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Application of Available Attributes and Physical Characteristics for Learning through Play in Malaysian Preschools

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Abstract

The National Preschool Curriculum (NPC) of Malaysia introduced "Learning through Play" (LTP) as one of the major teaching and learning approaches for preschools. However, for holistic growth, learning environment for young children should also emphasize on quality built environment that are planned in alignment with the vision and principles of LTP and consideration of children's development psychology. The theory of affordances was utilized whereby the existence of affordance within the physical environment creates potential to be actualized and it is independent of the users, namely children. This paper examined application of available attributes and physical characteristics for LTP in private preschools within converted residential houses. For this purpose, four case study preschools in Johor Bahru were selected through purposive sampling for participant observation to observe available attributes and physical characteristics as well as gain an understanding on potential and actualized affordances for LTP in the respective preschools. After qualitative analysis, findings indicated that opportunities for learning through play within preschools were hindered by four main factors which included lack of materials, equipment and free will; allowable play and independent mobility factors; time factor and safety factor.

Keywords

learning through play, private preschools, converted residential houses, attributes and physical characteristics

1. Introduction

As eager and curious learners, young children gain an understanding of themselves and the world around them from all experiences in their daily lives through active investigation. Preschool programs offering a healthy mixture of play and child-initiated discovery learning can be very valuable to young children, as children learn not by memorizing facts but by creating their own knowledge about the world (Piaget, 1962). According to Waldfogel (1999), young children learn best in an interactive, relational model rather than education model focusing on rote instructions making learning through play one of the most appropriate approach for teaching and learning in preschools. Shackell et al. (2008) believes that through play, children are able to explore the world, learning to take responsibility for their own choices while Brock et al. (2013) contends that learning through play enables children to learn through the restructuring and enrichment of processes, promotes new discovery and concepts as well as provides opportunities for the construction of experience and knowledge.

In Malaysia, although the National Preschool Curriculum (NPC) introduced "Learning through Play" (LTP) as one of the major teaching and learning approaches in preschool, a review conducted by the Curriculum Development Centre (2008) observed a less favourable situation in preschool classrooms. According to them, while teachers claim that they conduct LTP in their respective classrooms, their observations found otherwise. This observation was supported by Bakar et al. (2015) who found that learning through play faces many challenges in Malaysia. Notable challenges identified included formal approach in education which prohibits children's development as well as unsuitable environments and sources for play.

Inappropriate preschool design and environment may consciously or unconsciously impact teacher's classroom management ability especially in the area of promoting learning though play as part of the curriculum. Physical environments, especially those that merely fulfill the rudimentary spaces of indoor space for individual and group activities will drastically stifle children's creative and cognitive growth. Owing to the fact that preschool environment would have an impact on supporting children's developmental growth, this paper thus aims to highlight the application of available attributes and physical characteristics for LTP in preschool within the context of private preschools adapted from converted residential terrace houses. In a bid to make certain that these attributes and physical environment characteristics are facilitative instead of deterministic, the theory of affordances was utilized whereby existence of affordance within the physical environment creates potential to be actualized and is independent of the users.

2. Background of Study

2.1 Learning

What concerns development and learning is the acquisition of knowledge. However, according to Piaget (1964), learning is unlike development. While development, including cognitive development is spontaneous and relates to the "totality of the structures of knowledge" (p. 176), learning is aroused by

situations, thus not spontaneous. These provocations include educational means stimulated by teachers or by other external situation (*ibid*). Thus suggesting that how children are taught is a crucial aspect in children's learning. Mayer (2002) has it that the two vital educational goals include the promotion of retention and transfer of knowledge and these two aspects corresponds with three learning outcomes which are no learning, rote learning and meaningful learning.

When knowledge is not possessed and thus cannot be applied during learning, this results in no learning. Possessing knowledge through mere memorization of facts without true comprehension would result in the inability to apply that knowledge in solving problems. This learning outcome is termed as rote learning. For meaningful learning to happen, Mayer (2002) presents the case that the cognitive processes associated with transfer of knowledge—understand, apply, analyze, evaluate and create must be present.

2.2 The Importance of Play

Play takes various forms for different children. It can be quiet and contemplative, or active and boisterous yet, these characterizations accords children the freedom to play creatively while permitting them to experience risk, challenge, and excitement. Play accords children with the capacity for imagination, adventure and exercise as well as promote social interaction and problem solving skills while developing freedom of expression and ego development. When engaged with responsible others, active involvement in discoveries and self-initiated activities in play such as hands-on manipulation, sensory engagement, and self-initiated explorations multiplies a child's learning (OECD, 2006). These discoveries that children make may serve as a foundation of creativity or later innovations further on in life (Bjorklund & Pellegrini, 2000). Stated simply, rather than an education model focusing on rote instructions, young children learn best in an interactive, relational model (Waldfogel, 1999). Play thus accords children with meaningful learning and makes the case for why "learning through play" as pedagogy is pertinent in the education for young children.

2.3 Learning through Play

While definitions of play within the learning context are aplenty, "learning through play" as a term has been adapted into various preschool curriculum as part of a teaching and learning approach. In understanding meaningful learning, Kieff and Casberque (2000) bridges the definition of learning through play by defining meaningful learning as an attribute contributed by play through focused process based on intrinsic motivation no necessitating literal interpretation. This thus allows for experimentation with rules white promoting mental activity. While Bodrova (2008) noted that Elkonin (2005) and Istomina (1977) found higher mental skills level in young children during play, advocates of learning through play, the likes of Moyles (1995) as well as Wood and Attfield (2005) not only views meaningful learning as an important outcome in education but highlights the multifaceted impact play has on children's physical, social and emotional developments a well.

With regards to learning through play, studies can in general be categorized into two schools of thoughts. The first heralds children's own play and exploration without adult's interference while the

other believes otherwise. Ortega (2003) contends without adult interference, children have the potential to develop spatial knowledge and cognition through play. Nevertheless, Bennett et al. (2009) argues that children require the help of adults in making sense of their discoveries and connecting the dots between a child's new discoveries with their existing knowledge. Their believe is a reflection of Vvgotsky's concepts of the "zone of proximal development" and "scaffolding" which refers to the support offered by adults as well as more competent peers in guiding children through their discovery and thus helping children learn. These two schools of thought lead us to understand play through free play and structured play.

Free play connotes freely chosen activities by children and according to Wood (2010), is closest to "pure play". For Fisher et al. (2011), free play included object play, pretend play, sociodramatic play as well as rough-and-tumble play whereby children are in control without close oversight by adults. Lillard (2007) adds that elements involving make-believe and peers are frequently included in free play. Wood (2010) further expounds that while free play emphasizes children's control over their play, children are still free to select adults including teachers as co-players, referring to them for help and in setting their own goals. Thus, free play enables children to exercise control, provides freedom of choice and expands their capacity for imagination.

Contrary to opportunities provided by free play, structured play are adult led activities which involves planned approaches with defined learning intentions (Wood, 2010). These activities are applicable to a group as well as the whole class. Lillard (2007), who terms structured play as guided play sees this type of play as a "didactic instruction" whereby teachers directly instruct children and is said to be "teacher centered" and "teacher paced". An example given was specific toys distributed to children to interact with in order for them to gain knowledge. While Wood (2010) believes that children may be engaged in playful ways through adult-directed activities based on curriculum contents, she also cautions the limited choices and control children have in this instance. Nevertheless, for a cohesive curriculum, both types of play—free play and structured play should be given priority in the classroom as compared to purely formalized didactic learning.

2.4 Preschool Environment in Support of Play

Quality in early childhood care and education centers is commonly defined as the overall environment in addressing developmental needs of the children attending them (Australian Early Childhood Association, 1996; Elkind, 1993). It has been found that quality in these centers which includes preschool is partly related to its architecturally planned and designed physical environment whereby higher quality preschool education which contributes predominantly in the social and cognitive spheres transpires when the architecture is appropriate (Moore, 1986, 1987). Appropriateness in architecture or the physical environment thus can be deduced to be one which supports children development needs.

Hence, while the pedagogy calls for learning through play, the environment of preschools must subsequently be seen as an equal partner in enhancing children's motion and perception. Findings by Siti Zaliha (1999) showed that one of the constrains faced by Malaysian preschool in promoting play is

due to insufficient levels of facilities and equipment in preschools. Coupled with children spending the bulk of their time indoors in preschools nowadays, this would imply that characteristics for indoor environment should be viewed in terms of affordances to avoid deterministic physical characteristics in order to suggest design strategies that would enhance the environment for learning through play.

2.5 Reviewing Preschool Environment through the Theory of Affordances

The Theory of Affordances was first introduced by Gibson. Affordance is viewed by Heft (2001) as the perceived functional significance of an object, event or place for an individual. This would mean that affordances available may seem different for each individual and at the same time; the same individual may perceive different affordances when different situations arise. Hence, the existence of affordance creates potential to be actualized and is independent of the users. According to Bærentsen and Trettvik (2002), only in places where organisms live as active agents in the environment can affordances be present.

In discussing affordances, Heft (1989) recommends that potential affordance and actualized affordances be distinguished from one another. Looking in conjunction with the individual, potential affordances exist for a particular individual and are defined by their personal qualities. This would mean that children of various ages perceive affordances differently in accordance to their bodily proportions, physical motor qualities, their functional demands of activities and their personal intentions. Other qualities significant for perceiving affordances according to Costall (1995) not only involve skills, practice and strength but also goals and intentions of the individual. A child's abilities in perceiving affordances thus widens as they grow. Actualized affordances on the other hand encompass affordances which have been perceived, utilized and shaped, making actualized affordances an individual's relationship with the environment. Thus, as the environment changes, so would an individual's perception of affordances. Although Greeno (1994) notes that the prerequisites for action are affordances, Kyttä (2003) reiterates that prerequisites only unlocks the possibility of action but it does not assure the actualization of an action.

Albeit affordances might appear different from individual to individual, a significant number of affordances may be similar and shared by everyone. Gibson (1979) believes that perception of shared affordances is an integral part of socialization. As such, the basis for this study interprets that there is a likely possibility that the perception of affordances by teachers and children in the indoor setting of the Malaysian preschool is that of shared affordances.

2.6 Physical Environment Characteristics in Support of Learning through Play

Kagan (1990) views that the facilitation of play through the environment is one of the appropriate practices in implementing play in classrooms. As this paper concentrates on the physical environment for indoor learning through play, physical environment characteristics that contributed towards quality preschool environment was determined. These characteristic were derived through cross references from Moore's Designed Environments for Young Children: Empirical Findings and Implications for Planning and Design, Maxwell's (2007) Competency in Child Care Settings The Role of the Physical

Environment, 7 Cs: An Informational Guide to Young Children's Outdoor Play Spaces by Consortium for Health, Intervention, Learning and Development (CHILD) and other sources of relevance.

In short, the indoor characteristic for play should include spaces which reduce behavioural constrains, accommodate a variety of material and equipments as well as provide places for personalization to enhance children's control of their environment. At the same time, the physical environment should provide varying levels of challenge. Visual and physical linkages between the indoor and outdoor play spaces should also be legible with safety concerns addressed. Opportunities for privacy and restoration are equally important as children can become prone to "cognitive fatigue in an overly complex setting" (Evans, 1994; Kaplan, 1995).

3. Method

As the study to examine application of available attributes and physical characteristics for learning through play in private preschools within Malaysia, a qualitative method through purposive sampling was utilized to select four case study preschools in Johor Bahru. According to Patton (2002), through purposive sampling greater depth of information can be obtained from carefully selected cases which are smaller in number, of sampling through probability sampling. The selected studies for inclusion in this review were identified in the following jointly applied criteria:

1) Private preschool;

2) Adaptive corner lot terrace housing—to find out whether this aspect would influence how users utilized the area;

3) Accessibility.

3.1 Participants

In each of the case study, groups of five year olds were selected through probability sampling utilizing cluster sampling method. A total of 43 children took part, out of which 28 were male and 15 were female.

3.2 Instruments

Participant observation was conducted to examine the application of available attributes and physical characteristics for learning through play in the respective preschools. Participant observation enabled the researcher to capture children's relationships within their natural setting during play to understand the utilization of these attributes by children.

3.3 Procedure

Continuous observations were made throughout the time in each preschool. Observation for free play was conducted outside the classroom and included observation of children outside the focus group while focus group observation centered on the five year olds within their respective classrooms. In carrying out the observation data observation sheet was utilized which allowed the evaluation of preschool physical environment by recording the element of affordance and the corresponding actualized activities by children supported by a particular element. The observation was conducted for a

week in each of the identified preschool from 9 March 2015 to 6 April 2015 from 9.00 am to 12.30 pm with exception of one preschool whereby observation was conducted from 9.00 am to 6.00 pm. Data collected were analyzed through template analysis.

3.4 Method of Analysis

Template analysis was conducted based on data documented in data observation sheets. Additional data were documented through the use of logs and vignettes. For statistical comparison, frequency analysis was utilized to examine the application of available attributes and physical characteristics in the respective preschools. Upon completion data obtained were analyzed for frequency to determine the rate of occurrences of children's observed activity. Analyzed data were further deduced and synthesized through a combination of components to form a connected whole, thus drawing an appropriate understanding to study.

4. Findings

The central proposition in this research was that available attributes and physical characteristics indoors incorporated into the design and layout of preschools influenced children's ability to perceive, utilize and where appropriate shape their respective environment. As the four private preschools were managed by individual administrators; each setting was deem to incorporate various attributes into the physical environment. To understand the application of available attributes and physical characteristics for learning through play in the respective preschools, each of the case study was analyzed with their own merits. Findings are distributed into three sections which include:

1) Profile summary of case studies;

2) Available attributes and physical characteristics;

3) Potential and actualized affordances for learning through play.

4.1 Profile Summary of Case Studies

Table 1. Profile Summary of Case Studies

	Cute Cute Brain Stimulation and Development Centre	**Tadika Jaya**	**Tadika Asas Didik**	**Kid's Planet Kindergarten**
Setting	Ungated Community	Ungated Community	Ungated Community	Gated Community
Type of Conversion	Combined corner and intermediate double storey terraces house. Only utilised ground level for both units.	Combined corner and intermediate single storey terrace houses.	Corner single storey terrace house.	Combined corner and intermediate double storey terrace houses. Both levels utilized.
Opening Hours	8.00 am-6.00 pm	8.00 am-6.00 pm	8.00 am-6.00 pm	8.00 am-6.00 pm

and Sessions	Full day only	Half day/Full day	Half day/Full day	Half day/Full day
Age range of children	Toddler: 12 to 36 months Kindergarten: 4-6 years old	Kindergarten: 4-6 years old	Toddler: 18 to 36 months Kindergarten: 4-6 years old	Toddler: 18 to 36 months Kindergarten: 3-6 years old
Children's Ethnicity	Predominantly Chinese. One Indian.	Malay, Chinese, Indian (predominantly Chinese)	Malay	Chinese, Indian
Teachers' Ethnicity	Chinese, Malay, Indian	Chinese, Indian	Malay, Chinese	Chinese, Malay, Indian
First Language	Mandarin, Chinese	Mandarin, Chinese	Bahasa Malaysia	English
Other Languages	English, Bahasa Malaysia	English, Bahasa Malaysia	English	Chinese, Bahasa Malaysia
Pedagogical Orientation/ Curriculum	Subject-based.	Subject-based.	Subject-based.	Eclectic: play and literacy-based-adopts Cambridge English Young Learners Examination (YLE)
	Some aspects of play based predominantly on structured play.	Some aspects of Information and Communications Technology (ICT)	Some aspects of play based predominantly on semi-structured play.	Children free to voice opinion in class and raises hands for turn to speak
	Emphasis on children's obedience.	Emphasis on children's obedience.	More informal and laid back time table.	Adopts American Sign Language (ASL) for kinesthetic experience
Noted Comment by Principal /Teacher	Safety: teacher's must ensure children's safety thus, play is supervised and materials are to be handed out during lessons only when necessary.	Ethos of school: "No free play time…very academic based".	Financial and Space Constrain: Interested in Western ideas but setbacks faced due to space constrains and financial gains.	Ethos of school: Not all teachers agree with children voicing opinion in classes and time allowed for play. Only those agreeable take up employment here.

4.2 Available Attributes and Physical Characteristics of Case Studies

4.2.1 Case Study 1: Cute Cute Brain Stimulation and Development Centre

Cute Cute Brain Stimulation and Development Centre is a private preschool housed within two double storey terrace house with extension made at the corner unit. However, only the lower floors at both units were utilised. The upper levels were not accessible to children and were used as an office and

administrative space. The two units were accessibly linked indoors as well as outdoors. Staffing consist of a principal, five teachers and a caretaker. During the observation period, between 30 to 40 children aged thirteen months to six years attended. The available attributes and the application of these attributes are shown in Table 2.

Table 2. Application of Available Attributes at Case Study 1

Affordance Categories		**Flat, relatively smooth surface**	**Relatively smooth slope**	**Attached objects**	**Non-rigid attached object**	**Climbable feature**	**Shelter**	**Water/ Sand**	**Subject Related Affordances**
Potential Affordances		running, skipping, playing games, sitting, lying down	rolling, sliding, running down, rolling objects down	sitting on, jumping-on, jumping-over	swinging on, hanging (e.g., rope)	climbing	reflection, hiding, peace and quiet	playing with water/sand	Literacy related Maths related Art related Science related
Case Study 1	Outdoor	✓	X	✓	X	X	X	X	X
		strips on floor —"Imaginative Balancing" child walking on tip toe Running Skipping		*"mini obstacle race"* —Balancing Jumping-on Jumping-over					
	Indoor	✓	X	✓	X	X	X	X	✓
		Lying down Marching Sitting down		*Between sinks and kitchen counter* lifting body up			*Sitting in niche between wall and kitchen counter	*Playing with water at sink when washing hands	*Interlocking blocks* Imaginative play *Jigsaw puzzles* *Book-based* colouring

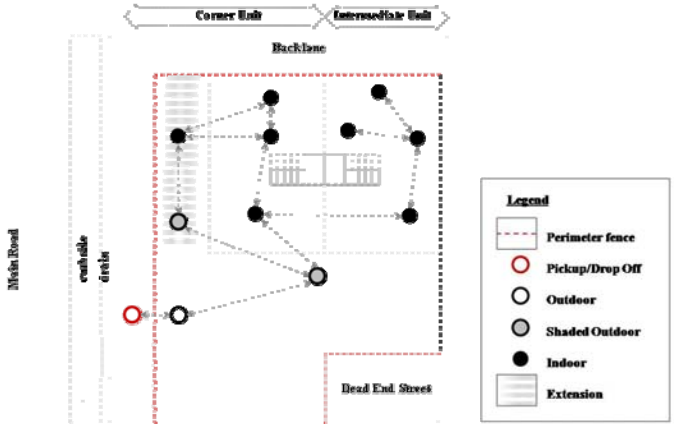

Figure 1. Space Adjacency Diagram

Figure 2. Outdoor and Indoor Environment within Preschool

4.2.2 Physical Indoor Environment

1) Classroom

Specific enclosed classes were designated only for toddler classes encompassing children ages three years and below. This class was an extension from the kitchen of the corner unit to the perimeter fence wall. It has direct access to a shared bathroom which was also accessible from the kitchen. The living area for the corner unit was turned into a class for the five year olds. This class was not enclosed on all sides while class for the four year olds was housed in the living area of the intermediate unit. Classes for the six year old were located in the extension directly beside the perimeter fence wall, forming the shaded-outdoor area. This space was also used as the dining area for all children during morning tea break, lunch and afternoon tea and for art lessons. For nap time, the toddler and class for the four year olds were used with children spreading their own mattresses on the floor. As teachers had their lunch at the area adjacent to the four year old class during children's nap time, they are able to keep a watchful eye over the children at all times.

2) Common Area for Play

There were no specific spaces dedicated for play. Instead, the five year olds' class was utilised as the common area for play. All children were asked to gather here at the end of the day to facilitate going home routine, except certain times when toddlers remained in their nursery. This space was preferable as it provided teacher's with visibility of parents arriving for pick up. As a demarcation of play space, a mat would be laid on the floor in which play materials such as interlocking blocks were distributed by teachers as they saw fit. Children were then asked to play within the confines of the mat. However, more often than not, children's play would "overspill" into the surrounding area. For playing with puzzles and the likes, children used the tables and benches of the class. In general, children were not allowed to make too much noise or run about during play and would be disallowed to continue play if they do so.

4.2.3 Physical Outdoor Environment

1) Indoor-Outdoor Connectedness

Typically, the daily routine inside the classes are not visible to the outside world. The classes in general have good visibility to the outdoors from their classes except the toddlers' classroom. However, positioning of children's seating discouraged children from gazing outside.

2) Shaded-Outdoor

The existing porch of the corner unit adjoining the porch of the intermediate unit was utilised as a morning exercise area and rehearsal space for children's concert. The shaded outdoor area also included an extension of roof from the pickup and drop of point to the porch at the corner unit whereby the roof was extended towards the perimeter fence wall. This extension formed the shared space for dining and acts as a classroom for the six year olds. It is accessible from the toddlers' classroom, easing their movement during meal times. This space was also utilised for art lessons on Thursday after lunch. However, as not all children sign up for art lessons, the remaining six year olds would join the five year olds in their class. Although this shaded outdoor space was versatile, due to its multi usage, children were sometimes hurried to finish their meal and art pieces to enable lessons for the six year old to resume.

Figure 3. Adjoining Porch between Corner Unit and Intermediate Unit Used as Morning Exercise and Rehearsal Space

Figure 4. Multifunctional Extended Shaded Outdoor Space Used as 6 Year Old Class, Dining Area and Space for Art Lesson

Table 3. Summary of Available Attributes and Physical Characteristics

Variety of materials & equipments	Variety of materials including story books stored and labelled clearly in racks but children were not allowed to access them independently. All materials including materials for play were determined and distributed by teachers.
Appropriate sizing of classrooms & play area	Classes were not enclosed. Rather, the classes were defined by furniture used. As an example, a mat was placed on floor as demarcation of space used both during classes and during play. As there was no specific area for play, the class directly at entrance was utilized as a common play area for all children.
Spaces for creating, manipulating & leaving impressions	There were no spaces for children to leave impression and manipulate. There were also no display board for displaying children's work.
Opportunities for privacy and restoration	No dedicated spaces for privacy and restoration observed.
Indoor/Outdoor connectedness	Classrooms had good indoor/outdoor connection but children's movement between indoors and outdoors were restricted.
Opportunities for challenges	No spaces for physical challenge observed. Children were not allowed to climb stairs as the upper level were utilised as office space by the preschool's administration.
Others	Facilities for children: wc and sinks based on children's anthropometric.

4.3 Case Study 2: Tadika Jaya

Tadika Jaya is a private preschool housed within two single storey terrace house with extension for an additional classroom made at the corner unit. Nevertheless, the two units were not accessibly linked indoors. Staffing consist of a principal and seven teachers. During the observation period, between 35 to 50 children aged four to six years attended. The available attributes and the application of these attributes are shown in Table 4.

Table 4. Application of Available Attributes at Case Study 2

Affordance Categories		**Flat, relatively smooth surface**	**Relatively smooth slope**	**Attached objects**	**Non-rigid, attached object**	**Climbable feature**	**Shelter**	**Water/ Sand**	**Subject Related Affordances**
Potential Affordances		running, skipping, playing games, sitting, lying down	rolling, sliding, running down, rolling objects down	sitting on, jumping-on, jumping-over	swinging on, hanging (e.g., rope)	climbing	reflection, hiding, peace and quiet	playing with water/sand	Literacy related Maths related Art related Science related
Case Study 2	Outdoor	✓	✓	✓	✓	X	X	X	X
		Running Hopping Jumping Sitting down Marching *Grassed area* playing games	(Small slide not utilized during observation)	*Stairs: 2 steps to facilitate change of level* jumped-on jumped-off sitting	(Swing not utilized during observation)				
	Indoor	✓	X	✓	X	X	X	X	✓
		Sitting down		Sitting on					*Print, counting and shapes related materials* Children pointing to materials during lessons

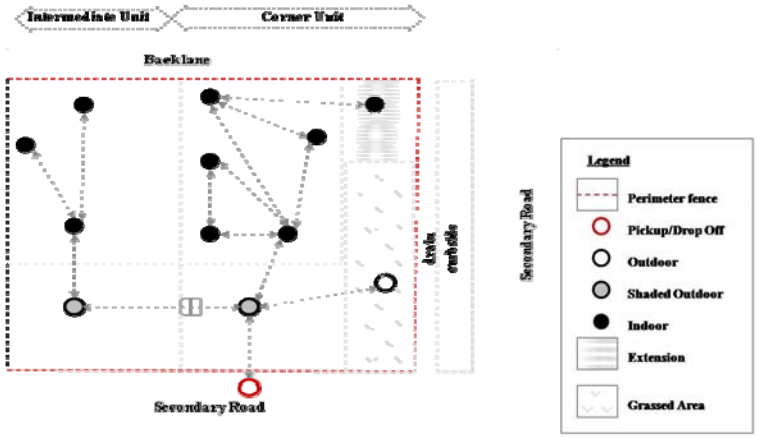

Figure 5. Space Adjacency Diagram

Figure 6. Tadika Jaya's Outdoor and Indoor Environment

4.3.1 Physical Indoor Environment

1) Classroom

The space immediately of the entrance door of the corner unit was turned into a class for six year olds. This class was not enclosed on all sides. As it fronts the main door, this space was also a transition space; hence tables and chairs were arranged on one side to form a passage leading towards the other classrooms. Immediately to the left of this passage was the classroom for the four year olds. This class was located directly adjacent to the principal's office. As the partition wall between the principal's office and the class was removed, this class was accessible and visible from the principal's office. Hence, a whiteboard was utilized as a partition between the classroom and the principal's room acting as a visual screen. Classes for the five year olds were housed in the extension at the rear of the corner unit. This classroom had good visual connection towards the outdoors. The intermediate unit of this preschool housed the computer class. As there was no direct access indoors from the corner unit to the intermediate unit, children had to pass the six year old class, out into the porch towards the class. For

meals, as there were no common dining tables in the kitchen, children typically remained within their respective classes.

2) Common Area for Play

No common area for play was observed indoors. There were also no materials and equipments for play observed indoors.

4.3.2 Physical Outdoor Environment

1) Indoor-Outdoor Connectedness

The daily routine inside the classes are not visible to the outside world. The four and six year olds' classes did not have good visibility to the outdoors. Only class for the five year olds which was housed in the extension had good visibility to the outdoors, overlooking grassed lawn of the preschool.

2) Shaded-Outdoor

The shaded outdoor area included an extension from the porch to the front gate which was used as the pickup and drop of point. The roof was extended towards the porch of the intermediate unit to enable children to cross over from the corner unit to the intermediate unit for computer lessons. The shaded area outdoors was typically used as a transition area.

Figure 7. Shaded Outdoor Area Used as Transition Space Where Children "Transit" towards the Intermediate Unit for Their Computer Lessons

Table 5. Summary of Available Attributes and Physical Characteristics

Variety of materials & equipments	Less variety of materials and equipments for play but wide range of literary and mathematic related materials glued on walls in all classrooms.
Appropriate sizing of classrooms & play area	One classroom not enclosed. Other classrooms are enclosed (classrooms within transition space directly at entrance). No indoor play area observed.
Spaces for creating, manipulating & leaving	No spaces for children to manipulate. But display board available in each classroom displaying children's works.

impressions	
Opportunities for privacy and restoration	No dedicated spaces for privacy and restoration.
Indoor/Outdoor connectedness	Only one classroom observed to have good indoor/outdoor visual connection. Children's movement between indoors and outdoors are restricted.
Opportunities for challenges	No spaces for physical challenge observed.
Others	Facilities in toilet not modified to fit children's anthropometric.

4.4 Case Study 3: Tadika Asas Didik

Tadika Asas Didik is a private preschool housed in a corner unit single storey terrace house. There were no extensions made to the existing structure. Staffing consist of a principal, and three teachers. During the observation period, between eight to 10 children aged 26 months to six years attended. The available attributes and the application of these attributes are shown in Table 6.

Table 6. Application of Available Attributes at Case Study 3

Affordance Categories		**Flat, relatively smooth surface**	**Relatively smooth slope**	**Attached objects**	**Non-rigid, attached object**	**Climbable feature**	**Shelter**	**Water/ Sand**	**Subject Related Affordances**
Potential Affordances		running, skipping, playing games, sitting, lying down	rolling, sliding, running down, rolling objects down	sitting on, jumping-on, jumping-over	swinging on, hanging (e.g., rope)	climbing	reflection, hiding, peace and quiet	playing with water/sand	Literacy related Maths related Art related Science related
Case Study 3	Outdoor	✓	X	✓	X	X	X	X	✓
		✓	X	✓	X	X	X	X	✓
	Indoor	Running Hopping Jumping Sitting down		Sitting on					*Wooden blocks* Imaginative play *Craft* cutting colouring pasting

		Audio Visual singing

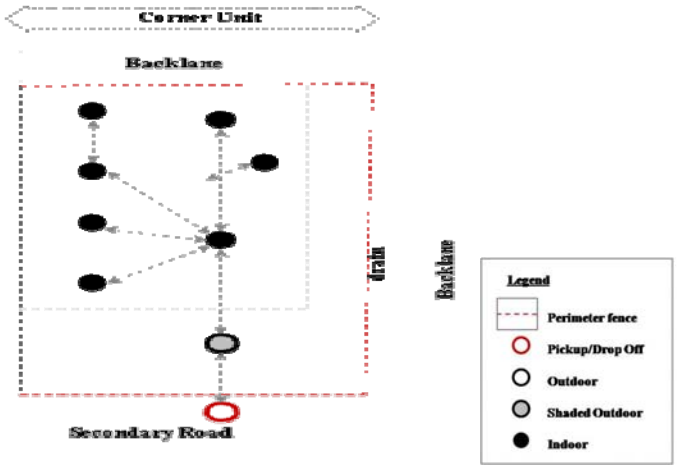

Figure 8. Space Adjacency Diagram

Figure 9. Outdoor and Indoor Environment in Tadika Asas Didik

4.4.1 Physical Indoor Environment

1) Classroom

The front most room was dedicated as a class for toddlers. This room was also utilized by all children during play time. As there were not many children, the classroom for the five and six year olds was combined. This class was located beside the nursery. The unenclosed space between the kitchen and the five and six year old classroom was utilized for the four year olds as shown in Figure 10.

2) Common Area for Play

The common area in this preschool consisted of the living area, kitchen and toddler class. The living area, directly accessible from the front door was equipped with television, sound systems and racks of books. As there were no dedicated sitting areas, children sat on the floor while watching educational

programs. This space was also utilized as the exercise area. The kitchen at the rear of the preschool was utilized as a dining area for morning and afternoon tea breaks. As there were no dedicated sitting, children typically sat on the floor, against the wall in a row during break time. The class for toddlers was utilized as the play area for children. Materials and equipments for play were stored here. Teachers typically distribute materials for play.

Figure 10. Class for the Four Year Olds

Figure 11. Common Area

4.4.2 Physical Outdoor Environment

1) Indoor-Outdoor Connectedness

Typically, the daily routine inside the classes were not visible to the outside world. Although the nursery and living area had windows overlooking outdoors, the curtain was drawn in the nursery while the windows in the living room was located too high for children to have view towards the outdoors. The other classes did not have good visibility to the outdoors.

2) Shaded-Outdoor

No extension was made to the existing structure. The shaded outdoor area included the existing porch. This space was not utilized for the duration of the observation.

Table 7. Summary of Available Attributes and Physical Characteristics

Variety of materials & equipments	Less variety of equipments. Variety of materials for learning through play stored within one classroom but not directly accessible to children. Materials for play determined by teachers. Storybooks on racks located outside at common area directly accessible by children.
Appropriate sizing of classrooms & play area	Two classrooms enclosed, one not enclosed. Nursery classroom utilized as play area.
Spaces for creating, manipulating & leaving impressions	No spaces for children to leave impression and manipulate. No display board for children's work.
Opportunities for privacy and restoration	No dedicated spaces for privacy and restoration.
Indoor/Outdoor connectedness	Less appropriate connection between indoor and outdoor. Children's activities concentrated indoors.
Opportunities for challenges	No spaces for physical challenge observed.
Others	Facilities in toilet not modified to fit children's anthropometric.

4.5 Case Study 4: Kid's Planet Kindergarten

Kid's Planet Kindergarten is a private preschool housed within two double storey terrace houses. The ground levels for both units were utilised. The upper level of the corner unit was used as classrooms while the upper level of the intermediate unit was used for administrative purposes. Extensions made ran along the corner unit towards the perimeter fence wall. Staffing consist of two principals, fourteen teachers and a caretaker. During the observation period, between 70 to 90 children aged 26 months to six years attended. The available attributes and the application of these attributes are shown in Table 8.

Table 8. Application of Available Attributes at Case Study 4

Affordance Categories	**Flat, relatively smooth surface**	**Relatively smooth slope**	**Attached objects**	**Non-rigid, attached object**	**Climbable feature**	**Shelter**	**Water/Sand**	**Subject Related Affordances**
Potential Affordances	running, skipping, playing games, sitting, lying down	rolling, sliding, running down, rolling	sitting on, jumping-on jumping-over	swinging on, hanging (e.g., rope)	climbing	reflection, hiding, peace and quiet	playing with water/sand	Literacy related Maths related Art related Science

			objects down						related
Case Study 4	Outdoor	✓	✓	✓	✓	✓	X	✓	X
		Running Hopping Jumping Sitting down Marching Cycling	*Slide* -sliding down	*Tree bark* jumping off sitting on	*Balancing bar* -balancing (swinging while standing)	*Slide* climbing up slide		*Sand pit* building sandcastles digging carrying sand in bucket *Plant Nursery* splashing water watering plants	
	Indoor	✓	X	✓	X	X	X	X	✓
		Running Hopping Jumping Sitting down Marching Yoga	*Putting book in inclined position with desk rolling objects into desk	Sitting on			*Hiding behind column and under table		*Craft* colouring drawing *Science* using magnifying glass

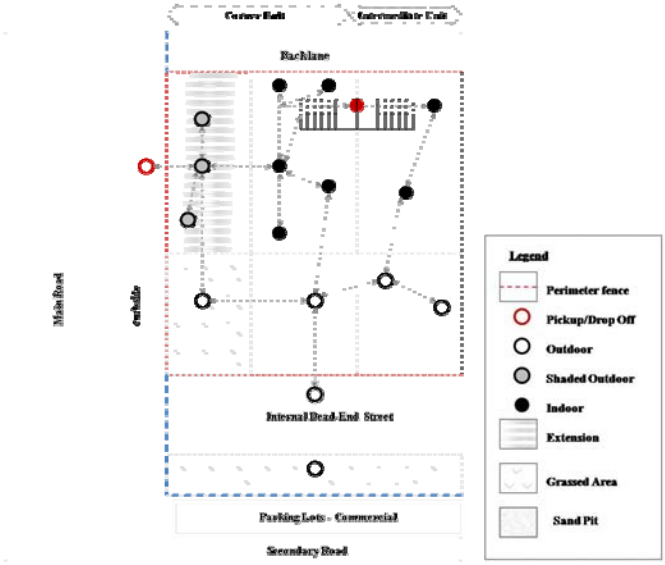

Figure 12. Space Adjacency Diagram

Figure 13. Kid's Planet Outdoor and Indoor Environment

4.5.1 Physical Indoor Environment

1) Classroom

Classes for children were distributed between the ground and first level of the corner unit and the ground level at the intermediate unit. Classes for toddlers and two classes for the three and four year olds were located on the ground level while classes for the five and six year olds were located on the upper level. All classes had dedicated rooms except two classes which were the classes for six, three

and four year olds. The six year olds' class was located on the first level at the niche area directly in front of the stair's landing. This space was located in between two five year old classes. The class for the three and four year olds were combined and was located in the living area of the intermediate unit. Although not located in a dedicated room, this class enjoyed the privilege of being the only class in the intermediate unit.

2) Common Area for Play

The living area was utilised as the common area for morning motivation and exercise sessions for the five and six year olds. This space was directly accessible from the principal's office. The living area was also utilised by all children for queuing up before heading towards their respective classes.

4.5.2 Physical Outdoor Environment

1) Indoor-Outdoor Connectedness

Typically, the daily routine inside the classes were not visible to the outside world. However, a few of the classes in general have good visibility to the outdoors except three other classes which did not enjoy good visibility towards the outdoors. The classroom for the three and four year olds had view directly towards the sandpit within the preschool while the classroom for the six year olds which utilized the niche area above the upper stair landing had view outdoors towards to commercial and other residential units beyond.

2) Shaded-Outdoor

The shaded outdoor area included the roof extension towards the perimeter fence wall from the rear of the corner unit towards the garden in front. This shaded area formed the dining area at the rear, the pickup and drop off point in the middle with the remaining area utilised as a play and exercise area for the children.

Table 9. Summary of Available Attributes and Physical Characteristics

Variety of materials & equipments	Less variety of equipments and materials observed. Storybooks on racks located outside at common area directly accessible by children. Teachers bring along 'busy bag' with materials for craft to occupy children after lessons.
Appropriate sizing of classrooms & play area	Enclosed and unenclosed classrooms. Common area on ground level utilised as indoor play area (yoga, etc.)
Spaces for creating, manipulating & leaving impressions	No spaces for children to leave impression and manipulate. No display board for children's work.
Opportunities for privacy and restoration	No dedicated spaces for privacy and restoration.

Indoor/Outdoor connectedness	Not all classrooms have good indoor/outdoor connection. Windows of classrooms on upper floor are closed and shaded (air conditioned and uniformly lighted). Children's movement between indoors and outdoors determined by teachers.
Opportunities for challenges	No spaces for physical challenges observed.
Others	Opening between units under staircase based on children's anthropometric. Sinks at dining area based on children's anthropometric.

4.6 Potential and Actualised Affordances for Learning through Play

As actualization of action requires both motion and perception, for a better understanding of the chances children have at perceiving their surrounding for affordances and actualize them would be based on the type of allowable play in the respective preschools. For learning through play to happen, as mentioned previously, there are generally two schools of thoughts—one which advocates free play and the other which believes in structured play. Nevertheless, after observation, the types of allowable play in each of the preschools were distributed into three categories; structured play, semi-structured play and free play. Semi-structured play was added here to differentiate play which were situated between structured play which according to Wood (2010) involved planned approaches with defined learning intentions and free play which according to Lillard (2007) included elements involving make-believe and peers. Hence, semi-structured play here involved children's play whereby teachers determined the type of play but children were given the freedom to be involved in make-believe play and play with peers. Most of the preschools' pedagogical orientations were subject based with emphasis on drilling methods especially in literacy. Hence in all the case studies, children typically had very little opportunity for "free play" save the limited time afforded to them at the end of the day. Even so, materials for play were determined by teachers giving children little opportunity in making their own decisions whereby these types of play were in fact more semi-structured then total free play in nature. Emphasis on children's obedience in the Case Study 1 and Case Study 2 further limits children's ability to play freely. Table 6 provides the profile summary of allowable play in the respective preschools and a general observation of activities.

Table 10. Profile Summary of Allowable Play

	Cute Cute Brain Stimulation and Development Centre	**Tadika Jaya**	**Tadika Asas Didik**	**Kid's Planet Kindergarten**
Type of Allowable Play	Structured play. Occasional semi-structured play (e.g., playing with blocks).	Structured play.	Semi-structured play.	Structured and semi-structured play. Occasional free play.
Observation on Activities	Play equipments available outdoors. But children's movement outdoors restricted by teachers.	Limited outdoor play structures.	No outdoor play structures.	Dedicated play equipments outdoors. Teachers determine area of play but children allowed free play at the area.
	Variety of materials for indoor play but materials not accessible to children. Distributed as directed by teacher.	Limited materials for play indoors.	Variety of materials for indoor play but materials not accessible to children. Distributed as directed by teacher.	Less material for indoor play but teachers bring a "busy bag" with art materials inside for children to draw, create etc as they like.
	Activities directed by teachers-limiting children's movement.	Activities directed by teachers-limiting children's movement.	Activities directed by teachers—children allowed more free movement.	Activities directed by teachers—children allowed more free movement.
	Rigid timetable: children allowed to playing after 4pm—while waiting for parents.	Rigid timetable: children allowed to playing only during limited time one day per week (usually Fridays).	Less rigid timetable: children allowed to playing when deemed needed by teacher (teacher senses the mood of children).	Rigid timetable but less rigid lessons: play incorporated into lessons.

5. Discussion

The findings of the study showed that the physical environment served utilitarian purposes of didactic teaching in a formalized setting. The most typical available attributes and physical characteristics indoors included flat, relatively smooth surface and attached objects. For flat, relatively smooth surface, actualized affordances by children included running, skipping, marching, hopping, jumping, laying down and sitting on while actualized affordances for attached objects such as benches and chairs included sitting on and jumping on were also common in all preschools. Characteristics not present included relatively smooth slope, non-rigid attached object, climbable feature, shelter and water. However, children were able to utilize the available attributes and shape them into attributes not present by modifying the positions of the relevant objects as well as using various body postures. This showed that children had the ability to actively shape various physical environment attributes to support their needs to be actualized.

In terms of subject related affordances for learning through play in classrooms, print related materials for literacy and math were most common in the preschools. However, these affordances went unnoticed except times in which teachers encouraged children search around their environment for examples as part of their lessons. Art experiences usually concentrated on two dimensional experiences through colouring and drawing. Nevertheless, structured lessons took up the majority of time in preschools with two thirds of the observed sessions conducted in a formal way through rote learning with children being passive learners following instructions to complete workbook activities determined by the teachers. This had an impact on potential affordances to be actualized by children as movement is indispensible for the environment to be perceived by children, as Gibson (1979, p. 223) noted that "…we must move around to be able to perceive". Children are selective in picking up their perceive appropriate affordances based on their individual "bodily qualities, to the functional demands of ongoing activity, and to their current intentions" (Kyttä, 2003, p. 50).

Observation showed that opportunities for learning through play to happen within preschools were hindered by four main factors which included lack of materials, equipment and free will, allowable play and independent mobility, time factor and safety factor.

i) Variety of Materials, Equipment and Free Will

While few preschools provided variety of materials and equipments for play, preschools which had a variety of materials for play did not allow the children to freely choose their preferred materials for play, ruling out free play.

ii) Allowable Play and Independent Mobility

The extent to which teachers allowed independent mobility were not present in the observed case studies. During lessons, play rarely happened and obedience was expected of children. Hence, children had little opportunity for independent mobility in classrooms. During play time, if present, most of the settings observed tolerated semi-structured and structured play. Physical play involving gross motor skill was most common and was incorporated into exercise play which took place mostly before

lessons in the morning under supervision of a teacher. Object play involving distribution of homogeneous objects such as interlocking blocks or wooden blocks by teachers was also typical. No social play was encouraged in the observed preschools. However, social play happened as a consequence of children's own initiative in involving peers during object play.

iii) Time Factor

The amount of time allocated for play in most preschools was minimal. The majority of time in preschools was dedicated to subject based lessons as the pedagogy orientation of these preschools was subject-based pedagogy focussing on academic activities. Typically, play time had not place in the children's timetable.

iv) Safety Factor

While some preschools have a variety of materials for children, they are kept and distributed accordingly for safety reasons. Most of the principals believed that it was teacher's responsibility to ensure children's safety through supervised play and the distribution of materials during lessons only when deemed necessary.

6. Conclusion

Through perception and motion, children are influenced by the environment's functional properties whereby when they move, a host of significant information about the environment is revealed which in turn expands a child's cognition capacity (McDevitt & Ormrod, 2002). In this sense, potential affordances are turned into actualized affordance when children are engaged with the particular attribute offered within the preschool setting. As independent mobility plays a part in contributing towards higher levels of actualized affordances, due to the type of pedagogic orientation and type of allowable play in the respective preschools, opportunities for actualization may be hindered or encouraged.

This paper shows that pedagogical orientation or curriculum of the respective preschool, individual teacher's initiative and the physical environment characteristics had implications on the actualised affordance for subject related affordances in learning through play. Thus, a central prerequisite for children to develop a relationship with their preschool environment and be able to actualize and shape potential affordances within preschool is for educators to encourage independent mobility and freedom for children to explore their environment. While semi-structure and structured play are both important for educators to determine learning outcomes from the proposed play, time for free play is equally quintessential. Coupled with an environment rich with potential affordances for playing and learning, free play sessions would help children exercise their control over their environment, provide freedom of choice in promotion of self expression and encourage social interactions. With children's ingenuity for adapting the environment to their respective needs, a resource rich environment with appropriate attributes and physical environment characteristics would further enhance learning through play within preschools and expand children's capacity for imagination.

Amid growing scientific evidence, it is undeniable that quality early intervention benefits young children in both their cognitive and non-cognitive development as well as in their later life. Consequently, there is a critical need for society to reexamine the experiences and circumstances in which we subject our young children to, more so in preschool environments where children are observed to spend a major bulk of their time. It is hope that within the domain of architectural, interior and private preschools establishment, the stimulation of design strategies for aiding learning through play within the indoor environment of preschools would encourage better understanding of key issues contributing towards a comprehensive planning in alignment with the vision and principles of learning through play.

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References

Australian Early Childhood Association. (1996). *Physical Environments for Center-Based Early Childhood Services*. Watson, ACT.

Bærentsen, K. B., & Trettvik, J. (2002). An Activity Theory Approach to Affordance. In *Proceedings of the Second Nordic Conference on Human-Computer Interaction* (pp. 51-60). Aarhus, Denmark.

Bakar, N. A., Daud, N., Nordin, N., & Abdullah, A. H. (2015). Developing Integrated Pedagogical Approaches in Play Pedagogy: Malaysian Experiences. *Asian Social Science*, *11*(4), 234-245. http://dx.doi.org/10.5539/ass.v11n4p234

Bennett, N., Wood, E., & Rogers, S. (2009). *Teaching through Play: Teachers' Thinking and Classroom Practice* (Original). Buckingham, United Kingdom: Open University Press.

Bjorklund, D. F., & Pellegrini, A. D. (2000). Child Development and Evolutionary Psychology. *Child Development*, *71*(6), 1687-1708.

Bodrova, E. (2008). Make-Believe Play versus Academic Skills: A Vygotskian Approach to Today ' S Dilemma of Early Childhood Education Make-Believe Play versus Academic Skills: A Vygotskian Approach to Today' s Dilemma of Early. *European Early Childhood Education Research Journal*, *16*(3), 357-369. http://dx.doi.org/10.1080/13502930802291777

Costall, A. (1995). Socializing Affordances. *Theory and Psychology*, *5*(4), 467-481.

Curriculum Development Centre. (2008). *Early Childhood Care and Education Policy Implementation Review 2007*. Malaysia. Retrieved from http://www.tadika.org/Malaysian_ECCE_Policy_Review_24_Jan_2008.pdf

Elkind, D. (1993). *Images of the Young Child: Collected Essays on Childhood and Education*.

Washington D.C.

Elkonin, D. B. (2005). Development of Speech. *Journal of Russian and East Europe Europena Psychology*, *43*(1), 22-48.

Evans, G. W. (1994). Learning and the Physical Environment. In F. J., & D. L. (Eds.), *Institutions for personal learning: Establishing a research agenda* (pp. 119-126). Washington D.C.: American Association of Museums.

Fisher, K., Hirsh-Pasek, K., Golinkoff, R., Singer, D., & Berk, L. W. (2011). Playing Around in School: Implications for Learning and Education Policy. In A. D. Pellegrini (Ed.), *The Oxford Handbook of the Development of Play* (pp. 341-362).

Gibson, J. J. (1979). *The Ecological Approach to Visual Perception*. Boston: Houghton Mifflin.

Greeno, J. G. (1994). Gibson's Affordances. *Psychological Review*, *101*(2), 336-342.

Heft, H. (1989). Affordances and the Body: An Intentional Analysis of Gibson's Ecological Approach to Visual Perception. *Journal for the Theory of Social Behavior*, *19*(1), 1-30.

Heft, H. (2001). *Ecological Psychology in Context: James Gibson, Roger Barker, and the Legacy of William James's Radical Empiricism*. Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Istomina, Z. M. (1977). The Developmental of Voluntary Memory in Preschool-Age Children. In M. Cole (Ed.), *Soviet developmental psychology*. New York: Sharpe.

Kagan, S. L. (1990). Children's Play: The Journey from Theory to Practice. In E. Klugman, & S. Smilansky (Eds.), *Children's Play and Learning: Perspectives and Policy Implications* (pp. 173-187). New York: Columbia University.

Kaplan, S. (1995). The Restorative Benefits of Nature: Toward an Integrative Framework. *Journal of Environmental Psychology*, *15*(3), 169-182.

Kieff, J. E., & Casberque, R. M. (2000). *Playful Learning and Teaching. Integrating Play into Preschool and Primary Programs*. Boston: Allyn and Bacon.

Kyttä, M. (2003). *Children in Outdoor Contexts: Affordances and Independent Mobility in the Assessment of Environmental Child Friendliness*. Helsinki University of Technology.

Lillard, A. S. (2007). Playful Learning and Montessori Education S, *5*(2), 157-186.

Maxwell, L. E. (2007). Competency in Child Care Settings: The Role of the Physical Environment. *Environment and Behavior*, *39*(2), 229-245. http://dx.doi.org/10.1177/0013916506289976

Mayer, R. E. (2002). Rote Versus Meaningful Learning. *Theory Into Practice*, *41*(4), 226-232. http://dx.doi.org/10.1207/s15430421tip4104_4

McDevitt, T. M., & Ormrod, J. E. (2002). *Child Development and Education*. New Jersey: Prentice Hall.

Moyles, J. R. (1995). *The Excellence of Play*. Great Britain: Open University Press.

Organisation For Economic Co-Operation and Development. (2006). *Starting Strong II: Early Childhood Education and Care*. *Early Childhood Education* (Vol. 37). Paris, France: OECD Publishing. http://dx.doi.org/10.1787/9789264035461-en

Ortega, R. (2003). Play, Activity and Through: Reflections on Piaget's and Vygotsky's Theories. In D. E. Lytle (Ed.), *Play and educational theory and practice* (Vol. 5, pp. 99-115). Westport, CT: Greenwood Publishing Group.

Patton, M. Q. (2002). *Qualitative Research & Evaluation Methods*. California: Sage.

Piaget, J. (1964). Part I: Cognitive Development in Children: Piaget. Development and Learning. *Journal of Research in Science Teaching, 2*(3), 176-186. http://dx.doi.org/10.1002/tea.3660020306

Siti Zaliha, R. (1999). *Teachers' Perception of Play in Pre-School Education in Sarawak.* University of Bristol.

Waldfogel, J. (1999). The Impact of the Family and Medical Leave Act. *Journal of Policy Analysis and Management*, *18*(2), 281-302.

Wood, E. (2010). Developing Integrated Pedagogical Approaches to Play and Learning. In B. P., H. J., & E. Woods (Eds.), *Play and learning in the early years* (pp. 9-25). London: Sage Publications.

Wood, E., & Attfield, J. (2005). Developing Play in the Curriculum. In *Play, learning and the early childhood curriculum* (2nd ed., pp. 118-157). Great Britain: Paul Chapman Publishing.