

MIDDLE CHILDHOOD CHILDREN INTERACTION WITH HOME AND NEIGHBORHOOD GARDENS IN URBAN AND RURAL SETTING

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ABSTRACT: This study investigated the properties and attributes of home and neighborhood gardens as a place for middle childhood children to play. The home garden is defined as legal proximity territory demarcated by plants and landform in village and in urban terraced- house neighborhood. The neighborhood garden is an expansion territory range of home garden accessible for public to interact with natural elements. The play involves physical and social performances which are triggered by cognitive performances. Perceptual responses of 120 children, aged 6-12, were elicited using survey questionnaire in a village and a terrace house neighborhood. Data analysis involved the differences of children performances between village and urban, and between home and neighborhood garden. Outdoor participation of children in rural is greater than urban that influenced by variety of feature material, outdoor range, and spaces. It means rural children preferred the outdoor more than their urban counterparts. During play, 48% of rural children used both plants and animals as play tool. On the other hand, only 24% of urban children utilized plant as play tool. The result suggests the rural children were exposed a variety of environmental affordances than their urban counterparts. The affordances are categorized into: performatory (60%), 25% exploratory and 15% productive. It means much of the children performances were physical and social as well as manipulating outdoor elements. This study suggests that rural garden affords more functional affordances than urban garden for children's performances: physical, social, and cognitive. Finally, this study implies that rural outdoor offers more opportunities and independent mobility for children to be physically active and socially interactive.

Keywords: Middle childhood children, garden, plants, animals, functioning

1. INTRODUCTION

Nature is diverse and complex. It is dynamic, that is it comes in ever changing variety of shape, texture, color and smell. Nature exists in a variety forms such as at rivers, forests, open spaces, parks and gardens. These places afford children to perceive, utilize and shape (Kytta, 2003) the natural elements in their own imaginative and creativity ways (Hart, 1978). Inasmuch, children are important users of local environments (Chawla 2002; Hart, 1979; Moore, 1986). The environmental qualities most appreciated by children are colors in nature, trees, woodlands, shifting topography, shaded areas, meadows, places for climbing and construction, and challenging places for exploring and experience. In other words, children required complex, challenging and exciting play environments, and thus vital for their growth and development (Striniste and Moore, 1989).

Children recognized the value of playing in nature on its function rather than its aesthetic (Fjortoft, 2004, 2001, 2000). Play is a reflection children's development; the vehicle by which they communicate, socialize, learn about the world, understand themselves and other people, deal with their problems, and practice skills that may be of use to them later in life (Hughes, 1995). It is an important element in children's lives and continues to mirror their overall pattern of social, physical and cognitive developments (Fromberg, 2002). In nature, children engaged with plant and animals which act as their play tools, which accompanied them in interesting play as their special friends-animals

(Bryant, 1986), object attachment and cross-modal match (Myers, 1998). Figure 1 illustrates some play activities that middle childhood children may engage in natural environment.

Children recognized plants and animals primarily in principal setting (Ziegler, 1987) such as forest (Fjortoft, 2004) in which they recognized a place for refuge (Dovey, 1990). In the refuge, Kellert (2002) posits that children set values to plants and animals in nine values: aesthetic, dominiostic, moralistic, humanistic, negativistic, naturalistic, scientific, symbolic and utilitarian.



Figure 1: Children perceived trees as utilitarian; climbing, meeting places and plucking fruits. Otherwise, observe small animals as a naturalistic and scientific value.

This study aims to investigate the level of middle childhood children functioning in home and neighborhood gardens, both in rural and urban settings. It examines how properties of the gardens influencing children's physical, social and cognitive performances. The research questions of the study were: (1) what are the preferred garden elements and spaces of the children, (2) what are the activities children participate with plant and animals in the gardens, and (3) do children perceive the garden as an ecological system for play and learn?

2. MEANINGS AND FUNCTION OF HOME AND NEIGHBORHOOD GARDENS

A home garden of rural house is referred as legal proximity territory of spaces demarcated by plant including fruit trees. The outdoor spaces are front yard, side yard, back yard, barn yard, and bush area (Figure 2). These spaces are regularly connected to neighboring houses which are generally houses of relatives. The spaces and the trees afforded a variety of functional properties to children for outdoor experience. On the other hand, a home garden of urban house is a fenced or walled space in front of building. Its shape is similar to one another in a neighborhood that is having a standardized design as shown in Figure 2. Its typical spaces are car porch area, side yard and back yard. Like the rural outdoor spaces, they provide space for children to play. However, its functional properties are less varied than the rural ones due to its monotony in form and layout.

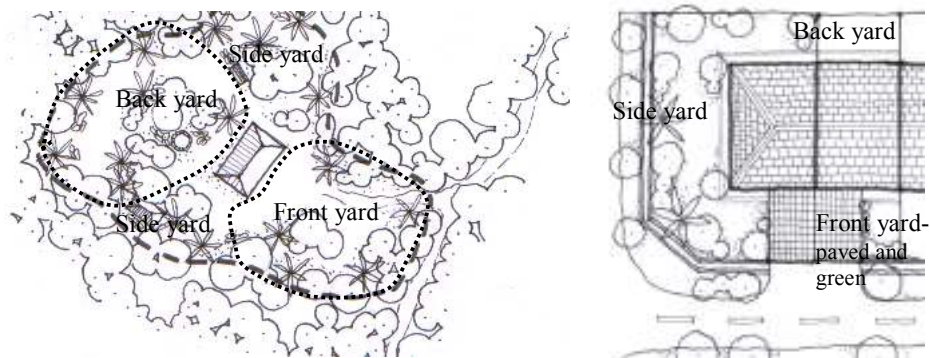


Figure 2: Schematic layout of home garden in a rural and terrace house.

A neighborhood garden of urban setting is a composite of playgrounds, parks, paved open spaces, and abandoned open spaces affording more and larger spaces for children to discover, to explore and to socialize with peers in their play. The parks and playground are equipped with play structures and

trees planted in organized layout. They afforded the children with regulated play and few manipulating opportunities. On the other hand, the abandoned spaces are wild place with treelets, tall shrubs and weeds affording the children to play loose and be manipulative. A neighborhood garden of rural setting are composed with varied spaces that include farm, orchard, nearby forest, and bushed area. These spaces afforded children to play freely to perform and explore intuitively on natural elements as their play tools.

3. METHOD

The study elicited perceptual responses of 120 middle childhood children, aged 6-12, who lived in an urban terrace-housed neighborhood (n=60) and a rural village neighborhood (n=60). It investigated on children preferences on home garden and neighborhood garden, their interaction with plants and animals, and the knowledge gained over their experience.

The terrace-housed neighborhood was composed terrace houses laid in a grid-iron, regimented layout including playgrounds and playfields. The landscape of urban neighborhood garden was primarily composed of ornamental trees and shrubs planted along streets and in playgrounds and playfields. The playgrounds were equipped with equipments, pathways and garden shelters. In contrast, the rural village was characterized by agriculture crops such as oil palm, rubber and fruit trees and vegetables. Generally, its landscape diversity was higher than the urban neighborhood.

The children were interviewed on their experiences with the home garden and neighborhood garden. Both were social space for the children to play involving sensorial and motoric activities. The former was defined as legal proximity territory demarcated by domesticated plants and landform, and the latter was a combination of several home gardens including parks, orchards and nearby forest.

The children were interviewed in the gardens or at their schools. They were randomly selected, and were interviewed either individually or in a group of five. In the school, the survey was conducted in three classrooms with the permission of the class teachers. The children were rewarded with knick-knacks after they completed the questionnaires. The survey last for about one hour for each classroom and 10 to 15 minutes per individual or per group in the gardens.

4. MEASUREMENTS AND DATA ANALYSIS

The instruments to elicit the perceptual responses of the children were survey questionnaire and open-ended interview. The questions in the survey were divided into two settings according to children participation: (1) home garden, and (2) neighborhood garden. The survey questionnaire and interview of urban and rural children was conducted in school, playground of terrace house and home garden. The interview was conducted either as individual or group of five. The survey elicited two types of data: children habitual range, and affordances of the gardens for cognitive, physical and social functioning.

The children habitual range in urban neighborhood garden was divided into four types: playground, green or abandoned spaces, nearby forest, and open or asphalt spaces. On the hand, the habitual range in rural neighborhood was comprised of five types: farm, orchard, river and stream, home garden, and nearby forest.

During the interview, the children were asked on their definition of home and neighborhood gardens, their interactions with plant and animals in their play, and the places that they regularly visited.

5. RESULTS

The analysis results are divided into level of participation, place of experience and types of play tools.

5.1. Level of Participation

The level of children participation in garden was based on children interaction between plant and animals. The participation was analyzed between urban and rural setting and home and neighborhood garden. These variables are tested in *chi-square* test to measure the significant level of participation in garden. The comparisons of urban and rural setting participation are analyzed based on results of Table

1 (item 1,); (1) garden participation (home and neighborhood garden), (2) frequency of visiting garden (home and neighborhood garden), (3) feeling of attachment (group), (4) participation in garden of residential setting, and (5) attachment with properties in garden and residential setting.

From the results of survey questionnaire, 63 % of children preferred to play in home garden and compelled with home environment because they perceived the garden was safe and afforded feeling comfort. This result is paralleled to the finding Thigpen (2007) that safety and comfort are factors required by children from their home environment. The finding suggests that the children viewed the home garden as principal setting for outdoor exploring which is in accord with the study of Ziegler (1987).



Figure 3: Children play in home garden with siblings and occasionally with peers

In contrast, an expected results that according to children participation in garden, children frequency of visit garden are measured into three categories such as *often*, *seldom*, and *never*. The *often* refers to children everyday visit the home garden in a week. The *seldom* refers to children visit home garden into three to four times in a week and *never* refers to children that are not visiting or play in home garden at all, thus, it means that they are always playing in neighborhood garden. (Table 1). This question is answered for frequency visiting home garden.

The results of children repeatedly respond to play in garden is 82% are replied to play in neighborhood garden and 63% replied to play in home garden. One of the reasons is 60% and 40% of urban children are replied play in neighborhood garden is concerned a place to meet peers and a place to feel free. The chi-square tests has revealed that children responses between the home garden and neighborhood garden as their play space are differ which the *p* value is 12.836(b), *df*= 1, *asym. Sig* (2-sided) = 0.000.

Table 1: Descriptive of the main single items (with chi-square test) of the study in garden for urban and rural setting

| Measure | Scale Measurement | Garden individual responses (%) | | | Group or individual responses of Garden (%) | | Test | | |
|--|-------------------------------|---------------------------------|-----------|-----------|---|-----------|----------|----------|----------|
| | | <i>HG</i> | <i>NG</i> | <i>BT</i> | <i>Ur</i> | <i>Ru</i> | <i>p</i> | <i>f</i> | <i>N</i> |
| 1 Frequency of visit | 1=often (everyday in a week) | 18 | | | - | - | .000 | - | 120 |
| | 2=seldom (3-4 times per week) | | 37 | | | | | | |
| | 3=never | | | 45 | | | | | |
| 2 Feeling of attachment (Group) | 1=place to feel free | - | - | - | 40 | 16 | - | - | 120 |
| | 2=place to see animals | | | | - | 16 | | | |
| | 3=place to climb trees | | | | - | 16 | | | |
| | 4=place to meet peers | | | | 60 | 36 | | | |
| | 5=place as private | | | | - | 16 | | | |
| 3 Participation in garden of residential setting | 1= <i>HG</i> in urban | - | - | - | 17 | - | .000 | .001 | 120 |
| | 2= <i>NG</i> in urban | | | | 32 | - | | | |
| | 3= <i>HG</i> in rural | | | | | 30 | | | |

| | | | | | | | | |
|---|--|---------------------------|----|----|---|----|----|------|
| | | 4=NG in rural | | | | 21 | | |
| 4 | Attachment with properties in garden and residential setting | 1=plant | 24 | - | - | 14 | 17 | .001 |
| | | 2=animals | 19 | - | - | 10 | 13 | - |
| | | 3=both | 29 | 11 | - | 3 | 27 | - |
| | | 4=mixed-recalled memories | - | 26 | - | 15 | - | 120 |

HG= home garden, NG=neighborhood garden, BT= both garden setting, Ur=Urban children, Ru= Rural children p= significance value of chi square test, f= fisher's exact test, N= the numbers of respondents

The result suggests that children are curious and eager to play in outdoor environment which seems to confirm with is a study by Chawla (2004). It also parallels to the finding of Kytta (2003) that children discover new affordances during outdoor participation.

The result also indicates that 45% of the children played in both settings. It suggests that the children are mobile moving from their home garden and into their neighbors. This phenomenon happened due to the richness of natural elements, plant and animals, for the children to experience, physically and socially. This finding is in accord with the studies of Hart (1995) and Kytta (2003) that outdoor environments afford a variety of opportunities for children to play.

As can be seen in Figure 4, 32% of urban children preferred to play in neighborhood garden because of availability of open spaces and plant and animals. This finding is accord to the studies by Faber *et al.* (2001) and Well (2000) that children perform a variety of physical play in outdoor environment.

The percentage of rural children playing in home garden (30%) is almost similar to the urban children playing in neighborhood garden (32%). One of the reasons is that the rural home garden is diverse with a variety of plant and animal life. It means that the home garden is an empathy radius for the rural children (Sobel, 1998). In other words, the home garden is a place that affords the children to develop their own personality and refuge. As such the children perceived that the home garden provides safety and comfort which is paralleled to the studies of Pollowy (1974) and Thigpen (2007).

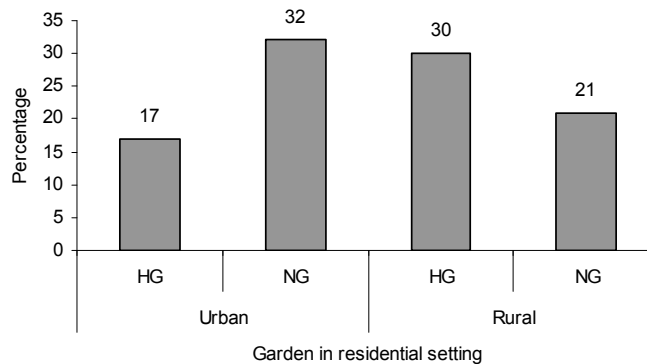


Figure 4: Children responses on play in garden of residential setting

5.2. Spaces and Places Experience of Urban and Rural Children

As shown in Figure 5, the urban children categorized their neighborhood into four play spaces which were playground, green space or abandoned space, nearby forest, and paved open space. The playground was an open space equipped with fixed equipments such as swings, see-saws, spring riders, and merry-go-round. The green spaces were road shoulders and drain reserves, and the abandoned spaces were patch areas planted with grass and trees. As specified by parents the nearby forest in the urban setting was an abandoned oil palm farm mixed with secondary forest and inhabited by wild and poisonous animals. The paved area was an open space paved with cement, bitumen, and pavement block that were usually used for play games, and for drive way and pathway.

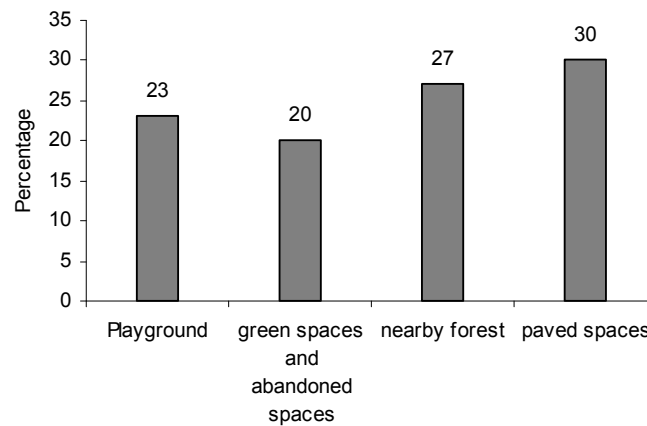


Figure 5: Types of open space in urban neighborhood experienced by middle childhood children

As can be seen in Figure 5, the urban children participated in all four spaces for exploration, discovery and socialization. As such, 30% of urban children preferred to play in paved open space and they were easily monitored by their parents or adults. This finding is parallel to the studies by Christensen (2003) and Pollock (1974) that garden range of urban children started from doorstep and expanded to paved spaces. Furthermore, as specified by the children that the green space, abandoned space and nearby forest were uncomfortable place for them since they are familiar with indoor and air-condition space. This response is consistent to a study by Bixler and Floyd (2007) that urban children are comfortable with indoor environment more than the outdoor.

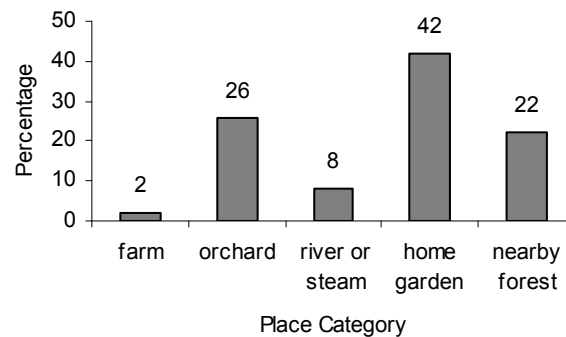


Figure 6: Category of places in rural neighborhood experienced by children

In the rural neighborhood garden, the children preferred five places for play: (1) farm (2) orchard (3) river or stream, (4) home setting, and (5) nearby forest (Figure 6). A farm is a place where trees such as oil palms are arranged in rows at regular intervals. It means that it is a semi-natural setting affording lesser opportunity for play than the orchard. The rural children reported that they rarely visited and wandered in the oil palm farm because they perceived that it was a dangerous place with pesticides and poisonous animals. However, the children visited the rubber farm to search and to collect rubber seeds for play games. The orchard is a place that the children frequently visited with their parents. They play while their parents tending the crops in the orchard. Inasmuch, the orchard was an extension of the home garden.

The river and stream in the rural setting is located far away from the children houses, at fringe of nearby forest. Occasionally, rural children visited the river and stream to participate in physical activities such as bathing, scooping shrimps, catching small fishes, snails, rafting with self-made raft from bamboo and banana stems, and observing and catching kingfisher's babies in burrows at river bank. In sum, they experienced 62 affordances at the river and stream. This finding is quiet similar to a studies by Ismail (2008) that river and stream offer as many as 87 affordances.

As can be seen in Figure 6, the largest percentage of the children (42%) utilized home setting as their play space. The home setting was composed of front yard, side yard, back yard, barn area, and bush area. The back yards were planted with a variety of fruits trees including durian trees, jambu air (*Syzygium aqueum*), mangosteen (*Gracinia mangostana*), mango's tree (*Mangifera indica*), ciku (*Manilkara zapota*), and rambutan trees (*Nephelium lappaceaum*). It means that the fruit trees offered them to climb trees, to cling on branches, to shake branches, and to cut branches for making slingshots, swords and toy guns. The children felt safe and comfort in the rural home garden because they were observed by their parents or other adults. In other words, the home garden is a refuge that children establish bonding to it through repetitive visits (Appleton, 1975; Maria, 2003; Melson, 1991; Rivkin, 2000).

In addition, the home gardens were equipped with duck and chicken coops and goat barns. The animals afforded them able-to-observe, able-to-feed, and able-to-pamper. The result suggests that the children perceived that the animals were their companion to play. This finding is an accord with Myer (2002) that children see domesticated as their friend.

Finally, they children also perceived that bushes, trees less than five meters tall, afforded to build den by tying branches and twigs with strings, and thus, afforded place to practices pretend play with peers and siblings. Theoretically, bush area is perceived by middle childhood children as a place to hide and away from their parent's surveillance (Hill, 2006). Furthermore, the den acts a home of womb (Sales, 1989; Sobel, 2002) that affords the children another home for them to create their own play.

In summary, the rural children play recognized the home garden as a place that affords a variety of materials for them to play independently. In contrast to the urban counterpart, they generally participate in their home gardens that afforded them plenty of physical and social activities.

5.3. Children Play Tools in Residential Garden Setting

The analysis on children play tools in garden are referred to children interaction or play with plant and animals as their playscape. Thus, these tools are defined as properties in garden. Children's responses on the properties were categorized into four types: plant, animal, both plant and animal and mixed properties including plant, animal and play equipments. This categorization is based on physical and social participation with the properties leading the children to perceive the properties as their play tools.

However the term of rare are referred to 26% of children in urban are rarely attached with plant and animals as play tools but, they are generally reported previous events or memorized on their play with plant and animals. Thus, rare is categorized in play most with fixed equipments, watches the behavior and activities of other children, actively listens to or communicates verbally with peers, engaged in playful physical activity-rough-and-tumble or rules of games with peers such as play badminton, cycling, and running (Petrakos, 1996). Furthermore, they are encountered in play activities that influenced in categories of activities with plant and animals in garden.

As can be seen in Figure 7, rural children are greater responses (25%) on plant and animals in garden as their play tools. It suggests that rural children are greater opportunities to manipulate both properties for their play tools. However, in urban setting, the percentage of urban children interacts with plant and animals are almost similar. It suggests that children in urban setting are dependently responses on those three affordances (plant 11%, animals 8% and both 6%) due to lack and limited of properties exist in garden. Due to inconsistent of properties exist in garden, 26% children are reported recalled memories interact with plant and animals at the past thus, it persuaded them most response on fixed equipments, watches the behavior and activities of other children, actively listens to or communicates verbally with peers, engaged in playful physical activity-rough-and-tumble or rules of games with peers such as play badminton, cycling, and running. Thus, these groups are categorized mixed.

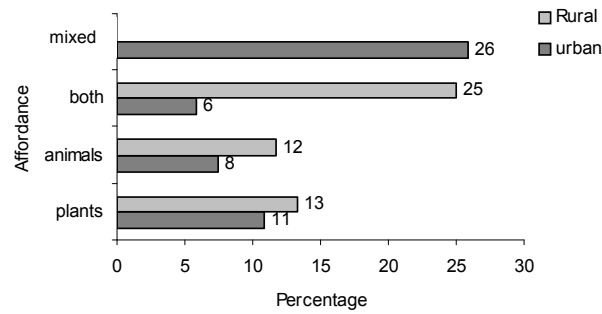


Figure 7: Children properties attachment in residential setting

In summary of children play tools in garden, urban children affordances is inconsistent exist and enforced to interact irregularly. Thus, it seems triggered them unacquainted of environmental of particular properties in garden. For example, scanning, scooping and catching colorful finned fish in open drain for urban children as their ornamental aquarium become popular among them for the certain period and then unfortunately, at the same time other activities are replaced such as collecting red saga seeds (*Adenanthera pavonina*). Thus, the urban children tools seem controlled and depending on man-made landscape inventions and urban impact ecology.

As can be seen in Figure 8, children properties engagement in home and neighborhood garden are categorized into four; plant, animals, both and mixed; involved with plant, animals and play equipments. These results of Figure 8 are related with Figure 7 in term of interaction with the properties. The results revealed that the proportion of ratio value of children engagement in home garden are on three domain categories (plant, animals and both) is almost similar. It suggests that these values are influenced by heavily used of home garden by rural children. In contrast, the mixed category (26%) described children participation in urban setting in which that they recalled their memory interacting with plant and animals as their play tools. Therefore, for urban children, playing with play equipments is an important activity for them. According to result of Figure 8, chi-square tests on four multi-attachments of properties, it revealed that the significance level of properties attached in garden are differ with X^2 value 14.554, $df=2$, $p > 0.001$ (Table 1-item 4). The different is because of their properties of the gardens; neighborhood gardens were mainly composed of play equipments whereas home gardens were made up of plant and animal. It means that much of urban children’s performances were with play equipments. On other hand, much of the rural children’s performances were with plant and animal.

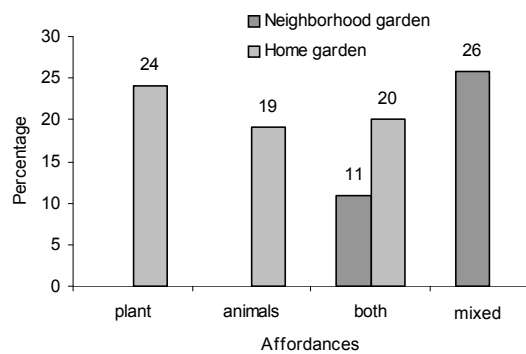


Figure 8: Children properties in home and neighborhood garden

As can be seen in Figure 8, children play with plant and animal solely, therefore, children are most preferred to play with both; plant and animal in neighborhood garden because they found these properties are mutually relationship and plenty of plant animal exist in neighborhood garden. These finding are paralleled with study by Myers (1998) and Myers and Kellert (2004) that children are attached with both species; plant and animal in outdoor environment that mutually offered a nature-link or cross-modal match and children cross-species interaction. For example of nature-link or cross-

modal match is rural children found a mutual relationship on existences of wild berries (*Ardisia crenata*) as bullet of self-made bamboo gun is interesting. The cross-species interaction is children found green grasshopper or ground worm is suitable for fishes bait for fishing in river and stream.

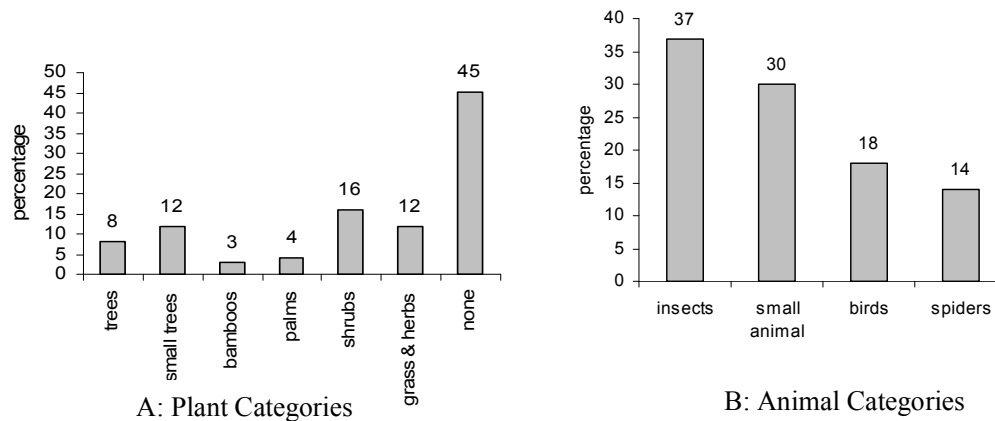


Figure 9: Children frequency participation with plant and animal categories in garden

As can be seen in Figure 9 (plant categories), children preferences of plant as play tools are categorized into seven categories; trees, small trees, bamboos, palms, shrubs, grass and herbs, and none. None category is comprised of children are preferred to play with animal and mixed. However, children dominantly preferred to play with three categories; shrubs (16%), and small trees, and grass and herbs are in equivalent preferences (12%). It suggests that shrubs and grass and herbs plant is affordable plant that afforded more functional affordances of urban and rural children. This finding is accord with study by Myers (1998) that explained in Theory of Mind an affordable material or object in which children easily to contact and play with interactant object. It means that the interactant object that the play tools; plant, and animal are viewed as subjective and intersubjectivity toy that particularly and individually afforded personafication potent. For example, rural children viewed a guava tree that located at the house back yard as a refuge place that privately shared experienced with peers. This tree are personally created a sense of place and landmark or identity with peers as a meeting place, climbing place that afforded plucking fruits, clinging place, and sitting on branches.



Figure 10: Bananas blossom are perceived as play tool for rural children as army figurine that offered persuasive emotional of sense of self identity.

As analyzed of functional properties involved in home and neighborhood garden, the children are most response on small trees and trees (n=377), bamboo plant (n=126) and Henna trees (n=38) as their play tools. Small trees and trees are seen affords more affordances for children for climb, cling, shake and bending, holding, and plucking fruits. Meanwhile, the bamboo plant singularly seen affords more affordances for rural children as their play tools; home-made gasoline lamp, bamboo cannon, musical instrument, fishing rod, kite frame, self-made bamboo gun, rafting bamboo, and birds trap. However, children in home and neighborhood gardens are interacted with multi-properties and afford

affordances. Thus, it has categorized into five domain plant taxonomy of children interact in garden (Figure 11) such as sticks and twigs, fruits and seeds, trees, leaves and flowers and buds.

As can be seen in Figure 11, sticks and twigs afforded the children the highest number of functional properties (n=640). Sticks and twigs are referred to object manipulated and invented into play tools. For example, in the neighborhood and home garden, children found trees as a place for climbing, stamping on, plucking fruits, and clinging on branches. The flexibility of tree branches offered them an interesting play tool to play repeatedly with peers. A frequent visit (environment and nature exploring) and play with trees branches, they found other affordances of branches such as self-made slingshot stick. Specifically, a guava tree branches are afforded n=41 activities of rural children for the most popular branches as their favorite slingshot stick rather than urban children. They described guava branches are most easily to cut, available in home yard or illegally planted in reserve area in urban (low cost house) and affordable materials for the curtailment of seasonal games as self-made slingshot. It suggests that both urban and rural children are experienced the capability and competence of flexibility branches for seasoning self-made slingshot.

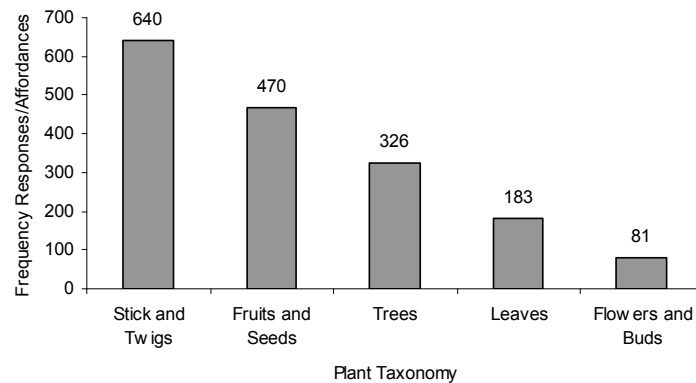


Figure 11: Five domain categories of plant taxonomy involved in children play with plant

Bamboo plants are seen as ornamental plant that wildly growths at river edge or semi-forest are neglected economical uses of activities of urban children. Meanwhile, rural children seen bamboo plant as categorized in sticks and twigs are valuable for their self- made of gasoline lamp, bamboo's cannon, musical instruments, fishing rods, kite frame, bamboo gun stick, rafting bamboo, and birds trap (Table 2). These manipulation are seen as own imaginative and creativity inventions in new quality of environment. The most popular game of rural children with bamboo is self-made bamboo shooter stick. They cut a selected bamboo pole that popular name called *buluh tumpat* (*Gigantochloa ligulata*) for self-made bamboo gun (Figure 12). The nature-links occurs while preparing bullets for war games. They found wild berries (*Ardisia crenata*) as interesting bullets while fixed into bamboo shooter and pushing stick on it.

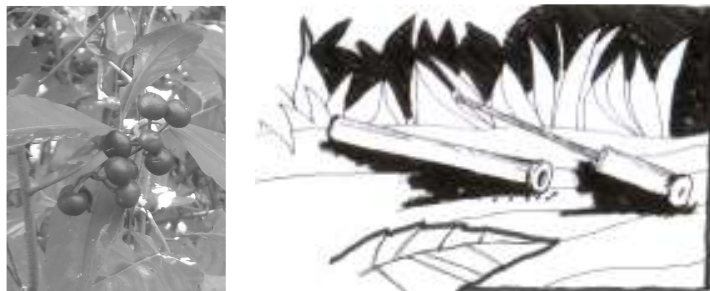


Figure 12: Rural children found wild berries (*Ardisia crenata*-buah mata ayam, mata pelanduk or beberas) as interesting bullets of bamboo shooter game

Fruits and seeds were perceived by the children as edible or non-edible. They considered the edible fruit as food and non-edible ones as play tool. For example, *Ardisia crenata* is a wild plant that its non-edible fruits were used by the rural children as bullets for their self-made gun made from

bamboo. Thus the children understood the link between the fruit and the self-made gun. This link is known as cross-modal match (Myers, 1998) denoting that the children recognized affordance of the fruit is directly affecting the use of the gun. In sum, the fruits and the gun afforded seven functional properties which were search-bamboo-pole-able, cut-bamboo-pole-able, measure-bamboo-pole-able, clean-bamboo-pole-able, cut-bamboo-stick-able, and assemble-bamboo-parts-able, and search-fruit-able, select-ripe-fruit-able, and pluck-fruit-able.

In urban and rural residential areas, children were attached to four animals including birds, insects, spiders, and small animals (Figure 13). The figure shows that the children play mostly with insects followed by birds, small animal and spiders. With insects, for example, the children played with ants that started with searching on grass as bait to catch ants in burrow. They put grass in burrow and waiting for ants bite on grass. The activities are involved with pulled out the antenna and put them together to fighting each other (Figure 14). Therefore, the ants afforded six functional properties which were search-grass-able, stick-grass-into-burrow-able, wait-for-ant-able, pull-ant-out-from-borrow-able, pull-ant's antenna-able, and let-ant-to-fight-able. It suggests that the insects afforded interactive and enjoyable activities. In another example, the children played with spiders. Children recognized spiders lived in shrubs plant such as pandan plant (*Pandanusa spp.*). The children searching and catch spiders in pandan plant with peers. They individually put the spider into matches box and lastly putting spiders together to fight each other. These activities are involved with other peers to entertain the games. Therefore, the spiders afforded six functional properties which were search-pandan plant-able, seek-spider-able, catch-spider-able, put-spider-into-matches box-able, put-spider-onto-floor-closely together-able, and let-spider-to-fight-able.

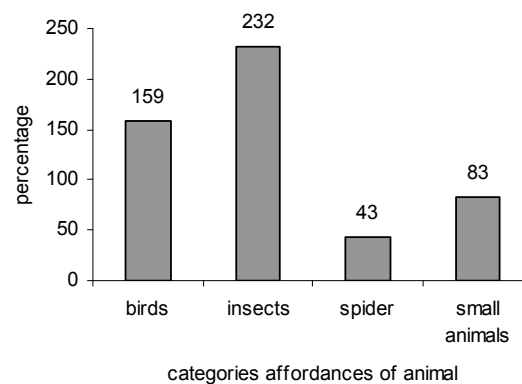


Figure 13: Animals categories response in garden as play tools

Meanwhile, rural children are recognized more affordances of slingshot a birds, and small animals in home and neighborhood garden. It is because of more opportunities of plant available offer them to self-made slingshot sticks such as Senduduk (*Melastoma malabtricum*), and Guava (*Psidium acutangulum*) branches (Table 2) to slingshot birds, small animals, and other rules games.



Figure 14: Catching ground ants with flower grass and watching ground ants fighting

As can be seen in Figure 13, self-reported of children explorations on insects are greater (232) as animate and interactive play tools. They found that insects are easily found in home and neighborhood garden such as ground ants for their interactive games. These activities are involved with nature-links

which children have to find flowers grass to catch ground ants as bait. They put a flower grass in small burrow that considered ground ant's nest and waiting to pull out the flower grass (Figure 14) while recognized flower grass been bitten. The games are starting with pulling out an ant's antenna and put them together to biting each other on the ground.

Secondly, another interesting activity with animals is catching, and slingshot birds in neighborhood garden are among popular activities of children. Rural children reported a cross-modal match (Myer, 1998) activities occurs while starting from children seeking sticks or twigs (plant) for self-made slingshot stick. The results of open-ended interview of group has revealed that they slingshot birds with a group in nearby forest or vacant lot. Furthermore, a knowledgeable of animal's nature is catching and slingshot Bulbul birds. They recognized Bulbul favorite fruit is *Calladium spp.* (Figure 15). They built a bird trap and put *Calladium* fruit as bait and then waiting for shoot or trapped. One of the reasons they like to catch Bulbul bird is considered for food and pet. Thus, another cross-modal-match occurred is when rural children decided for pet. They cut sago tree frond (*Metroxylon spp.*) and peeling out their outer layer and cut fiber stem into piece to built bird cage.

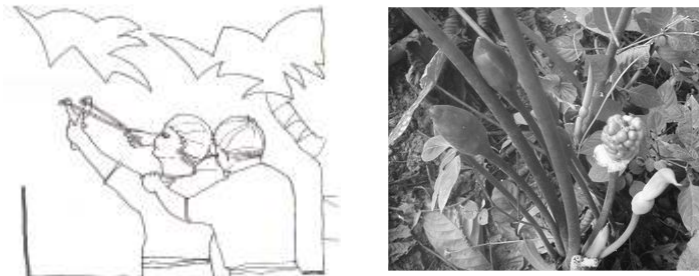


Figure 15: Children slingshot birds with peers and *Calladium spp.* as bait for Bulbul bird

Rural children who play in river and stream recognized Kingfisher birds-*Raja udang* are nested in burrow at nearby the river bank. They reported that the river is a place for Kingfisher to catch fish, shrimps and small aquatic insects as food and feeding their baby. Rural children also recognized a Kingfisher nest is by observed adult Kingfisher flying around at burrow and birds drop at the edge. It suggests that rural children are knowledgeable on Kingfisher nature and spontaneously developed three self-nature value; dominionistic, naturalistic and scientific (Kellert, 2002).

6. CONCLUSION

The results of this study suggested that middle childhood children in urban and rural settings prefer to play in home garden and neighborhood garden. They perceived that the gardens as playscape affording a variety of landscape elements and spaces for physical and social activities. Much of their physical interactions involved with plant and animals. To them, trees afforded to climb and cling on, to gather fruits and to eat them, and to manipulate plant material and to turn into a play tool such as bamboo is crafted into home-made gun. The children participated in outdoor play with their peers affording social acquaintanceship, and in turn allowing them to assimilate and accommodate peers' behaviors.

Apart from the commonalities of behaviors between the urban and rural children, there existed few differences. Noticeably, urban children preferred to play in the neighborhood garden whereas their counterparts, the rural children, preferred to play in their home garden. In other words, the urban children went further away from their home to play in the outdoor environment. This is because the terrace-housed neighborhood offered little variety of landscape elements for physical and social play. Therefore, the children extended their range of play further away from their home gardens. On the other hand, the rural children were much occupied by the diversity of plants (e.g. seeds and fruits, bamboo poles) and animals (e.g. spiders, worms, birds and insects), and topographical elements (streams and differences in elevation) in their home gardens. Apart from the diversity of biotic and abiotic elements, the home gardens were large and thus open affording opportunity for running, swimming, and catching animals.

To summarize, home garden and neighborhood garden in urban and rural communities are place for children to perform their physical and social activities. These activities were triggered by cognitive (sensorial) performances, and in turn, generated more motoric and social actions. Outdoor experience afforded middle childhood children to understand the physical properties of plants, animals and topography, as well as ecological and functional links between plants and animals and between play tools and plants or animals.

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