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# Assessing the residential and schools' surrounding environments for child-friendliness in precinct 11 Putrajaya, Malaysia

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## Abstract

**Aim:** The purpose of this research is to assess the proximity of homes and schools in terms of their child-friendliness using a variety of indicators. The idea of creating sustainable urban and community environments is central.
**Method:** Using the Analytical Hierarchy Process (AHP) and a case study approach, it promotes livability by adhering to basic human needs. Primary data were collected through in-person observations of sites, including examining site characteristics, taking photographs of the surrounding environment and its elements, and examining the children's movement patterns. Tracking the whereabouts of elementary school kids was also a part of the investigation.
**Findings:** Research shows that neighbourhoods near schools are accommodating to students' needs. Signage, playground equipment, and pedestrian walkways were found to all contribute to a more kid-friendly setting. The research also found that several contextual factors, such as proximity to pedestrian amenities and the entrance to a school, influence how child-friendly a given area is.
**Implications/Novel Contribution:** The study added to the growing body of evidence suggesting that child-friendly indicators be incorporated into residential planning to improve the quality of life for children in urban areas.

*Keywords:* Residential and School, Surrounding Environment, Children, Child-Friendly Indicators

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## INTRODUCTION

The global environment toward creating more "child-friendly" communities and governmental policies has as its goal the actualization of children's rights. Since the launch of the UNICEF Child-Friendly Cities initiative in 1996, multiple initiatives have been aimed at assisting cities and communities in developing and enacting child-friendly policies and programs. This action resulted from a resolution at Habitat II, the United Nations Conference on Human Settlements, to ensure that everyone has access to safe, affordable, and sustainable housing in well-designed, walkable urban environments. At Habitat II, it was declared that "the well-being of children is the ultimate indicator of a healthy habitat, a democratic society, and good governance" (Arnas, 2016; UNICEF, 2018).

According to Badaruddin (2015), urban design and housing settings in Malaysia are currently planned exclusively for children, ignoring the needs of the country's rapidly growing child environment. As a result of this problem, Malaysia lacks a unified set of standards or principles to prioritize the interests of children in the design and construction of new communities and homes.

One of the steps toward achieving Sustainable Development Goal (SDG) No. 11, i.e., Sustainable Cities and Communities, is making the environment friendlier for children. This objective seeks to make urban areas more welcoming and secure for all residents and more resistant to natural disasters and built-up areas (Teng, Quoquab, Hussin, & Mohammad, 2016; United Nations Department of Economic and Social Affairs, 2019). Thrust 3 of Malaysia's National Physical Plan 3 aimed to achieve this goal by fostering the development of inclusive and livable communities through implementing three strategic policies: a complete and high-quality living environment,

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a livable community environment, and community involvement and collaboration (Federal Department of Town and Country Planning, 2016; Ortega, 2017). Some of the plans for the environment would involve starting new programs targeted at making urban neighbourhoods more kid-friendly. According to Freeman and Tranter (2012), "neighbourliness" is emitted from neighbourhoods and the surrounding environment when people make an environment to make it welcoming and safe for children. Similarly, the city commissioner recommends that "streets and roads that are safe and connected along with accessible and legible routes for walking and cycling will help facilitate independent mobility and active transport among children and young people" Commissioner for Children and Young People Western Australia (2011). To further foster a child-friendly environment, it is important to provide children and young people with accessible and safe public transportation options.

The purpose of this research is to measure how conducive the neighbourhood and school's surroundings are to the development of young children. The study's goals are to assess the neighbourhood areas in terms of child-friendly indicators, (ii) to assess children's mobility at the neighbourhood level, and (iii) to suggest actions to promote a child-friendly environment in urban neighbourhoods.

Children who can freely explore their surroundings without the assistance of a parent or other adult are said to have "independent mobility," as defined by the (Malone & Rudner, 2007). Children between the ages of seven and twelve have shown a downward trend in their ability to move freely and actively, as noted by the exploration group cited above Stark, Frühwirth, and Aschauer (2018). In the long run, this would hurt kids' development and influence their feelings about travelling as adults. If we want to encourage kids to move around on their own and actively, we need to find out what obstacles exist close to their homes and schools.

## LITERATURE REVIEW

### Sustainable Urban Neighborhood

According to Freeman and Tranter (2012), neighborhoods are places where children begin to encounter the world outside the home, where children make their first independent forays and where they become part of wider public life. Freeman and Tranter (2012) explains that this move to independence can only happen if the neighborhood base is itself a place that provides good experiences: Ideally, a neighborhood should be the place where children can play safely, run errands, walk to school, socialize with friends and observe and learn from the activities of others. When the neighbourhood provides a secure and welcoming transition to the larger world, children can gradually test and develop their competence before confronting the full complexity of the city also provide the opportunity for children to begin to understand, accept and ideally enjoy differences, a critical part of child development as tolerant, and responsible citizens.

Biddulph (2007) stated that living in a more sustainable way would include the willingness to walk and cycle as frequently as possible or otherwise attempt to use public transport as a major form of transport in their area and community that wants to live in an environment where kids can roam, play and socialize freely, rather than surrounded by traffic and highway.

One of the main shortcomings in Putrajaya planning is its broad formal avenues to expose pedestrians, buildings and traffic to direct sunlight as highlighted by Moser (2010). Bicycles were used only as a recreation and not as a mean of transportation. The lack of shade also discourages green forms of transportation such as walking and cycling around the city and within the neighborhoods.

### Child and City in the Urbanism Theorist's Point of View

According to the ideas of Birtles (1982), if the children are treated well at home and school, they will be responsible without needing to remind them. When children are responsible, it is not necessary to tell them how to act in various situations. In this case, children can participate well in the decisions made around them and be effective. In the vicinity design scheme, prevention of entering cars into residential neighborhoods will make them a suitable place for children to play. Therefore, it presents convenience, health and low amount of traffic to children. In addition, with primary schools between green spaces with half a mile functional radius, children can easily move from house to schools and vice versa feeling secured. Mumford (1962) argues the importance of all groups of people especially children. He emphasizes mainly on the existence of green spaces between buildings to prevent density among them. He believes parks are huge dams against frequent urban development and are inseparable

items of urban life. In his idea, there should be a place for children to play freely.

In the schemes of Le Corbusier, there are lots of green spaces and open spaces for children. He decreased the amount of traffic by advising 3 levels of street networks in order to decrease the danger of accidents. Jacobs (1961) focuses on urban streets and believes that they are clearly effective in making social relationships. In her idea, a street should contain different land uses along it to attract people and make security with separated public and private spaces. Children connect to adults while they are on the street and therefore they can experience the bases of their life. So, streets should be a place for children's activity and play. When children grow up, the space of the building won't respond the answers.

Jacobs (1961) believes that in urban society most of the children's interest in street safety, mixed land uses, lively urban spaces which is considered the key elements of eliminating all human being's concerns. Therefore, free times of children which are the majority of their time should specifically belong to their favorite activity. Marcus and Sarkissian (1986) emphasized the needs of different groups of the society especially children and considered their encounters and interactions on the playgrounds. He believed playgrounds should be adventurous and related to water and nature. Therefore, they should have adequate safety for children. He suggested that for recreational places we are not supposed to look for vast and large spaces. Table 1 below shows the issues in past research on children.

Table 1: Issues in past research on children

| Issue | Author/Year | Context | Country |
|---|---|---|---|
| Children's Living surrounding<br>Children's safe routes<br>Children's spatial knowledge<br>Children's cycling<br>Independent mobility<br>Affordance of environments<br>Children's active free play<br>Children's transportation<br>Urban forms and Children's travel mode | Hüttenmoser (1995);<br>Osborne and Osborne (2005);<br>Ahmadi and Taniguchi (2007);<br>Orsini and O'Brien (2006);<br>Harrison, Page, and Limin (2009),<br>Kyttä (2002);<br>Veitch, Stokkermans, and Newsham (2013);<br>John, Litov, and Yeung (2008);<br>McMillan (2007); | Neighborhood,<br>Home-school way,<br>Home, School | Switzerland, UK,<br>Iran, Canada,<br>Finland, Australia,<br>USA |
| Children's living surrounding<br>Children's spatial knowledge<br>Children's cycling<br>Affordance of environments | Ahmadi and Taniguchi (2007);<br>Orsini and O'Brien (2006);<br>Kyttä (2002); Heft (1988) | Neighborhood, Home-school way | Switzerland, Iran,<br>Canada, Finland,<br>UK |
| Children's play behavior | Pellegrini, Perlmutter, Galda, and Brody (1990); John et al. (2008) | Playground, Natural | Athens, UK, |
| Landmark use<br>Natural environment as a playground | Fjørtoft and Sageie (2000) | Environment, Home | Norway, Poland,<br>Athens |
| Ergonomic design for children | Nowakowski and Werbińska-Wojciechowska (2012) | | |
| Children on playground | Pellegrini (1989); | | |
| Children's spatial knowledge<br>Children's freedom of movement | Ahmadi and Taniguchi (2007);<br>Kyttä (2002), | Home-School way,<br>City, Surb, | Iran, Italy, Canada,<br>UK, Australia |
| Children's travel behavior | Van Vliet (1983); Heft (1988) | Neighborhood | |

Source: Said (2012)

Table 1: Continue...

| Issue | Author/Year | Context | Country |
|---|---|---|---|
| Affordance of environments | Veitch et al. (2013) | | |
| Children's active free play | | | |
| Children's participation | Francis and Lorenzo (2002); | Neighborhood | USA, Italy, Canada |
| Children's outdoor place | Castonguay and Jutras (2009) | | |
| Children's Independent Mobility | Harrison et al. (2009) | Neighborhood, Home, School | UK |

Source: Said (2012)

**Key Design Principles: Child-Friendly Neighborhood**

The definition of child-friendly environment cited in Broberg, Kyttä, and Fagerholm (2013) is related to safety, available green space, variety of activity setting, independent mobility possibilities, active socialization or neighborliness, and integration of children into decision-making processes is often included as essential criteria of environmental child-friendliness (Freeman & Tranter, 2012; Haider, 2007; McAllister, 2008). Barton, Grant, and Guise (2003) proposed a guide as listed below to enhance the quality of neighborhoods as places to live, work and play. It advocates an inclusive environmentally responsible model of neighborhood, which is relevant for making urban neighborhoods and environment more child-friendly.

i. A socially balanced population, and varied housing opportunities which are suited to a range of incomes and types of household;

ii. Pedestrian, bicycle, public transport and road networks within the neighborhood, linking to the wider city and region, creating a permeable and connected environment with real transport choice;

iii. A pedestrian-dominated public realm to facilitate a healthy social life and provide an attractive, safe, human-scaled environment;

iv. A greenspace network that provides accessible open space with effective water, energy, wildlife and climate management;

v. An aesthetic identity that is rooted in the collective identity of region, reflecting characteristics valued by the local community;

vi. A fine-grained neighborhood structured around public transport accessibility, with varied densities, providing an opportunity for gradual renewal and adaptation to new needs; vii. Diversity of use - housing, business, shopping, social, cultural and health facilities, offering easy accessibility, opportunity and choice for all.

Based on this guide, it is concerned with reality which is not vain hopes. It is about socially and economically feasible policies for commonplace, everyday neighborhood. Besides, this guide of the image of a sustainable neighborhood is related to the place making approach which refers to project of public space judgement of any place with four indicators such as (i) sociability, (ii) uses and activities, (iii) access and linkages; and (iv) comfort and image.

To conduct the study, the understanding of the theory of child and city, as well as the key design principles, and the theory of sustainable urban neigboruhoods are important in ensuring that the focus of investigation was emphasized and intended for child-friendly environment study.

## METHODOLOGY

Precinct 11 in Putrajaya was selected as the study area because its development applies the neighborhood planning principles for all the residential areas in line with the two fundamental concepts in its planning, i.e., a city in the garden and as an intelligent city. There are 10 residential areas in Putrajaya, namely Precinct 5, 6, 8, 9, 10, 11, 14, 15, 16 and 18 (Federal Department of Town and Country Planning, 2009). The selection of Precinct 11 as the designated study area was derived using the AHP method.

Generally, there are seven (7) indicators of activity spaces for child-friendly environment which are home, school, neighborhood, city centre, service space, cultural space and natural space (Freeman and Tranter, 2011). For this study, only two (2) indicators were applied; Indicator (1) - Residential Environment; and Indicator (2) - School Environment. The purpose of determining these two (2) indicators is because this study was designed specifically to investigate the Residential Environment and School Environment only.

This study mainly focuses on the facilities and physical environment in the urban neighborhoods of Precinct 11, Putrajaya. Besides observing the sites' characteristics, the children's movement patterns were also recorded at the selected locations during the fieldwork. The target group for this study was primary school children i.e., those aged between 7 to 12 years. The observation checklist was based on indicators that reflect child-friendliness in terms of the facilities and physical environment. These factors affect the children's activities and independent mobility in their residential environment as well the schools' surrounding environment during their daily trip from home to school and vice-versa.

**Children's Perspective Checklist**

The children's perspective checklist was used to assess and describe the current situation in the study area with an assessment of the existing condition whether good, moderate or not in good condition. Table 2 shows the elements of each indicator that were included in the observation checklist. The observation stations are as follows:
a. Residential areas (neighborhoods) housing blocks on 10 streets (Jln. P11K/2, Jln. P11H/1, Jln. P11B 1/6, Jln. P11A 1/14, Jln.. P11/2A, Jln. P11F/1, Jln. P11E/3, Jln. P11D/1, Jln. P11D/6 and Jln. P11C/16).
b. Education (primary schools) Surrounding areas of Sekolah Rendah Kebangsaan Putrajaya Presint 11 (1), Sekolah Rendah Kebangsaan Putrajaya Presint 11 (2), and Sekolah Rendah Kebangsaan Putrajaya Presint 11 (3).

Table 2: The elements in the observation checklist

| Observation Station | Elements |
|---|---|
| Residential environment (neighborhood) | - Street (Jln.)<br>- Social aspects |
| School's surrounding environment (primary schools) | - Entrance of school gates<br>- Road that lead to the entrance<br>- Distance from other indicator<br>- Connection to the pedestrian walkways, cycle lane and zebra crossing |

In deriving the decision to select Precint 11 and by using the AHP method, neighbourhood areas in 10 Precincts in Putrajaya were evaluated. From that analysis, three (3) Precincts reflected the indicators listed. These indicators included education (primary school and tuition), residential (neighborhood), recreation (park and playground), commercial area and public facility. However, the study focused on the elements of educational (school and tuition) and residential (neighborhood) as the main reference in making decision in selecting the study area. Other than that, the type of school also influences the assessment of site selection. Table 3 shows the criteria that should be defined in the child- friendly environment which were applied in assessing all 10 Precincts, whilst Table 4 demonstrates the indicators used to decide on the case study. Based on the preliminary site evaluation, Precincts 8, 10 and 11 had met the criteria of child-friendly environment but finally Precinct 11 was selected as the case study because it had fulfilled all the indicators required.

This study adopts both the quantitative and qualitative approaches and analyses the children's physical environments and their usual movements in getting from home to school and vice-versa. There were ten observation stations for the residential areas (neighborhoods) and three (3) observation stations for the schools' surrounding environments. Precinct 11 was divided into eight (8) divisions (Figure 1) and 10 observation stations in the residential environment were selected by using Simple Random Sampling method while for the school environment, the observation stations were undertaken outside the three primary schools in the study area i.e., Sekolah Rendah Kebangsaan Putrajaya Presint 11 (1), Sekolah Rendah Kebangsaan Putrajaya Presint 11 (2), and Sekolah Rendah Kebangsaan Putrajaya Presint 11 (3).

Table 3: General criteria of child-friendly environment

| No. | Indicator | Child-Friendly Environment |
|---|---|---|
| Children's Needs | | |
| 1. | Children's Housing Needs (Social and Physical) Cooper Marcus and Francis (1998) | Safe outdoor plays area |
| | | Safe from traffic and pollution |
| | | Natural spaces |
| | | Private open space that is linked to communal open space |
| | | Communal spaces for adults and children to meet each other |
| | | Private play spaces |
| | | Good management and maintenance regimes |
| | | House identity and variety in buildings |
| | | Street linkage and access to a wider environment that encourages independence |
| 2 | School as Community Assets Steen (2003) | Safety |
| | | Accessibility |
| | | Integration |
| 3. | Making Public Space work Cooper Marcus and Francis (1998) | Easily accessible and can be seen by potential users |
| | | Beautiful and engaging |
| | | Accessible to children and people with disabilities |
| | | Provide a feeling of safety and security |
| | | Furnished to support the most likely and desirable activities |
| | | Provide an environment that is physiologically comfortable |
| | | Clearly convey the message that they are available and meant to be used |
| | | Offer relief from urban stress and enhance the health and emotional well-being of its users |
| | | Are geared to the needs of the user group most likely to use the space |
| | | Encourage use by different groups |
| | | Incorporate components that can be manipulated |
| Children's Right in a Child-Friendly City | | |
| 1. | Children's Right in a Child-Friendly City Fund (2004) | Influence decisions about their city |
| | | Express their opinion on the city they want |
| | | Participate in family, community and social life |
| | | Receive basic services such as health care and education |
| | | Drink safe water and have access to proper sanitation |
| | | Be protected from exploitation, violence and abuse |
| | | Walk safely in the streets on their own |
| | | Meet friends and play |
| | | Have green spaces for plants and animals |
| | | Live in an unpolluted environment |
| | | Participate in cultural and social events |
| | | Be an equal citizen of their city with access to every service, regardless of ethnic origin, religion, income, gender or disability |
| Measuring Child Friendliness | | |
| 1. | Child Oriented Planning Approach Cilliers and Goosen (2016) | Safety |

Table 3: Continue...

| No. | Indicator | Child-Friendly Environment |
|---|---|---|
| | | Accessibility |
| | | Integration |
| | | Green space |
| | | Tradition |
| | | Scale |
| 2. | Urban Design Approach Cilliers and Goosen (2016) | Traffic calming element |
| | | Separation |
| | | Different surface and sufficient benches |

Table 4: Alternative research

| No. | Children's Perspective Checklist Indicator | (%) | Elements | Selection of Case Study based on percentage of indicators | Precinct 8 | % | Precinct 10 | % | Precinct 11 | % |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. | Residential (neighborhood) | 100 | -Street - Interaction | | Five (5) neighborhood's residential blocks | 40 | Six (6) neighborhood's residential blocks | 60 | Eight (8) neighborhood's residential blocks | 70 |
| 2. | Education (primary school and tuition center) | 100 | - Entrance of school gates - Road that lead to the entrance - Distance from others indicator - Connection to the pedestrian walkways, cycle lane and zebra crossing - Accessibility control | | Two (2) Primary Schools and three (3) Tuition Centers | 60 | - | - | Three (3) Primary Schools and two (2) Tuition Centers | 70 |
| 3. | Recreation (park and playground) | 100 | - Accessibility control - Interaction - Safety and security - Various facilities for children/ disabled people - Connection to the pedestrian walkways, cycle lane and zebra crossing | | Twelve (12) locations of playgrounds | 60 | One (1) location of playground | 30 | Thirteen (13) locations of playgrounds and one (1) park (Taman Saujana Hijau) | 70 |
| 4. | Commercial area | 50 | - Connection to the pedestrian walkways, cycle lane and zebra crossing - Accessibility control | | Two (2) locations of commercial areas | 30 | Two (2) locations of commercial areas | 30 | Two (2) locations of commercial areas | 30 |
| 5. | Public facilities | 50 | - Accessibility control - Interaction - Safety and security | | Pusat Kejiranan (neighborhood center) Precinct 8 | 40 | One (1) location. Kompleks Lanai | 40 | Pusat Kejiranan (neighborhood center) Precinct 11 | 40 |

A guided observation survey was conducted at all observation stations during a two-week period at different times of the day on both weekdays and weekends. Face-to-face interviews with adults who have children aged between 7 to 12 years old were also conducted and the questions were focused on whether the environment in the study area can achieve independent mobility of children and does the neighborhood planning creates a child friendly environment.

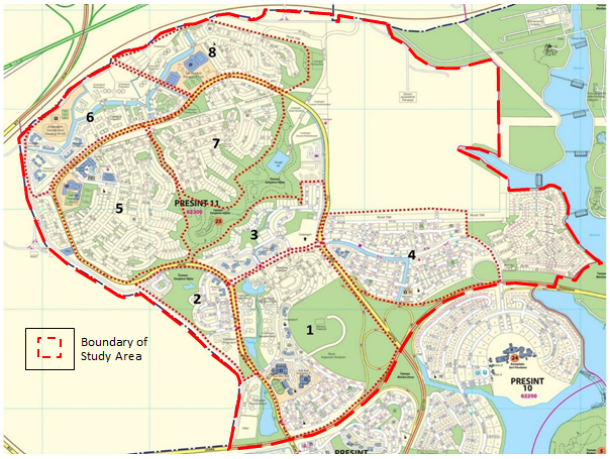


Figure 1. The division of precinct 11 putrajaya (neighborhood 1-8)

## RESULTS AND DISCUSSION

As mentioned earlier, out of seven (7) indicators, two (2) indicators were only used. The following paragraphs describe the results of the analysis.

### Indicator (1) - Residential Environment

As shown in Table 5 and Figure 2, the analysis for the neighborhoods environment focused on two elements which were the characteristics and features along the residential streets and also the social aspects. The assessment of the neighborhood environment showed that the highest score of child-friendly environment in terms of physical aspects was at Jln. P11F/11 while the highest score of child-friendly environment in terms of social aspects is at Jln. P11A 1/14. The residential blocks and the street at Jln. P11F/11 fulfilled the characteristics of a child-friendly environment based on the features including signages, playgrounds, pedestrian paths along the road, pedestrian path between the houses and pedestrian path surrounding the playground. However, this street did not score high in terms of social aspects.

Table 5: General criteria of child-friendly environment

| Indicator Street | Signage | Play-ground | Pedes-trian path along the road | Pedestrian path between the houses | Pedestrian path surrounding the playground | Score | Scale |
|---|---|---|---|---|---|---|---|
| Jln. P11K/2 | 4 | 3 | 2 | 4 | 5 | 18 | |
| Jln. P11H/1 | 3 | - | 4 | - | - | 7 | |
| Jln. P11B 1/6 | 4 | - | 3 | 3 | - | 10 | |
| Jln. P11A 1/14 | 4 | - | 3 | 2 | - | 9 | 1 Least Child friendly |
| Jln. P11/2A | 3 | 4 | 4 | 3 | 5 | 19 | 2 Low Child friendly |
| Jln. P11F/11 | 4 | 5 | 5 | 5 | 5 | 24 | 3 Moderate Child friendly |
| Jln. P11E/3 | 4 | - | 4 | 4 | - | 12 | 4 Child friendly |
| Jln. P11D/1 | 3 | 3 | 5 | 4 | 4 | 19 | 5 Most Child friendly |
| Jln. P11D/6 | 4 | - | 5 | 5 | - | 14 | |
| Jln. P11C/16 | 5 | 5 | 4 | 4 | 5 | 23 | |

* Jln. = Street


Figure 2. Jln P11F/11 (Neighborhood 5)

Table 6 and Figure 3 show the assessment of the neighborhood environment in terms of social aspects. This assessment relates to the safety and security of the children within the neighborhood areas. Feedback gathered from the respondents of the 10 streets demonstrated a high satisfaction rate in Jln. P11A 1/14. Children and adult respondents in Jln. P11A 1/14 claimed that they felt safe being within their neighborhood areas. The interaction among neighborhood has created a sense of security and safety for the children to socialize, play and to walk alone within their neighborhood.

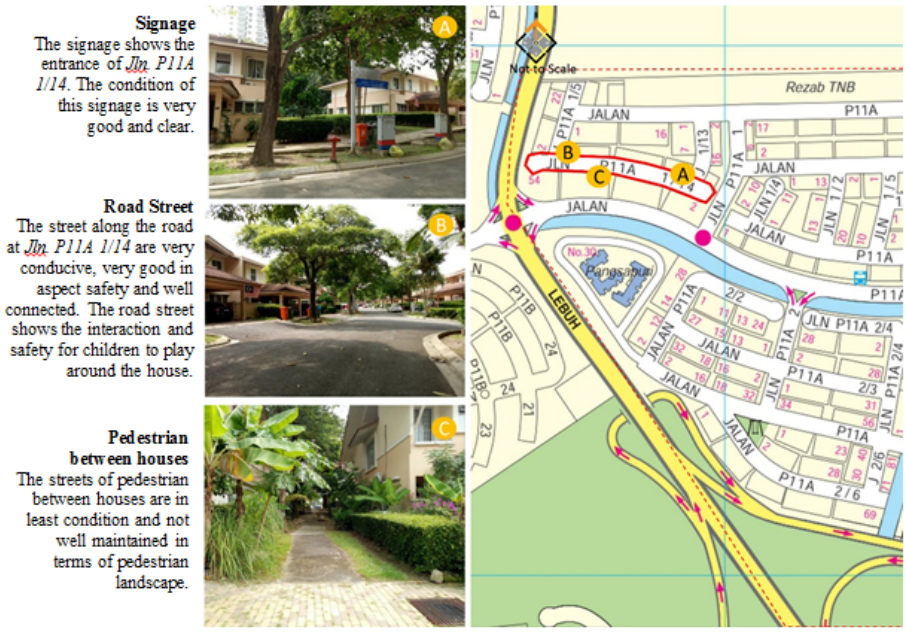


Figure 3. Jln P11A 1/14 (Neighborhood 4)

Table 6: General criteria of child-friendly environment

| Indicator | Perception on the safety level of children in their neighborhood area | Perception on the safety of children in their house and its surroundings area | Society's involvement in children's programs in the neighborhood area | Score | Observation | Scale |
|---|---|---|---|---|---|---|
| Street | | | | | | Level of Child Friendly Neighborhood Environment |
| Jln. P11K/2 | 3 | 3 | 3 | 9 | 4 | |
| Jln. P11H/1 | 3 | 2 | 3 | 8 | 3 | |
| Jln. P11B 1/6 | 2 | 2 | 3 | 7 | 3 | |
| Jln. P11A 1/14 | 4 | 4 | 4 | 12 | 5 | 1 Very Disatisfied |
| Jln. P11/2A | 2 | 2 | 2 | 6 | 2 | 2 Disatisfied |
| Jln. P11F/11 | 3 | 3 | 3 | 9 | 4 | 3 Slightly Satisfied |
| Jln. P11E/3 | 2 | 3 | 3 | 8 | 4 | 4 Satisfied |
| Jln. P11D/1 | 3 | 3 | 2 | 8 | 4 | 5 Very Satisfied |
| Jln. P11D/6 | 3 | 3 | 3 | 9 | 4 | |
| Jln. P11C/16 | 3 | 4 | 3 | 10 | 4 | |

* Jln. = Street

Based on the analysis of the residential areas and the schools' surrounding environment in Precinct 11, Putrajaya, most areas were found to meet the child friendly environment characteristics in terms of safety, scale, accessibility and integration. However, there are some issues regarding the lack of social interaction in certain types of neighborhoods, whereby the study observed that more children in the medium-cost residential areas are forging ties and interacting with each other through play and activities, unlike the children in the high-cost housing area who tend to play in the comfort of their own home.

**Indicator (2) - Schools' Surrounding Environment**

As indicated in Table 7, the analysis for the schools' surrounding environment was focused on four elements which were the entrance of school gates, the road leading to the entrance, the distance from home, shops, parks and playgrounds, and the connection to the pedestrian walkways, cycle lane and zebra crossing. The assessment of the four indicators at the station points outside Sekolah Rendah Kebangsaan Putrajaya Precinct 11 (1), Sekolah Rendah Kebangsaan Putrajaya Precinct 11 (2), Sekolah Rendah Kebangsaan Putrajaya Precinct 11 (3) indicated that the surrounding environment of Sekolah Rendah Kebangsaan Putrajaya Precinct 11 (2) meets the criteria for child friendly environment better than the other two schools.

Table 7: General criteria of child-friendly environment

| Indicator | Entrance of school gate | Road leading to the entrance | Distance from others indicator | Connection to the pedestrian walkways, cycle lane and zebra crossing | Score | Scale |
|---|---|---|---|---|---|---|
| School | | | | | | Level of Child Friendly School Environment |
| Sekolah Rendah Kebangsaan Putrajaya Presint 11 (1) | 4 | 5 | 5 | 3 | 17 | 1 Least Child friendly<br>2 Low Child friendly |
| Sekolah Rendah Kebangsaan Putrajaya Presint 11 (2) | 5 | 5 | 4 | 5 | 19 | 3 Moderate Child friendly<br>4 Child friendly |
| Sekolah Rendah Kebangsaan Putrajaya Presint 11 (3) | 3 | 3 | 3 | 2 | 11 | 5 Most Child friendly |

* Jln. = Street

Assessment of the areas surrounding the schools based on children's movement pattern during a two-week field survey discovered that there is a safety issue with regards to the connectivity between the pedestrian walkways, cycle lane and zebra crossing at Sekolah Rendah Kebangsaan Putrajaya Precinct 11 (3). This is due to the school's location which is adjacent to the main road (Jln. P11), facing the main entrance of the local neighborhood center (Pusat Kejiranan Precinct 11) and the residential blocks. Figure 3 shows the the surrounding environment at Sekolah Rendah Kebangsaan Putrajaya Precinct 11 (3).

There is also conflict between pedestrians, cyclists and vehicles at Sekolah Rendah Kebangsaan Putrajaya Precinct 11 (3). There are two zebra crossings in the study area. Both zebra crossings are along the precinct's main road. One zebra crossing has a traffic light while the other is without a traffic light. Most children use the zebra crossing without the traffic light than the other crossing. This situation poses a danger to children who pass through the major road daily on their way to school and getting back home. Figure 4 shows the zebra crossing without traffic lights (a) and with traffic lights (b) along the main road.


Figure 4. Areas surrounding sekolah rendah kebangsaan putrajaya precinct 11 (3)

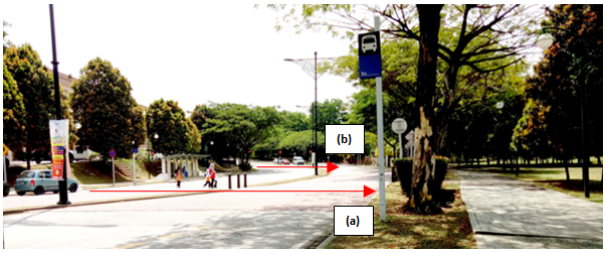


Figure 5. The zebra crossing without traffic lights (a) and equipped with traffic lights (b) along the main road

For schools' surrounding environment, some issues regarding safety for children who uses the zebra crossing without traffic lights along the main road at Sekolah Rendah Kebangsaan Putrajaya Precinct 11 (3) were found.

Most parts of the study area were designed in such a way that enables children to achieve independent mobility. Analysis of the accessibility indicators within the radius of 1 kilometer at the residential areas and the schools in Precinct 11, Putrajaya shows that these areas have easy access and the places are interconnected. The street and access to a wider environment also provide independence to children's usual movement to and from home to school and also to other destinations in the study area like the parks and playgrounds.

Although the residential and school's surrounding environment in Precinct 11 Putrajaya had fulfilled most criteria in the children's perspective checklist employed in this study, the implementation of other measures for making a child-friendly environment should be given attention and be considered for implementation.

## CONCLUSION, RECOMMENDATIONS AND IMPLICATIONS

Based on the study findings, the lack of traffic lights at a zebra crossing along the main road at Jln. P11 near Sekolah Rendah Kebangsaan Putrajaya Precinct 11 (3) should be solved as soon as possible to reduce the risk of accidents among users who are mostly children who use the road to get to school. Other neighborhoods' facilities in Precinct 11, Putrajaya is well connected in terms of cycle lane, zebra crossings and pedestrian walkways. In addition, strategies to increase active socialization or neighborliness among residents could also be given priority especially with the involvement of residents in neighborhood community activities. Programs that focus on making the residential streets lively through various neighborhood events could be co-organized by the community groups, NGOs, local business community and the local authority.

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