Abstract

This study investigates the affordances of cul-de-sac as play space in Malaysian urban neighbourhood for middle childhood children. Behavioral responses of 82 children experiencing two cul-de-sac in two different residential neighbourhoods were elicited using three methods: semi-structured interviews, observations and survey questionnaire. It is found that cul-de-sac with a monotonous, flat landscape with some vegetation offered less affordances to the children than the one that is a slightly slopping landform with a variety of vegetation. In addition, it is not the aesthetic design of the cul-de-sac but the caregiver’s permission and the affordances of sociality that encourage the children to play.

Keywords: Cul-de-sac; Urban Neighbourhood; Play; Middle-childhood children.

1. Introduction

In their everyday lives, children largely stay within and relate to three settings – their homes, schools and recreational institutions. These environments have been created by adults and designated by them as ‘places for children’. The concept ‘children’s places’ to explain the fact that children relate not only to
official places provided by adults, but also to informal places, often unnoticed by adults (Rasmussen, 2004).

The world once offered thousands of delights of free play to children. Children used to have access to the world at large, whether it was the sidewalks, streets, alleys, vacant lots and parks of the inner city or the fields, forests, streams and yards of suburbia and the rural countryside. Children could play, explore and interact with the natural world with little or no restriction or supervision. The lives of children today are much more structured and supervised with few opportunities for free play. Their physical boundaries for independent play have shrunk. However, the urban range roaming are seen as restricted due to parent concern of stranger, criminal, distances, surveillances and parent of sense of familiarity of spaces (Hallden, 2003; Bjorklid, 1984; 1985). Parents are afraid for their children's safety when they leave the house alone; many children are no longer free to roam their neighborhoods or even their own yards unless accompanied by adults.

Children have little time for free play anymore. And when children do have free time, it is often spent inside in front of the television or computers. Childhood and outdoor play are no longer synonymous. The culture of childhood that focuses on outside played is gone and children’s everyday life has shifted to the indoors (Hart, 1999). Today, many children live what one play authority has referred to as a childhood of imprisonment, child care facility play grounds are often the only outdoor activities that many young children experience anymore (White, Stoecklin, 1998). In most situation, as safety are the main concern by adults on children playing at outdoor, where the location of open space or playground are usually not located nearby but yet quite far and the needs to cross the main road is terrified by the adults.

Finding ways to encourage children to play in outdoor area is crucial rather than discourage by the safety issues. Currently developers are incorporating more landscape features to encourage a more interesting and pleasant outdoor environment such as larger green space with lush greenery, more playground rather than just one centralized playgrounds, wider road curbs and even cul-de-sac at certain properties. As an alternative for outdoor play area, the street: a cul-de-sac is a potentially to be a play space because of its near location. It is a good approach to recreate the best elements of village and small-town life where children can play outside our homes with friends without fear from crime and traffic, in a community where people know and talk to each other who are trying to create a more suitable environment for the “kampong boy of the future” – something better than our existing terrace houses. These housing types can deliver all the benefits of the cul-de-sac housing environment (Mazlin Ghazali, 2007).

2. Literature Review

2.1. Levels of Affordances

Kytta (2003) divided the affordances into two levels: potential and actualised when in relation to children experiencing the outdoor environment. The potential affordances of the environment are viewed in relation to the individual perception of quality and quantity in the environment such as children’s physical skills or bodily proportions (Kytta, 2003). The environment according to her has countless number of potential affordances such as playground affords running, walking, sitting, climbing, jumping, sliding and social play such as negotiation, communicating and turn-taking (Hartle and Johnson, 1993).

The actualised affordances of an environment are what the children have experienced through movement and perception (Heft, 1999; Kytta, 2002, 2003). Therefore, Kytta (2002) has furthered categorised the affordances into three types: perceived, utilized and shaped. We can further differentiate among actualized affordances in terms of those that can be considered actively actualized affordances, namely used and shaped affordances, and those that are actualized passively, i.e. perceived affordances.
Within the process of actualization, affordances are first perceived, then possibly used or shaped. In the last case the selection of potential affordances for other actors is also modified (Kytta, 2002).

Thus a cul-de-sac with a loop street, for example, equipped with a lawn will be perceived by children as a place that affords playing - a positive affordance. Once the children go and play in the cul-de-sac, they attain utilised affordances by making physical contact with the lawn such running or laying on the grass – other positive affordances. Moreover, when the children change content of the cul-de-sac such as digging holes in the lawn or making mud castle from it they gain shaped affordances – positive affordance involving manipulating a feature. Relating to the concept of children activities in outdoor environment (Chawla and Heft, 2002), they utilized affordances permit performatory and exploratory activities and the shaped affordances allow productive activities.

2.2. Affordances of Phenomenal Landscape for Children

Playing in the landscape appears as a dynamic interaction of a child. That is, play involves perceptual and physical actions. Generally, childhood play involves three activities: performatory, exploratory and productive (Chawla and Heft, 2002). The first are those actions directed towards some objects or other individual within some setting for an intended purpose. The second are actions directed towards discovering new properties in the environment. And, the third are actions transforming a feature into new environment structures. It seems clear that during play the children gather and process the information through direct perception while moving in the landscape space (Kytta, 2003).

Studies on children experiencing the outdoor environment by Kytta (2003) and Fjortoft (2004) as well as studies on paediatric patients experiencing hospital gardens by Whitehouse et al. (2001), Sherman et al. (2005) and Said et al. (2005) found that the children value a place is not determined by its appearance but by its potential for affording activities. That is, the perception and movement of children are influenced by the functional properties of the environment (Heft, 1999). This is because children experience the environment in a deep and direct manner, not as background for events, but rather as a factor of stimulator (Sebba, 1991). Moreover, children perceive and interpret the landscape not as forms but as functions (Gibson, 1979). In other words the children recognise the functional properties (affordances) of the outdoor environment. In the context of children experiencing the environment, the relationship of children’s play and environment stirs the following questions.

2.3. Summary of Children’s Play Behavior in Outdoor Environment

Experiences in outdoor environment involve many categories of play: functional, constructive and symbolic play. These three types of play triggered children’s play behaviours development: sensorimotor, pretend and games with rules. However, these developments of play turn present conditioning into positive children functioning in environment which involves cognitive, affective and evaluation. This psychology development will develop children’s self-esteem, self-confident, and self-awareness towards environment that tells them the significant of natural element in their play. Thus, children experience outdoor environment that involves with manipulation of new qualities afford them potentials and opportunities of engagement in outdoor environment. Children demonstrated the understanding of these elements through fascinating play with peers or siblings. The natural elements that are mostly involved with manipulation are more interactive and animate. These experiences seem to elevate the levels of children actualization of affordances who perceived the materials through sensoric and motoric actions. However, different environment affords different functional and preference of activities.
2.4. Cul-de-sac

Normally a cul-de-sac design incorporate in a housing scheme is to create a safe environment to the residents. The first suburban cul-de-sacs were short, straight streets with just few houses. They were extended to provide public realm for the residents while allowing safe, slow car movement to and from dwellings. Today, with the increased auto ownership, the cul-de-sac has grown wider and longer with more dwellings along it. There are generally two types of cul-de-sac. First one, there will be a roundabout with hard surface or landscaping at the end of the street. A circular space terminates it, large enough for service and emergency vehicles to turn around (often more than a hundred feet in diameter) in Figure 1(a). Second, a close cousin of the cul-de-sac is the loop street with a green island in the middle at the end of the street whether it is in organic or non organic shape Figure 1(b) which is similar in that it discourages through traffic, going nowhere than to the homes along it. However, it has two access points, and usually longer than the cul-de-sac.

Referring to Figure 1(a) and (b), the spatial planning affords children to have interaction with the outdoor elements. This is because the design not only reduces the amount of car traffic which ideally space for the children freely use the area but also because of the flat surface incorporated in the design allows many activities to occur. The design orientation of the houses which all facing the road within the subdivision making public surveillance very good because all eyes on the street which increase the safety among the children in the area. The best way to increase the user’s safety is by having the public surveillance, Jacobs (1961).

3. Criteria for the Setting of Study

This study was conducted in two neighborhoods in Malaysia. The first neighborhood is in Jalan Bakti, Taman Mutiara Rini, Johor Bahru and another is in Taman Lagenda, Bukit Jelutong, Selangor. The primary reasons for selecting these two areas other than because of cul-de-sac were implemented in the housing scheme, these areas were researcher’s familiarity with the social and ecological context of this neighborhood as well as the possibility of easier to facilitate the process of data collection due to the locations are near to researcher’s place. The selected neighborhoods were located in prime residential area in Johor Bahru and also in Selangor where the developers have won several awards for their approach of quality living and friendly design in housing scheme. This criterion was important in that the majority of
the residents want to live in such a situation in all over the cities currently and most probably in the future.

![Location of the study area](image)

**Fig.2. Site plan of the study area in Taman Mutiara Rini, Johor. Source: Sumaiyah Othman, (2010)**

### 3.1. Data Collection

In this research, the researcher had developed several strategies to be more friendly and followed certain steps to make the children comfortable which are based on review of studies by Ismail (2006), Browning and Hatch (1995), Graue and Walsh (1995). The steps include in pilot survey, the researcher brought their son and nephews to play in the playgrounds and cul-de-sacs and pretended as parents whilst monitoring their children’s play (urban setting) with play equipments. This method developed a meaningful role ground for the other children to participate in the outdoor activities. These methods were repeated when conducting the actual survey for both site in Jalan Bakti, Taman Mutiara Rini, Johor and Lagenda, Bukit Jelutong, Selangor.

The intention is to promote the children’s recognition of the researcher as a familiar person rather than as a stranger in the cul-de-sacs. This step also helped the researcher to identify the usual time and where the best time to conduct the interview and the observation. The researcher negotiated a relationship by obtaining parent’s permission before interviewing the children in home and neighbouring cul-de-sacs. For example, the first observed, the children playing in home cul-de-sac such as riding a bicycle, playing with the reflexology pathway and sitting at the pavilion. After the children completed answering the survey questionnaire form (with the help and explained by the researcher), they were rewarded by their parents to play longer.
3.2. Semi-structured Interview

Survey questionnaires and interviews were conducted in two different settings of cul-de-sac in Jalan Bakti, Taman Mutiara Rini, Johor and at Taman Lagenda, Bukit Jelutong, Selangor. The children were surveyed and interviewed in cul-de-sac at their home or neighbouring area due to easy accessibility of their cul-de-sac. The survey and interview were conducted for six weekends which consisted of 12 days at 5pm to 6.30pm in the afternoon. The behavioural responses of 82 middle childhood children, aged 6-12, were elicited by the researcher using the survey questionnaires and interviews. However, several activities which involved with children hands-on experience were recorded through content analysis. The recorded interviews of children hands-on experience were applied in both area; in Jalan Bakti, Taman Mutiara Rini, Johor and at Taman Lagenda, Bukit Jelutong, Selangor.

The questionnaire form for individual and group was designed in two sections; A and B. The individual questions comprised of thirty-two questions and parent’s interview comprised of nine questions. In individual and group questions, section A focuses on personal data and activities qualities meanwhile Section B on parent’s perception of their children play activities.

3.3. On-site Observation

In addition to understanding what children felt or liked about the cul-de-sac, this research was keen to understand what they actually did in cul-de-sac as well as what the attributes of cul-de-sac were. To achieve these two goals, observation was a proper method of data collection. Furthermore, to understand and evaluate the physical attributes of the cul-de-sac that made it utilized by children, the affordance scale (Kytta, 2003) was used as a checklist to record actualized affordances and the features supporting them in cul-de-sac. This scale allows evaluating a place by recording a feature description and a corresponding activity supported by the feature in the place (Chatterjee, 2006).
4. Results and Discussions

4.1. Levels of Affordances

The affordances of cul-de-sac elements were divided into three types: perceived, utilized, and shaped. The difference of levels of affordances between the home and neighbouring cul-de-sac at Taman Mutiara Rini and at Taman Lagenda is shown in Figure 4. As can be seen in Figure 4 the results show that children in Taman Lagenda displayed the highest utilized performance (n=35) followed by perceived (n=14) rather than children in Taman Mutiara Rini counterpart. It suggests that the children at Taman Mutiara Rini demonstrated less performance with the outdoor environment that might be caused by less interaction and lack of properties available in cul-de-sac. It means that in cul-de-sac the children actively played with siblings and peers, or artefacts tools and are actively passive. Noticeably, the children at Taman Lagenda show greater performance because they are able to utilize the properties into plenty of affordances. For example, children at Taman Lagenda found shelter afforded ten affordances: sitting, playing playhouse, picnicking, swinging on the beam, hanging, reading books, laying down, being in peace, security, and privacy. The children at Taman Lagenda afforded to observed and played with the vegetation and animals in the cul-de-sac. They afforded to smelling, picking flowers and fruits, harvesting mango fruits , touching fruits or tree bark, hiding behind trees because the tree have many branches, watching birds and insects (red ants) and also afforded hearing birds.

In contrast in Figure 5, the quantity of level of affordances of children in Taman Mutiara Rini found utilized and perceived performance is almost similar in both area; home and neighbouring cul-de-sac which are utilized (n=18) and perceived (n=14). It suggests that the children at Taman Mutiara Rini regard to affordances of properties as play tools in home and neighbouring cul-de-sac was almost similar. Therefore, the children at Taman Mutiara Rini are able to continue the affordances either in home cul-de-sac or neighbouring cul-de-sac. Mostly children in Taman Mutiara Rini only afforded to utilize the limited spaces that they have in the cul-de-sac for sociality with their peers such as walking, running, skipping, playing badminton and afforded to talking to peers, turn taking, being noisy, making friends and be away from their caregivers.

Fig. 4. Levels of affordances of the children at Taman Mutiara Rini and at Taman Lagenda. Source: Sumaiyah Othman, (2010)
In summary, noticeably, the results of the levels of affordances for home and neighbouring cul-de-sac at Taman Mutiara Rini and at Taman Lagenda were actual affordances (Figure 5). The quantities of affordances were accumulated in Figure 5. The utilized affordances afforded twice times more affordances than perceived affordances suggesting that children at both areas: Taman Mutiara Rini and at Taman Lagenda maximize utilizing the properties in their cul-de-sac. There are no shaped affordances for both areas: Taman Mutiara Rini and at Taman Lagenda maybe because in urban setting, it is lack of landscape properties (trees, water bodies, natural area) and children’s knowledge of the existence properties in the outdoor environment for children to explore and manipulate during their outdoor playtime. The understanding of the significance elements or properties leads to the children’s environmental knowledge. Less interaction cannot afford the children at Taman Mutiara and at Taman Lagenda to perform the shape affordances. A child in Taman Mutiara Rini or in Taman Lagenda does not show any tendency towards manipulating any properties or show any spatial relation of those properties during their playtime. Most of the children just used their readymade play tools such as bicycle, rollerblades, dolls or remote control cars when playing. The children at Taman Lagenda see home and neighbouring cul-de-sac as places with plenty of outdoor properties: vegetation and animals, shelters and flat surfaced area for them to play safely and comfortably under the surveillance of parents. Cul-de-sacs in Taman Lagenda afforded the children to use the area as a play spaces but the children choose to play more at neighbouring cul-de-sac due to the space availability: bigger flat surfaced area to play rule games such as soccer and badminton their peers. Meanwhile children in Taman Mutiara Rini have more freedom to venture alone, with siblings or peers to the neighbouring cul-de-sac through linear greenways regardless to similar affordances and monotonous properties as play tools in their home and neighbouring cul-de-sac. Therefore, the children at Taman Mutiara Rini are able to continue the affordances either in home cul-de-sac or neighbouring cul-de-sac. This showed that the children viewed cul-de-sac not just by viewing the properties that affords them to play but more by the affordances that afforded them to socialize with peers. the activities that the children engaged in is more to talking and watching peers playing, turn taking, making friends and afforded being noisy.

5. Conclusion

5.1. Children’s Cul-de-sac Preference between Home and Neighbouring Cul-de-sac

The home and neighbouring cul-de-sacs offered different space layout (cul-de-sac or loop street layout), elements and functions. Urban children mostly spent their outdoor activities in centred areas such as playground and patched area. Home cul-de-sac mainly offer limited spaces and activities which usually making the children bored after repetitive visits. The activities involvement in cul-de-sac at home was
dominantly occupied by girls due to the concern of parents on the safety of the children in the outdoor environment. However, girls were permitted to occasionally play in neighbouring cul-de-sac or other outdoor spaces accompanied by parents and caregivers. The home cul-de-sac in the urban housing was an expansion of interior spaces and occupied by paved area or island of greenery with ornamental plants. Thus, this encourages children to spend more time in neighbouring cul-de-sac due to social factor with sibling and peers or at other outdoor space.

The layout of the home cul-de-sac in the urban housing are composed of two type of layout that can be utilized by the children to play. The spaces were in front of their home or at the end of their street that are occasionally used for play with outdoor elements (whether it is just paved layout or with greenery layout) in a monotonous manner. This means that those playing in cul-de-sac with only paved setting interact less with plants and animals as their play tools compared to cul-de-sac with greenery. The findings of children’s participation in cul-de-sac showed that children in the urban housing spent most of their activities in neighbouring cul-de-sac with peers. They felt that meeting peers in neighbouring cul-de-sac were far more interesting than playing in their home cul-de-sac. They found that the cul-de-sac spaces of at their home, limit their social interaction with their peers even they are doing the same physical activities in the outdoor environment. Therefore outdoor environment allowed them to physically, interactively and freely express their interaction with peers through performatory. This means that while meeting with peers, they exchange information about outdoor play experiences and stories based on their daily life and freely move about with the permission of their caregivers within their neighborhood. Children who played in neighbouring cul-de-sac were divided into three groups; (i) play with play equipments (play dolls, riding bicycle, play badminton, man-made structure) (ii) passive activities such as watch peers playing around, talking with peers and (iii) play at paved spaces or green spaces; rules of games. Cul-de-sac at urban home on the other hand offered less social affordances that encourage children to further their range of play and at the same time because they are under constant supervision by their parents or adults which sometimes limit them to play freely with their sibling and peers. In summary, parallel with Suhaizan (2009) urban children who played in home gardens (cul-de-sac at home) only, often get bored and eager to explore the neighbouring gardens (neighbouring cul-de-sac). The implication towards design and planning of neighborhood setting to have more natural properties to afford them to manipulate or invent new qualities of the environment.

5.2. Natural Elements (Vegetations and Animals) as Actual Affordances

Home and neighbouring cul-de-sac elements (vegetations and animals) were manipulated by the children as play tools. The cul-de-sac with only paved area reported having less affordance as their play tools. Thus, they spent most of their time watching other children or adults in the playground, talking with peers, sitting on grasses with peers, playing structured toys; dolls, riding bicycle and play badminton. However the children found to be more attached to cul-de-sac with natural element such as island with greenery. Girls use flowers, leaves and fruits when they play house. Meanwhile boys used fruits to throw at his peers when they play. Other than that, the children afforded to smell, picking flowers and fruits, touching fruits or tree barks, hiding behind trees and afforded hearing and watching birds and insects. Children at cul-de-sac with green island afforded to roll and laying on the grass when they play. In summary, due to inconsistent availability of these materials in urban gardens (the cul-de-sac) as their play tools as mentioned earlier, the urban children viewed passive activities in home and neighbouring cul-de-sac as active socializing in the nature setting. They sits under trees while talking to their peers or watching other peers playing which this also afforded them to make more friends. This is a way the children in urban neighborhood spend their play time by socializing with their peers in a comfortable settings.
5.3. Implication on Neighborhoods Design and Planning of Cul-de-sacs for Children’s Play Space

This section briefly explains potential of cul-de-sac as a play space for children in the urban neighborhood. Children in urban neighborhood spent most of their time watching other children or adults in the playground, talking with peers, sitting on grasses with peers, playing structured toys; dolls, riding bicycle and play badminton. The results of this study showed that cul-de-sac with loops street design that have green island should be incorporated more in cul-de-sac design planning. This is because the layout is more friendly to the children to play or just to use the area when they want to spend time outdoor with peers and at the same time the children and their caregivers do not need to worry because they already have public surveillance looking into their children safety due to the cul-de-sac layout design. Having a cul-de-sac with this layout features allowed the children living there have an alternative play space rather than going to the nearest open spaces or playground which is always been designed to be centralized in a neighborhood which need them to share with other children and adults nearby.

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