation to designing child care environments.

**Light and lighting.** Despite the importance of lighting in child care centers, it is an element that is greatly neglected by interior designers. Fluorescent ceiling grids are usually specified for child care centers due to cost issues. Electric lighting needs to be designed according to the quantity, quality, and location of natural light entering the space (Olds, 2001). Children prefer parts of the space that are well lit and provide ample natural light. Natural light changes slowly and continuously throughout the day and across the seasons, providing children with the opportunity to experience objects and spaces under different conditions of illumination.

The best way to ensure that children receive sufficient amount of natural light is by providing large outdoor play areas all year long. Another way to provide children with opportunities to experience natural light is through supplying the space with windows, especially if they are operable, have low sills, and frame interesting views (Curtis, & Carter, 2003). Children should not spend long day hours in windowless spaces (basements, etc.). Other architectural elements can be used in bringing natural light into child care spaces. A few to consider are greenhouses, patios, balconies, window wells, courtyards, atria, skylights, clerestories and interior glass walls (Olds, 2001).

Artificial light should be provided within child care spaces in two main categories; general and task lighting. Electrical lights should be designed according to room-by-room needs to support activities and feelings desired in a space.

Another important aspect in lighting is control. Providing children and caregivers with some kind of control to specify the amount and direction of needed light is necessary for the space to fully support both children's development and child care tasks up-taken by
caregivers. Natural lighting can be controlled by provide window treatments such as curtains, blinds, or louvers (Olds, 2001). Artificial lighting can be controlled by providing accessible switches and dimmers for both general and task lighting.

**Visual Connectivity.** Interior windows between rooms, or rooms and corridors, and even clerestories can provide children with natural light when they are in spaces that don’t have direct outdoor access. Interior windows also promote connectivity between different spaces where children can have visual access to events occurring around them. Another approach is to create window "places" by making one window in each space into a special place (Olds, 2001).

Interior doors aim to provide visual access for adults and children of different ages, sizes, and abilities. Using semi-glazed or fully glazed interior doors promotes children's anticipation of the space they are about to enter. It also expresses a relationship between spaces on both sides of the door.

**Sound.** Sound is yet another challenge in early childhood environments. A generally noisy environment from which children cannot get relief is not helpful to children's overall development; cognitively, academically, and health wise. In addition to using soft, sound absorbing materials in the classroom, sound can be controlled by increasing the secluded spaces for one or two children and decreasing the number of spaces for six or more children (Kostelnik, Soderman, & Whiren, 2011).

**Color.** Color adds dimension, meaning, and beauty to life. Addressing the physiological, psychological, aesthetic, and technical aspects of color is an important part of a designer's job. As a form of energy, color effects our emotions, state of mind and physiology within a space. Color can modify the apparent size or warmth of a room; influence our perception of volume, weight, noise, and temperature; encourage solitude or sociability, and stimulate anger or peacefulness (Olds, 2001).
Color in child care spaces is considered the most powerful visual organizer because it helps users in a space deal with visual overload. Therefore, it is necessary for walls to act as a background rather than a focal point within a space, which can be achieved by using luminous yet calm colors for large wall surfaces. The colorful touches and differentiated textures can be added to the space through smaller elements such as pillows, seating surfaces, and storage units. Color applications within different parts of a classroom space can help define areas without the necessity of using physical boundaries (Curtis, & Carter, 2003).

Different age groups prefer or can benefit from specific color tints. Preschoolers develop their curiosity and eagerness to learn about their surroundings. Children in such ages need colors that support and nurture their imagination. A calming background can be brought to life by using touches of bright, energetic colors such as yellow, orange and purple to enhance preschoolers’ curiosity (Olds, 2001).

Colors have different apparent depths which can be used in child care spaces to manipulate their spatial dimensions. Warm colors usually advance and catch children’s attention, while cooler colors recede. Using cooler colors to make rooms seem larger than they really are is often a technique used in child care spaces to provide users with a sense of spaciousness. Patterns also play a role in deceiving the perception of users. Larger floor patterns make a space feel smaller, and small detailed floor patterns enlarge it (Olds, 2001).

Designers need to keep in mind that the level of architectural detailing in a space can affect its tolerance of color use. Elaborately detailed spaces with moldings and woodwork can draw attention to themselves without much need for color intervention.

**Materials and variety.** Difference in materials used within the child care environment can help convey different messages to adults and children. Finishes and materials in a child care environment can affect how people feel by affecting what they see, hear, smell, and touch. A balanced variety of finishes and materials can help children in their sensory
development and keep them alert to changes in textures around them. Settings are most nourishing when they provide both varied forms of stimulation and subtle change in that stimulation, which is similar to what is found in the natural world. The task for designers is to saturate the static, built world with subtle variations at all levels of experience.

Child care spaces often use smooth, washable surfaces without paying attention to the lack of textural variety in the classroom space and how that may influence the level of children's interactivity. Man made materials such as plastic do not age properly, since they show wear and tear quickly. Natural materials such as unpainted wood, wool, and stone show the marks of age and use eloquently as part of their progress and interaction with users and environmental factors within a space. Scars, scratches and bumps are a way of expressing to children the stories and activities that have taken place in the space (Olds, 2001). A good balance between manmade and natural materials is necessary for the level of variety desired in a child care space.

_Aesthetics._ An attractive learning environment appeals to all children's senses. It is child centered, serene, and exciting and invites children to engage in activities and to reflect upon their privacy (Kostelnik, Soderman, & Whiren, 2011).

The physical wholeness of a beautiful place expresses wholeness and harmony, helping children feel connected yet free, and closer to sources of vitality and well-being. Currently, child care centers pay more attention to cleanliness and safety than to aesthetic values of spaces. From a child's perspective, all surfaces are interactive and can be manipulated, sculpted, crafted or painted (Olds, 2001). Small gestures such transforming some straight lines in the space into curvilinear surfaces and angles can help invite children to use spaces within the classroom.

Contrast tends to be either absent or vividly present in child care centers. Designers are encouraged to focus on where more contrast is needed within classroom spaces and
provide a link between the contrasting parts (Olds, 2001). Extending this technique to larger and smaller scales provides children with a space that is balanced and harmonious, yet interesting and explorative.

**Environmental and Behavioral Scales for Child Care Environments.**

The most popular scale used for the evaluation of child care environments, Early Childhood Environment Rating Scale (ECERS), is developed by Thelma Harms and Richard Clifford in 1980 (ERSI, 2013). The scale focuses on different aspects including the programmatic or social environmental quality of the child care environment but does not focus on the effect of the physical environment on children's social interaction (Moore, 1994). Gary T. Moore, along with efforts of a team of researchers at the University of Wisconsin-Milwaukee, developed sets of scales to measure/and evaluate different aspects of the child care environment. Two of the tools developed by Moore are used in this research to collect data and evaluate the physical and social aspects of the preschool classroom environment: early childhood physical environment scale, and environment/behavior observation schedule for early childhood environments.

**Early Childhood Physical Environmental Scale.** This scale was developed as a systematic tool to understand and evaluate the layout and ambience of early childhood development centers. Two patterns were developed into this scale: spatial organization pattern, and behavior setting pattern. The behavior setting pattern was developed to evaluate the organization and characteristics of a specific area within the larger framework of the child care center (Moore, 1994). For the purposes of this research, the pattern is modified and used to assess the organization and spatial characteristics of each activity center within the preschool classroom. The modified spatial organization pattern is based on the following dimensions which are rated on a five point Likert-type scale:

- Degree of enclosure of the activity center
• Degree of visual connectivity to other activity centers
• Degree of the appropriateness of the activity center's size for 1-3 children and for the nature of the activity being performed.
• Degree of softness of surfaces within the activity center
• Degree of flexibility for easy modification
• Degree of separation of activity centers from circulation paths and from neighboring activity centers.

**Environment/ Behavior Observation Schedule for Early Childhood Environments.** The observation schedule was developed to evaluate early childhood environments in regard to a number of items within the socio-physical environment (Moore, 1994). The schedule is slightly modified to focus on the following aspects within each activity center within the preschool classroom:

• Environmental Setting. It refers to the activity center being observed.

• Individuals Involved in Interaction. Information is recorded about the group size, gender of participants, number of children from each gender, physical posture, ethnicity, and age group.

• Interaction Type. It includes four main types of social interactivity;
  
  o Cooperation: Children work together in order to achieve a common goal, associate for mutual benefits, or become involved in similar but separate activities.
  
  ▪ Cooperative Activity: Endeavor of one child is enhanced by that of another child or group; using or sharing common object, and playing formal games.
- Associative Activity: Acknowledging a common activity without working together towards a common benefit; borrowing objects, imitating activity, and perform similar activity side-to-side.

- Parallel Activity: Playing next rather than with other children.

  - Competition: Compete and strive with other children for personal or group gains.
    - Absolute Gains: Increasing personal or group gains on the account of other peers.
    - Relative Gains: Gaining more than other children in a group, but without compromising their benefit.
    - Rivalry: Trials to reduce benefits of other children without success.

  - Aggression: Displaying violent behaviors verbally or physically.
    - Physical Attack: An actual physical hit, strike or damage to other children.
    - Threatened Attack: Displaying gestures and verbal threats to other children.
    - Verbal Abuse: Irritating, teasing, or demanding in an unfriendly manner.

  - Affection: Exhibiting feelings of fondness or affection toward other children in a group.
    - Intimate Physical Affection: Warm display of affection using physical gestures, such as kissing and hugging.
    - Friendly Physical Affection: Display of friendliness using less physical manner, such as holding hands and smiling towards one another.
- Verbal Affection: Exhibiting fond feelings using words and language, such as complimenting a peer's action, and speaking in a friendly manner.

- Social Interaction. Rating the level of interaction reciprocation among children in a group. These interactions include verbal and physical representations.
  - Reciprocated: Social behavior is recognized and acknowledged by other children in the group and to which there is a verbal or physical reaction.
  - Acknowledged: Social behavior is noticed by other members in the group but not acted upon or answered.
  - Not Acknowledged: Social behavior is not noticed by other members in the group intentionally or unintentionally. The behavior is also not answered or reciprocated by these peers.

**Conclusion**

Designing beautiful spaces and finding engaging materials is exciting and one of the important aspects for creating an environment that provides for children's development. When children are gathered in groups, the potential for overstimulation, competition for space and materials, and less-than-desirable behavior is great. However, children's explorations, dramas, messy play, and conflicts are valuable to their learning. They can benefit greatly from an environment that is specifically designed to focus their attention, and provide them with steps to master something they wish to accomplish (Curtis & Carter, 2003).

Environmental psychologists perceive an environment as both social and physical since it includes perceptions, attitudes and actions that constitute both aspects. Most of environmental psychology's topics have focused on adult populations, but there is now a substantial body of research concerning the developing child (Spencer & Gee, 2011).
Evidence on the significance of children's transactions with their social and physical environment is being provided through a huge body of recent research. The setting of a behavior is generally a better predictor of a child's actual behavior than are any measures of their personality, upbringing, or parental style. The flow of an individual's behavior can be best understood by studying the surrounding environment. Human behavior can be strongly influenced by the social and physical elements of the environment which can be identified as a Behavior Setting.

This can also be applied to better understand children's behavior. According to Spencer and Gee (2011), children perceive the environment to provide places, features, and situations for possibilities of physical and social action. These affordances can be used to assess the environments of children from a functional point of view. Thus, the environment can be described in socio-physical terms which would create an understanding between places and the behaviors they stimulate or support. The presence of a supportive preschool environment is one of the most essential elements for children's social and emotional development. This support should be adopted by the caregivers and also in terms of the provision of adequate resources – including materials, time, classroom coverage, space and monitoring - to enable the optimum environment for children growth and development (Voegler-lee & Kupersmidt, 2011).

Children's environments should always provide for needs of safety, shelter and support. These environments should not contain features that induce stress such as being incoherent, confusing, and overloaded with information or stimulation. Stressful environments reduce children's sense of control and do not offer spaces for withdrawal or solitude when desired. It is essential to keep in mind that children's daily activities and routines differ significantly from adults in rhythm, scale and content. Even in their use of
space, children are more restricted by physical constraints and lack of access (Voegler-lee & Kupersmidt, 2011).

The influence of the physical and surrounding preschool environment of children carries on into their adulthood. Gaining control over their space is important in order to feel a positive sense of self identity (Voegler-lee & Kupersmidt, 2011). Experiences of children within early childhood education environments are significant for their social development because these programs are the context for interactions and relationships with non-relative peers.

In order to bring the three main topics into a comprehensive framework for this research, a hierarchical model (Figure 01) is developed upon a model depicting the major factors and processes contributing to children's social competence with their peers (Odom, McConnel & McEvoy, 1992).

Figure 01
A hierarchical model for research framework
The scales discussed in the third area of literature review come into play as a tool for evaluating the physical and social aspects of the activity centers within the preschool classroom (Figure 02).

Figure 02
A model of research variables
CHAPTER 3. METHODOLOGY

The main methodology used for this research is evidence-based design. Evidence-based design makes it possible to design a classroom that can measurably improve children's development since it is the process of basing decisions about the physical environment on credible research to achieve the best possible outcomes.

The data are collected to perform a quasi-experiment, where children 3-5 years old in a preschool classroom are observed before and after the introduction of a minor design intervention. One of the most underrated evaluation tools to use with young children is observational assessment. It has the following advantages:

- Nonintrusive.
- Yields credible and instant information.
- Can be used in multiple settings.
- Allows for capturing behavior in natural settings.

Behavioral observation serves a number of valuable functions in the assessment process. It provides a more personalized picture of a child's spontaneous behavior in everyday life settings than can be obtained from more formal methods. Information about the child's interpersonal behavior and learning style and a systematic record of a child's behaviors can be used for planning intervention for the physical and the instructional program. Young children are particularly good subjects for observations because they have not yet learned to mask their feelings, thoughts, and behaviors very well (Kostelnik, Soderman, & Whiren, 2011).

The quasi-experiment helps clarify how minimal changes in the physical environment can effect children's social interaction. The "Intimate Space" is a spatially well-defined behavior setting, within which a group of 2-3 children can interact socially. Providing such spaces within the preschool classroom can lead to decreased classroom interruptions and
contribute to sustaining longer attention spans, which eventually improve the quality and duration of social interactions between children (Moore, 1994).

**Administration of Methods**

The existing situation of the preschool classroom is evaluated by rating each activity center on a modified version of a scale developed by Gary T. Moore (Moore, 1994). The scale of organization and character of individual rooms or areas is used in this study to analyze the characteristics of existing activity centers in the preschool classroom (Figure 03). This analysis can provide rationale for the need and optimum location of the intimate space.

Cognitive mapping is also used to provide a visualization of the spaces within the classrooms. Here it must be indicated that the cognitive maps were of my personal cognition of the space. Children did not provide any cognitive maps of the classroom. Cognitive mapping is used in this study specifically to provide a rough visualization of the classroom space, and to indicate the different components of the activity centers. Floor plans and sketches are documented with reference to the different activities performed in each activity center. Photographs are also taken to provide a better visualization of the space.

Children's behavior is also observed before and after the introduction of the intimate space. Behaviors are recorded through using a modified version of a behavior observation schedule developed by Gary T. Moore for early childhood environments (Moore, 1994). The observations take place in 20 minute sessions. Each session contains the interactions that take place between children at a specific activity center (Figure 04). Activity centers are observed in the sequence they are physically placed within the classroom. Interactions within each activity center are recorded into the Early Childhood Environments Observation Schedule. If an activity center is empty, the observation is continued into the next center. Observation is continued into neighboring centers when an interaction is discontinued within a particular activity center.
The Intimate Space is translated into a wooden cube box (2'3" L x 2'3" W x 2'6" H) with circular openings on three of its sides to allow for easier child movement and visual access. The box is provided by the child care center itself, so the children are familiar with its presence in the center but not within the classroom. Simple fabric "curtains" are temporarily fixed on the sides where the circular openings are located. The purpose of the fabric pieces is to re-introduce the box as a new element to children, within which they can create new associations and interactions.
<table>
<thead>
<tr>
<th>Room/Area Number</th>
<th>Date</th>
<th>Day</th>
<th>Degree of spatial definition and enclosure of the activity centers in the room/area</th>
<th>STRONG</th>
<th>SOME</th>
<th>UNDECIDED</th>
<th>SOME</th>
<th>STRONG</th>
<th>lack of enclosure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>2 Degree of visual connections to other activity centers</td>
<td>connections</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>lack of connections</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3 Degree of appropriateness of the size of activity centers for 1-4 children</td>
<td>appropriate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>lack of appropriateness</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4 Degree of softness of activity centers</td>
<td>softness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>lack of softness</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5 Degree of flexibility of the activity centers</td>
<td>flexibility</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>lack of flexibility</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>6 Degree of separation of activity centers from circulation paths between centers</td>
<td>separation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>lack of separation</td>
</tr>
</tbody>
</table>
Since the preschool classroom is organized into multiple activity centers, the wooden box is also introduced as a separate activity center. Each center has a specific 5" x 8" card, where children can pin their names when they want to play in that particular activity center (Figure 05). Some rules were established verbally with children when the wooden box is first
introduced: jumping over or climbing over the box is not allowed, 3 is the maximum number of children allowed at once within the box and the fabric pieces are not to be removed.

**Figure 05**

*Intimate Space Activity Center Card*

**Sampling**

The participants were children 3-5 years old that were part of the preschool program in the Child Care Center at Veterinary Medicine at Iowa State University. There were 25 children at the program, and the parents of all the children approved their participation in the study.

The data collection took place twice a week for one hour (3:00 pm - 4:00 pm) during the children's free play time. This arrangement assured that the daily activities of the children were not interrupted by my presence at the classroom. The observations were recorded along a time span of six weeks.

**Data Analysis Software**

Microsoft Excel is used to organize the collected data. It is also used to generate charts and tables necessary for understanding the raw data.

**Limitations**

Observation, being the main method used for data collection in this study, has its limitations. An issue of reliability may arise, since I am the only observer. It is recommended
that at least two observers record observation data. Observation can also induce stressful situations when the observer is immersed into the site of observation for long periods of time (Sommer & Sommer, 2002). The stress factor can be avoided by spending shorter sessions observing the children at the preschool classroom, but increasing the total span of observation to ensure a good accumulation of data.

Another limitation for using observation as a data collection method is that it reflects the behavior of the subjects, and not what they think or believe (Sommer & Sommer, 2002). In the case of this study, it is difficult to collect data regarding what children (ages 3-5) think since a majority of the participants are barely speaking with full sentences. Also, recording children behavior is the main purpose for using observation as a main method.

Cognitive mapping may provide a distorted image rather than the actual experiences of users (Sommer & Sommer, 2002). Another limitation is the reliability of the data provided through cognitive maps, since they reflect my own interpretation of the classroom space. This issue is counteracted by the photographs of the space, which act as a reference point for the maps.

Experimentation as a research method tends to have high internal validity, but lacks the ability to generalize it findings. Quasi experiments in particular do not allow for refuting other factors explaining the results since the experimenter does not have full control over external variables (Sommer & Sommer, 2002). The results of this experiment cannot be generalized on all preschool classrooms, nor can they be generalized to all preschool children. Reasons behind this lack of external validity may lay in cultural and spatial differences. Also, children's preferences can have a large effect on how they interact with each other and the spatial elements surrounding them.
CHAPTER 4. RESULTS

The results of the experiment are organized into three sections. The first section displays the findings of the evaluation of the existing physical environment in the preschool classroom. The second section presents the data collected from observing children's behavior while interacting with each other within the classroom before introducing the Intimate Space. The third and final section of the results exhibits the data collected from the observations conducted after introducing the Intimate Space into the classroom.

Evaluation of the Existing Physical Environment

The first step of this experiment is the evaluation of the existing physical environment of the preschool classroom. Using a modified version of the scale of organization and character of individual rooms or areas - developed by Gary T. Moore (Moore, 1994), the existing physical environment is evaluated per activity center. The classroom includes the following activity centers:

- Kitchen/ tables area,
- Smart board/ cozy area,
- Construction/ blocks area,
- Math counts,
- Music/ dance area,
- Dramatic play.

Each activity center is rated according to the degree of enclosure, visual connection, size appropriateness, softness, flexibility, and separation. The degrees vary according to the following scale: none, weak, neutral, some, and strong. The data inferred from each center is organized into Table 03.

A comparison between the six physical attributes for the classroom as a whole is portrayed in Figure 06. A more detailed comparison of how each center scored on the given scale is clarified in Figure 07.
Table 03

Scores of Activity Centers on scale of Organization & Character of Individual Rooms or Areas

<table>
<thead>
<tr>
<th>Space</th>
<th>Degree of Enclosure</th>
<th>Degree of Visual Connection</th>
<th>Degree of Size Appropriateness</th>
<th>Degree of Softness</th>
<th>Degree of Flexibility</th>
<th>Degree of Separation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kitchen/Tables Area</td>
<td>1</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Library/Computer Area</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>2</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Smart Board/Cozy Area</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Math Counts</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Construction/Blocks Area</td>
<td>4</td>
<td>2</td>
<td>5</td>
<td>2</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Music/Dance Area</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>2</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Dramatic Play</td>
<td>4</td>
<td>5</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>

* Table 03 Legend: none = 1, weak = 2, neutral = 3, some = 4, strong = 5.

Figure 06

Preschool Classroom Physical Attributes Score
Figure 07

*Activity Center Physical Attribute Score*
Evaluation of Child Behavior within Existing Physical Environment

The second step of this experiment is the evaluation of children's behavior and social interactivity within the preschool classroom in its existing condition. The data are recorded using a modified version of a behavior observation schedule developed by Gary T. Moore for early childhood environments (Moore, 1994). The observation schedule is also used to collect details about subjects such as gender, ethnicity and age group. In total, 53 interactions are recorded within ten sessions of observation, each lasting twenty minutes. The average duration of a single interaction is 3 minutes and 46 seconds. Interactions take place within groups of children. The average number of children per group is 2.38. Gender participation percentages are displayed in Figure 08.

Figure 08
*Gender Participation Percentages*

Interactions take place in all the activity centers within the classroom in different frequencies. Figure 09 compares the frequency of use between all the different activity centers in the classroom.
Physical interaction is as important as verbal interaction. The posture of children during the observation sessions is recorded and Figure 10 displays the percentages in which each posture occurred.
The ethnicity of children is also recorded as part of research subjects details (Figure 11). Information about age is categorized into two main age groups: 3-4 year olds, and 4-5 year olds (Figure 12).

Figure 11
*Percentages of Subjects Ethnicities*

Figure 12
*Percentages of Subjects Age Groups*

Interactions are recorded according to their type: cooperation, competition, aggression, and affection. Cooperative interaction is subcategorized into cooperative, associative and parallel activity (Figure 13.a). Competitive interaction is organized into
absolute gains, relative gains and rivalry (Figure 13.b). Aggressive interaction is subdivided into physical attack, threatened attack, and verbal abuse (Figure 13.c). Affection is represented intimately physical, friendly physical and verbal (Figure 13.d). Data are also collected in regards to whether the interaction is reciprocated, acknowledged, or not acknowledged (Figure 13.e). To make the process of understanding the data easier, each type of interaction is charted into a separate figure. Each figure shows the percentages of each subcategory within the different interaction types.
In this third and final step of the experiment, the same categories of data are collected after introducing the "Intimate Space" into the preschool classroom. According to the spatial layout of the classroom, the "Wooden Box" described earlier is located within the Dramatic Play area but keeps its entity as a separate activity center. The tools used for observation and data recording remain the same as the ones used for the previous part of the experiment.

Fifteen interactions are recorded within four sessions of observation. Each session is twenty minutes long. Each interaction is 5 minutes and 18 seconds. The average group size is 2.87 children. The recorded interactions take place in the Intimate Space introduced within the classroom. Figure 14 shows the percentages of gender participation within the recorded interactions.

The posture of children during the interactions is recorded and categorized into: sitting, standing, laying down (face down), laying down (face up), walking, running, jumping, and crawling. Figure 15 displays the percentages in which each posture occurred.
Figure 14
*Gender Participation Percentages*

Figure 15
*Percentages of Physical Posture Occurrences*

Percentages of subjects' ethnicities are displayed in Figure 16, and groups are categorized into: 3-4 year olds, and 4-5 year olds (Figure 17).

Figure 16
*Percentages of Subjects Ethnicities*
As mentioned in Phase II of the experiment, interactions are recorded in regards to four main types: cooperation, competition, aggression, and affection (Figure 18.a-d). The social interaction is also rated according to three subcategories: reciprocated, acknowledged, or not acknowledged (Figure 18.e).
Figure 18.c
Aggression

Figure 18.d
Affection

Figure 18.e
Social Interaction
CHAPTER 5. DISCUSSION

The research focuses on understanding the direct correlation between the provision of private spaces in the preschool classroom and the level of children's social interactivity with each other through implementing a quasi experiment where children 3-5 years old in a preschool classroom are observed before and after the introduction of a minor design intervention.

The hypothesis suggests that providing an "Intimate Space" within the preschool classroom can lead to decreased classroom interruptions and contribute to sustaining longer attention spans, which eventually improve the quality and duration of social interactions between children. The "Intimate Space" is a spatially well defined behavior setting, within which a group of 2-3 children can interact socially.

The discussion of results is organized into two sections. The first section interprets the data collected to evaluate the existing condition of the physical environment of the preschool classroom by analyzing each activity center. The second section infers the meaning of the data collected to evaluate children's behavior and social interactivity before and after introducing the Intimate Space into the classroom.

**Evaluation of the Existing Physical Environment**

The data displayed in Figure 06 show that spaces within the classroom score 3.143/5 on the sense of enclosure and 4/5 of visual connectivity to each other. The sizes of activity centers score 4.571/5 on the scale of size appropriateness to the number of users and types of activities performed. The spaces score 2.857/5 on the level of softness for child use, and also 3.429/5 on the scale of spatial flexibility. The degree of separation between the activity centers is 3.143/5.

**Kitchen and Tables area.** The kitchen and tables area (Figure 19) lacks a sense of enclosure due to the layout of the tables. This results in increasing the degree of visual
connectivity due to the lack of physical space definers. The size of the kitchen area is highly appropriate to the number of children attending the classroom (4 tables, and 26 chairs). The kitchen space and furniture lacks softness due to the fact that all the seats are made of wood with no cushioning of any sort. The arrangement of the kitchen space is highly flexible. The tables and seats may be moved around to better serve the activity taking place at a given moment. The space also lacks a sense of separation, which may be confusing to children since the tables are used for eating at lunch and snack time, as well as writing and scientific experimentation with water, sand and other materials.

Figure 19
*Kitchen and Tables area*

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**Library and Computer Area.** The library and computer area (Figure 20) has some degree of enclosure and a high degree of visual connectivity and appropriateness to group size and activities. This area has the advantage of a semi opened partition that allows for good visual connectivity to the rest of the classroom without compromising the sense of
enclosure of the space. Although carpet is provided within this area, it is still weak on the scale of softness. The walls and chairs have no cushioning or soft support for children’s reading.

The area also has a weak sense of flexibility. Book shelves are fixed on the walls, as well as the computer table which is also fixed on the floor and to the wall. The library and computer space has a strong sense of separation due to the semi opened partition that separates it from the rest of the classroom.

Figure 20
*Library and Computer Area*

Smart Board and Cozy Area. These two areas are joined into one activity center for physical proximity. The cozy area is mainly used as a "waiting room" for children who are waiting for their turn to play with the smart board. This area lacks a sense of enclosure, and has a weak degree of visual connectivity due to its location within the classroom. The size of the area is highly appropriate to the number of users and the activity that takes place. The
area is somewhat soft for the availability of a chair for children to sit in while waiting their turn and also the carpet floor. The smart board and cozy area (Figure 21) is rated as highly flexible since children can assume any position while waiting for their turn: sitting, standing, laying down, etc. Also, the smart board as a learning and entertainment tool provides children with a variety of activities: drawing, singing, spelling, etc. The area significantly lacks separation because children using neighboring activity centers seem to easily occupy the area dedicated to the smart board.

Figure 21
*Smart Board and Cozy Area*

**Math Counts.** This area has some sense of enclosure and visual connectivity. It is well defined by furniture placement and also easily visible from different parts of the classroom. The size of the area is highly appropriate to the number of children and type of activity performed. It also has a strong sense of softness since the children can use a cushioned window bench to sit while practicing math problems (Figure 22).
The math counts area scores weakly on degrees of flexibility and separation. The only seating option available is on the window bench, which can get crowded easily and furniture is not movable. The area is not well separated from adjacent activity centers, which causes interruptions for children practicing math games.

Figure 22
*Math Counts*

**Construction and Blocks Area.** The construction and blocks (Figure 23) area has some sense of enclosure due to the spatial placement of furniture and toys. Visual connectivity of this area to the rest of the classroom spaces and teachers is weak. The main reason behind this weakness is the location of the constructions and blocks area within the classroom.

The size of this area is highly appropriate to the number of children present at a given time, and also appropriate to the activities being performed. Softness is not of high priority in this center, which explains the weakness of such attribute. Children need hard surfaces upon
which they can build their blocks. This area is highly flexible since children can easily move furniture and objects to use for constructions and block building. Some pieces of furniture in this area have wheels which makes it easy to move them around and change their configuration. The area is somewhat separated due to its location and also the spatial placement of its furniture.

Figure 23
Construction and Blocks Area

**Music and Dance Area.** The music and dance area (Figure 24) has some sense of enclosure due to furniture placement. It is also well visually connected to the rest of the classroom and its size is highly appropriate to the number of children that use it at once, and for the activities that are performed within. Softness is recorded as weak in this center for children do not need cushions or soft materials to dance on. The area provides a stable surface so they wouldn't fall while dancing and jumping. The music and dance area is highly flexible since it basically provides a dedicated, uninterrupted space for children to dance and
listen to music. It is also well separated and defined from the main circulation path of the classroom.

Figure 24
*Music and Dance Area*

**Dramatic Play Area.** This area is somewhat enclosed since the placement of furniture and toys creates a well defined entrance. It has a strong visual connection to the rest of the classroom areas. On the other hand, the size of the area is not suitable for the number of children interested to play within that area at any given time. It fits up to 3 children, while there usually at least 5 wanting to play in that area at the same time.

The dramatic play area (Figure 25) has some degree of softness which is mainly represented by the available child size couch. Unfortunately, the area lacks flexibility because the toys are either too big to be moved by a 5 year old or the space is too crowded for spatial modifications. This area is strongly separated from the circulation path within the classroom and from neighboring activity centers.
In order to prove the hypothesis of this study, a comparison is performed between the behavior and social interactivity of children before and after introducing the "Intimate Space" into the classroom. The discussion of the experiments results tackles each portion of the observation schedule used to record children behavior. Each aspect of Phase II (Child behavior in existing conditions) observation is compared to its counterpart within Phase III (Child behavior after introducing the intimate space) observation schedules.

**Duration of Interactions.** The average duration of an interaction recorded in Phase II is 3 minutes and 46 seconds, while the average duration of an interaction recorded in Phase III is 5 minutes and 18 seconds. The duration of interactions increases by 29% in Phase III within the intimate space. This indicates the effective role of the intimate space in increasing children's span of attention and interest in social interactivity with each other.
**Group size.** The average group size in Phase II is 2.38 children, while the average group size in Phase III is 2.87 children. The number of children involved in a single interaction increases by 17% in Phase III within the intimate space. More children seem to be interested in interacting with each other within the intimate space when compared to the traditional activity centers provided in the classroom.

**Gender Participation.** According to Figure 08, female and male percentages in Phase II (female 54%, male 46%) are relatively close when compared to the percentages in Phase III. Female participation percentage in Phase III (Figure 14) is double the male participation percentage (female 67%, male 33%). An explanation for this large difference in gender participation percentages - between Phase II and Phase III - is that girls are more interested in verbal role playing and storytelling while using the intimate space when compared to boys. Role playing invites girls using other activity centers to be involved in the interactions taking place within the intimate space. Boys seem to be less interested in verbal role playing within the intimate space, but rather prefer physical interactions with other children and objects.

**Frequency of Center Use.** Figure 09 shows that the most used activity center is the kitchen and tables area (43%). The second most used activity center is the library and computer area at 23%. By studying Table 03, it becomes evident that these two areas have high degrees of visual connectivity and their sizes are highly appropriate for the activities taking place. This indicates that size and visibility are the more important physical attributes of the physical environment in a preschool setting.

**Physical Posture.** The most preferred physical postures recorded for children during the observation sessions in Phase II are sitting (45%) and standing (35%). These percentages (figure 10) coincide with the fact that the kitchen/tables area and library/computer area are the most used centers within the classroom. Both of these centers provide ample room for
sitting and standing, but not for other physical postures such as running, jumping or walking around. When compared to children physical postures in Phase III (figure 15), the percentage of sitting increases significantly from 45% to 86%. Standing posture percentage in Phase III is equal to 0%. Postures such as crawling seem to appear in Phase III with a percentage of 10%. This difference in posture percentages can be explained by the size and physical attributes of the intimate space. The wooden cube box that is used as an intimate space in Phase III has the dimensions of 2'3" L x 2'3" W x 2'6" H, with circular openings on three of its sides. A child 3-5 year old with an average height of 33" - 40" (Disabled World, 2008) cannot physically stand in a space with the dimensions of the wooden box.

**Subjects Ethnicities.** Although the differences between percentages of ethnicities in Phase II and Phase III are significant in numerical data (figure 11, figure 16), no correlation is found between ethnicity and level of social interactivity.

**Age Group.** In Phase II, the percentages of age group participation in social interactions are close (figure 14) with 45% of total participants are 3-4 years old and 55% of total participants are 4-5 years old. In Phase III, the percentage of 4-5 year olds (67%) is double the percentage of 3-4 year olds (33%) participating in social interactivity within the intimate space (figure 17). This can be explained by children's ability to express themselves verbally with vocabulary. According to the California Preschool Learning Foundation, children around the age of 3-4 years can speak less clearly than children closer to five years of age. Also, children within the first age group (3-4 years) use language to construct short real or fictional narratives. On the other hand, children of the second age group (4-5 years) have the ability to use language to create long and extended narratives that can also be real or fictional (California Department of Education, 2008).

**Interactivity.** The level and quality of children's interactivity is measured according to the type of the interaction taking place, and the reciprocation of that interaction.
Cooperation. In Phase II and according to figure 13.a, 96% of recorded interactions are within the cooperation category and only 4% showed no cooperation at all. A large portion (43%) of those are cooperative activities in which children share play materials, use a common object and work toward a common goal. While engaging in cooperative activities, children seem to prefer using the blocks and construction center where they helped each other build "castles" and "houses" as they describe.

The percentage of children involved in associative activity is 34%. In associative activities, children seem to be interested in a common activity without working together to achieve a common goal. Children seem to be displaying associative activity while drawing next to each other using the same crayons.

Parallel activity occupied 19% of all cooperation displayed between children. While performing parallel activity, children play with similar objects beside each other rather than playing with each other. This type of activity is mainly observed in math counts center. Children use geometrical shapes and number boards to learn about math in the same physical space but do not engage in a common interaction.

The percentage of cooperative activity increases to 66% in Phase III (Figure 18.a). This difference in percentages between cooperation in Phase II and Phase III can be explained by the difference in type of activities being performed within the intimate space. Children display interest in role playing and storytelling within the intimate space, which encourages each child within the group to add their contribution to the story.

Associative activity decreases to 7% in Phase III, which can be explained by the fact that the interactions that take place within the intimate space do not usually involve objects or toys. This also explains the stability of parallel activity percentages when compared to Phase II, since younger children seem to just sit inside the intimate space without participating in older children role playing and storytelling.
**Competition.** According to figure 13.b, 51% of recorded interactions in Phase II do not display competition between children. 6% of competitive interactions are for the absolute gain of the child, where he or she is only interested in their personal gain at the expense of another child. Such behavior includes occupying more space than needed for writing or drawing, and disregarding the comments or needs of other children at the same activity center.

34% of all competitive interactions fall under relative gains. Children that are interested in relative gains try to gain more than their peers in a group but not in a direct manner. Relative gain is displayed when a child "recommends" that his or her peer use another center, nicely, in order to make room for a specific peer or friend. Only 9% of competitive interactions are considered rivalry, where a child tries to reduce the benefit of other children but fails to do so. Examples that occur among the observed children include taking away a toy, and taking advantage of a peers distraction to pursue a specific activity.

In Phase III and as displayed in figure 18.b, non competitive interactions increase to 60%. Interest for individual absolute gains is more directed towards the gains of the group at 20%. Relative gains decreased significantly to 13%, and rivalry attempts also decreased slightly to 7%. The total decrease in competitive interactions indicates that children steer their interests into a more productive type of interactivity within intimate space. This reduces tension and promotes the quality of social interactivity among children.

**Aggression.** In Phase II, 92% of recorded interactions are non aggressive (figure 13.c). Threatened attack and verbal abuse are kept to a minimum at 2% and 6%, respectively. When compared to Phase III, non aggressive interaction displays an unfortunate decrease from 92% to 60% (figure 18.c). The larger portion of aggressive interaction takes the form of verbal abuse (26%). According to the observations, the increase in aggressive interaction can be explained by children's increased interest in the intimate space. Also, the dimensions of
the space only allowed for 3 children to use it at a time. This made it difficult for children that are waiting for their turn to use the space, since they were very curious to use it. Verbal abuse is only displayed in forms of simple complaining expressions as "It is my turn now!", or asking the teacher to interfere in order to solve the problem of taking turns. No bad language is used among children.

**Affection.** According to figure 13.d, 49% of recorded interactions in Phase II are of affectionate nature. Verbal display of affection is the most common at 34%, which takes form in asking for toys and play objects nicely, complementing a drawing done by a peer and laughing upon friendly gestures. Friendly and intimate affection are displayed in percentages 13% and 2%, respectively. Intimate expression of affection is rarely displayed, and only takes form in hugging. Friendly expression of affection is more so displayed through holding each other's hands, and smiling to each other.

In Phase III, affectionate interactions increase to 74% when compared to Phase II (figure 18.d). Verbal affection decreased to 26%, while friendly physical display of affection increased significantly to 48%. The total increase in affectionate interaction in Phase III indicates that introducing the intimate space provided opportunity for larger display of affection among children, which promotes the quality of social interactivity on verbal and physical levels.

**Social Interaction Reciprocation.** In Phase II, the reciprocation of social interaction is recorded at 70% (figure 13.e). Children demonstrate physical or verbal social behavior that is exchanged among a group of 2-3 peers. 21% of recorded social interaction is considered acknowledged and heard but not reciprocated or answered by the other party, while 9% of social interaction is not acknowledged nor answered by other peers in the group.

When compared to social interactions recorded in Phase III (figure 18.e), the percentage of reciprocated social interactions increases to 87% and the percentage of
acknowledged social interactions decreases to 13%. Not acknowledged interactions are nonexistent in Phase III, which indicates the effective role of the intimate space in promoting the quality and reciprocation of verbal and physical social interactivity among children in the preschool classrooms.
CHAPTER 6. CONCLUSION

The purpose of this study was to understand the relation between children's social interactivity within "Intimates Spaces" provided in the preschool classroom environment. In light of the research, it is demonstrated that the physical setting plays a significant role in providing for social interaction between children, which eventually translates as one of the major blocks of social development.

The main goal of the experiment performed in this research is to confirm the hypothesis which suggests that providing an "Intimate Space" within the preschool classroom may aid in the following:

- Decreasing classroom interruptions.
- Sustaining longer attention spans.
- Improving the quality and duration of social interactions between children.

According to the results of the experiment, the importance and effectiveness of providing intimate spaces for small group interactions may be inferred from the following:

- An increase in interaction duration within the intimate space.
- An increase in group size which may indicate children's increased interest in the intimate space as an interaction setting.
- An increase in female participation in interactions within the intimate space while male interest decreases suggests gender preferences in the kind of performed social interaction. Females seem more interested in verbal social interaction while males seem more interested in physical social interactions and large motor skills that are difficult be performed within the intimate space.
- Increase in cooperation and decrease in competition among children within the intimate space.
- Increase in affectionate interaction among children.
• An increase in reciprocated social interaction and lack of not acknowledged interactions in Phase III.

• An increase in children's verbal interaction; multiword expressions, interrogative clauses, and negative clauses; regulatory speech; and intermediate and high level verbal and non verbal distancing.

These are indicators that suggest the intimate space's success in promoting the quality and quantity of social interactivity among children on verbal and physical levels. Research by Power tends to supports these findings through displaying that socio dramatic play differed from other forms of social object play in terms of more positive and negative affect, longer behavior sequences, more activity talk, more attempts to influence another's behavior, and more shared play focus (Power, 2011). Reviewed studies show that the increase of social coordination of play during the preschool years can increase social and developmental skills such as planning, meta-communication, information getting and sharing, and verbal responsiveness (Power, 2011).

After evaluating children's interactivity within the physical environment of the classroom, the following suggestions and points of interest were raised in regards to the character of the different activity centers. The following modifications are mere suggestions to the overall design of the preschool classroom. These general design guidelines were developed based on three main sources: previous design experience, knowledge collected through the literature review, and field notes from the performed observations.

• The weakness of enclosure degree in the kitchen area can be overcome by arranging the tables with seats facing the remainder space of the classroom instead of facing a wall. Vertical elements such as walls and cabinets can be positioned to create better spatial definition of entities within the kitchen area. Degree of softness can be increased by providing chairs with cushioned seats and backs or attaching cushions to
the existing chairs. A stronger degree of separation between the different activities happening at the kitchen area can be achieved by color coding each table with a corresponding activity. Also, using different textures can help separate the uses of each table and also provide increased softness to the space.

- Softness in the library area can be increased by providing cushioning on the walls for children to lean on to while reading. Individual pillows and soft bean bags can also increase the sense of softness of the space, and provide an element of flexibility.

- Visual connectivity can be increased in the smart board/cozy area by repositioning the smart board elsewhere or placing a reflective surface (mirror) on an adjacent wall. This can help teachers keep an eye on children without physically being close to them. A sense of separation can be created by using different carpet color or by repositioning furniture to help define the smart board area.

- Visual connectivity and size appropriateness are two of the more significant attributes of the physical setting within a preschool environment.

Throughout this research, two main issues developed where further research can be invested. The first issue focuses on children's physical posture within the intimate space. The differences in physical posture percentages between Phase II and Phase III of the experiment indicate that the physical dimensions and architecture of the intimate space narrates the posture and type of interactions that can be performed. Further research can tackle the flexibility of intimate spaces form to allow for a larger variety of interactions and physical postures.

The second issue is the increase of aggressive interaction among children in the intimate space, which was due to space limitation and increased interest in this new addition
to the classroom. Further research can investigate in ways to modify the experiment in order to reduce aggressive interaction among children.
APPENDIX A. PARENTS CONSENT FORM SAMPLE

Research Participant Information and Consent Form

To whom it may concern,

I hope this letter finds you well. My name is Zina Alaswad, and I am a graduate student at Iowa State University in the Master's of Fine Arts in Interior Design program. I would like to kindly request your permission to provide consent for your child to participate in a research study of Spatial Influences on Socialization in Preschool Classrooms.

This study is performed to understand the effects of providing physically defined space within the preschool classroom on the social interactions of children 3-5 years old. The study will take 3-4 weeks, where children will be observed 2-3 times a week.

The importance of this study is derived from the significance of early child development. The first three to five years of a life lay the foundation of each individual's personality, belief systems, and way of seeing and being in the world. Because children are in the course of developing physical, cognitive, social, and emotional skills, their interactions with the physical environment can have long-lasting effects. Understanding the milestones of child development and their relation to the physical environment of the child is fundamental in creating spaces that provide children with opportunities to blossom and advance at a young age.

Your child will not be asked to do anything other than the routine daily activities performed regularly in the classroom. Children in the classroom will be observed to collect anonymous data on their interaction with each other and with the elements in the space (chairs, toys, tables, mats, etc). The second portion of the research study is to introduce a new spatial element within the classroom. The element will be an existing wooden box that is opened on
four of its sides. The two other sides are cushioned for children's comfort. Since the box is open and not enclosed, it is visually and physically accessible by the staff to ensure children's safety. The children will be observed after the implementation of the new element to collect data on their interactions between each other and with the new element. The observation will include taking notes on paper by the principle researcher, in addition to audio recording of the researcher's observation. Data collection will not include video or photography of the children.

Records identifying participants will be kept confidential to the extent allowed by applicable laws and regulations. Records will not be made publicly available. However, federal government regulatory agencies, auditing departments of Iowa State University, and the ISU Institutional Review Board (a committee that reviews and approves research studies with human subjects) may inspect and/or copy your records for quality assurance and analysis. These records may contain private information. Names of the children will not be included in data analysis. Names will only be needed to make sure that children with no consent approval are not included in the observation for the study.

Participation in this research project is completely voluntary. You have the right to say no. You may change your mind at any time and withdraw your child from having his/her behavior and activities documented. You may choose to stop participating at any time. Whether you choose to participate or not will have no affect on your child's learning and developing experience at ISU Child Care Center at Veterinary Medicine.

If you have concerns or questions about this study, please contact the principle researcher:

Zina Alaswad

Phone: (515) 817-3320
Email: zalaswad@iastate.edu

606 Luther Drive, Unit 228

Ames, IA 50010

You can also contact the academic supervisor of this study:

Prof. Lori Stone

Phone: (515) 294-8284

Email: lbrun@iastate.edu

If you have any questions about the rights of research subjects or research-related injury,
please contact:

IRB Administrator

(515) 294-4566

IRB@iastate.edu

OR

Director, Office for Responsible Research

(515) 294-3115

1138 Pearson Hall

Ames, IA 50011.

Your signature below means that you voluntarily provide your permission for your child to
participate in this research study.

Parent Name (Printed)
Parent Signature

____________________________________________

Date

____________________________________________

Child's Name (Printed)

____________________________________________

Child's Age  Child's Gender
APPENDIX B. CHILD ASSENT FORM SAMPLE

My name is Zina Alaswad. I am doing a study to learn about social relations between children in preschool. I am asking you to help because I don’t know whether the classroom helps you to make friends quickly or not.

If you agree to be in my study, I am going to spend time in the classroom and take notes on my notebook so I can see how much time you spend talking and playing with your friends.

You can ask questions about this study at any time. If you decide at any time not to finish, you can ask us to stop. There is no right or wrong way to play or speak with your friends because this is not a test.

If you want to be in this study, you can tell your teacher that it is O.K. that I take notes of you. If you don’t want to be in the study, you can tell your teacher that it is not O.K. for me to take notes of you. Being in the study is up to you, and no one will be upset if you don’t want to or if you change your mind later.

Your name:
__________________________________________________________________________

Name of teacher:
__________________________________________________________________________

Signature of teacher:
__________________________________________________________________________
REFERENCES


