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THE EFFECT OF RESIDENTIAL LAYOUT DESIGN ON NEIGHBOURHOOD RECREATIONAL ACTIVITIES IN JOHOR BAHRU

Sumaia Ibrahim Othman^{1*}, Noor Aimran Samsudin²

¹ Department of Urban and Regional Planning, Faculty of Built Environment and Surveying, Universiti Teknologi Malaysia (UTM), 81310 Johor, Malaysia.

Email: sumaianani21@gmail.com

² Urban Design and Environmental Research Group, Faculty of Built Environment and Surveying, Universiti Teknologi Malaysia (UTM), 81310 Johor, Malaysia

Email: nooraimran@utm.my

* Corresponding Author

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Abstract:

In Malaysia, typically, the grid system of terrace houses layout has been dominated by landed housing in the property market for many years. The grid system of residential layout may offer more units to be built up by the developers. This situation may lead to fewer open spaces, playgrounds, and other recreational facilities in a strategic location within the neighbourhood schemes. Adopting some residential layout patterns may influence activities, frequency, interest, time, place, and route while doing their recreational activities. A study related to residential layout mainly focuses on building orientation, building design, privacy, safety, traffic calming, and social relation; however, a limited number of studies examine the effect of neighbourhood design on dwellers' recreational activities routine and pattern. This paper aims to assess the relationship between residential layout design and its impact on dwellers' recreational activities in well-planned landed neighbourhood schemes. Using observation, two (2) different residential layouts in Johor Bahru were selected as the study area, namely Taman Mutiara Rini (Presint Bakti), for the grid housing schemes and Taman Nong Chik Height for the innovative honeycomb layout. Descriptive analysis was used to analyse the data. Findings in this paper proposed recreational activities in the residential layout may be influenced by several design factors. The design of neighbourhood and outdoor open spaces, for example, played an essential role in residents' evaluation of the various recreational activities. This study concludes that residential neighbourhoods design, including buildings and the neighbouring environment, significantly impacts people's ability to participate in neighbourhood recreational activities. Based on this research's findings, residential layouts' design in both study areas influenced local dwellers'

recreational activities types behaviour and preferred route through outdoor space arrangement.

Keywords:

Residential Layout, Recreational Activities, Neighbourhood Design, Outdoor Spaces

Introduction

Recreational activities are one of the daily local community activities within the designed housing schemes. The provision of a neighbourhood park is an essential component to get planning approval from the local authority. A good neighbourhood is supplied with complete facilities that fulfil dweller and visitor needs. Park, playground, open field became a node for recreational, leisure, and social activities. The previous researcher, such as Ahmad Nazrin and Nur Hafidzah (2018), concluded that some neighbourhood parks are often neglected, underutilised and forgotten due to their inappropriate placement.

As a result, such open space becomes the lost space within the housing schemes. Several questions such as how the different housing schemes layout design may influence the dweller's decision to do their recreational activities? Did local dwellers prefer doing their recreational activities within the sidewalk? How road in front of the house instead of in a dedicated local park? Therefore, this paper explores the influences of two different residential layout designs (grid and honeycomb) in Johor on daily dwellers' recreational activities. A residential layout, in general, is a district that forms a local neighbourhood within a town, city, or suburb but on a smaller scale with fewer people. The type, size, and purpose of buildings and open space developed, such as specifically the gardens, streets, yards, and parks—are referred to as residential layout to have a practical, effective, and aesthetically pleasing physical atmosphere for living, working circulation, and leisure (Biddulph, 2007).

Originally, Malaysia's housing schemes and setting dates back a long time, starting with an unplanned and organic settlement known as the kampong (kampong or village). The traditional kampong is a unique settlement concept and inherited from one generation to another. It consists of several groups of houses arranged in cluster form, rich with the Malay architecture style, for hundreds of years. The Malay word '*kampung*' means 'village' or 'kampong'. The neighbourhood village was considered an old-fashioned concept before replacing grid 'modern' housing schemes (Noor Aimran, 2016).

The kampong living environment is considered the 'early form' of housing schemes in these countries. The houses have been arranged in several ways, linear, clustered, and concentrated by following the site topography and other natural features such as riverbank, valley, and hilly area. The settlement arrangement and each house were designed differently than the current housing schemes that look more monotonous. Space between houses is considered as the communal space, a space for social activities taking place.

Many Malays are now living in new housing developments in urban cities, as living in rural areas is very different from living in a traditional kampong (Noor Aimran & Syed Zainol, 2016). The modern housing schemes with proper planning guidelines have introduced the contemporary housing schemes and gradually evolved into urban housing schemes. Due to the

dominance of colonial powers that controlled Malaysia before, it has dramatically influenced modern housing schemes design, especially the terraced houses (also known as link houses). There are many planning guidance criteria relevant to the housing policies used by the Planning Authority (PA) in Malaysia that developers should follow to prevent urban issues that are a severe consequence of lack of planning and control. Malaysia housing policy, in general, aims to provide adequate, affordable, and high-quality housing for Malaysians of all income classes, especially low-income groups (Idrus & Siong, 2008). In addition, sufficient, convenient, efficient, and inexpensive housing is provided to improve people's quality of life and make a residential area a place to live, work, learn, and play.

Literature Review

Typologies Of Residential Layouts in Malaysia

The residential layouts are divided into three major types. The first one is the grid pattern, which refers to the organisation of residential units in grids and rows. This structure is standard, bland, with little differentiation. The second cluster pattern refers to housing units clustered together and sharing that open space or public facilities. It instils a greater sense of privacy than the grid system. The third one is the hybrid pattern, which can be created by combining grid patterns and structure patterns. Typically, hybrid systems are constructed in the form of a curve linear and a circle. These three layouts have various effects on the regulation of entry, the flow of vehicles and pedestrians and space (Noor Aslinaa Bte Hassan, 2012).

Residential Layout Principles

In Malaysian residential layouts, design should pay attention to environmental and natural aspects, emphasising providing public spaces for social and leisure events and using local materials that provide a healthy community (Esmawe Haji Endut, 1993). In general, Malaysia's township schemes use the modern urbanism approach, a planning and construction approach focused on how cities and towns have been designed for the last several centuries: open green parks, walkable blocks and roads, nearby shopping, and accessible public spaces (Alias et al., 2011).

Physical Attributes of The Residential Layouts

Level-Macro Scale

Well-designed residential layouts provide an opportunity for a positive sense of belonging for residents, which is fostered by their interactions with one another through events as well as the physical condition of housing units which includes the need for public services and utilities servicing the area; access to public open space areas; arrangement and configuration of buildings; surrounding scenery and borders all considered as physical attributes in residential areas at the macro-level (Dunkin et al., 2002). At the macro level, several design factors were considered, such as:

Location (Geographically & Topography)

If the landform is hilly, curvilinear streets might imply contrast to other straight roads; in this situation, the curvilinear streets will have a sense of enclosure and thus be suitable for intimate groupings (cluster arrangement). Straight streets might then act as major feeders and links to more private curved streets (Esmawe Haji Endut, 1993). Geographical and topography conditions may influence recreational activities.

Landscape (Landscape Features in Residential Layout)

Residential landscape design is one method for people to live in a comfortable setting. Malaysia's National Landscape Department was established in 1996 with the aim of "landscaping the country," which culminated in the implementation of a green policy for public spaces in urban residential landscape developments, which includes medium-sized trees, small and medium shrubs, and grass planted along the roads and public parks to provide shade and enhance scenic enjoyment in the surrounding areas (Sreetheran et al., 2006). Well-designed streetscape and recreational space will encourage people to do their recreational activities within provided spaces.

Communal Space Social or Play Space

In Malaysia, housing estates may be constructed around central or shared courtyards and incorporate private courtyards into individual homes. The shared courtyard may have inspired the design, as traditional Malay houses are designed in clusters with an open space in the centre for public activities (Esmawe Haji Endut, 1993). By locating recreational areas in the centre of the neighbourhood, the accessibility of such communal space will increase.

Road and Trail Networking System

The road network is a system of interconnected roads intended to accommodate all wheeled vehicles and foot traffic. Residential road layout influences the form, hierarchy, reserve, and capability of its streets, aiming to create a road network that provides direct links to activity centres and local amenities (Iskandar Regional Development Authority, 2011). There are at least three (3) road hierarchies within the neighbourhood: the collector road, local road, and service road. Other roads provide access to the residential area and link one house to the next, allowing entrance into the housing unit (Noor Aimran, 2016).

Furthermore, well-designed road circulation may reduce the number of traffic passing through into the neighbourhood area. Which will create a better and safer environment for dwellers to do their recreational activities nearby.

Boundaries (Physical and Non-Physical Boundaries)

Furthermore, housing boundaries, either physical or non-physical, have influenced layout design. Nowadays, there is a demand to stay within a gated and guarded neighbourhood. Gated communities have arisen as a recent urban type and pattern in modern cities, with roots dating back to the early 1990s in Malaysia to increase protection and establish a safe living environment from any potential crime risk. The physical walls erected are intended to provide people with a sense of security and privacy. Clear boundaries between pedestrian or bicycle lanes with vehicles offer a safer environment for them.

Level-Micro Scale

The micro-level is defined as houses with building material units, landscape elements, and house orientation. Houses are required to provide safety, experience, comfort, pleasure, and convenience. Malaysia is dominated by two types of houses: residential land (land buildings) and strata (multi-levelled buildings). In this case, several design factors could be considered, such as:

House's Condition (Architecture, Construction Material, and Structural Condition)

In Malaysia, the two-story terraced house is the most common house design. Terraced houses make up most new housing developments, with semi-detached houses, bungalows, and stores accounting for a small percentage. Despite the widespread development of terraced houses, the bulk of these homes lack adequate climatic adaptation in their design and style. Site constraints, the use of locally sourced materials, and natural ventilation are also largely ignored.

Boundaries Between House Unit (Physical and Non-Physical Boundaries)

A repetitive chain-link fence or brick perimeter wall defines each housing unit's borders, resulting in a monotonous pattern (Hashim & Rahim, 2008). This condition induces a sense of uniformity and rigidity in the living environment. Such boundaries lead to a situation where pedestrians need to take the longer loop to access nearby recreational space.

House Landscape Features

There are two types of landscape elements in contemporary Malay House: soft landscape elements that represent nature and are made up of many plant species such as ornamental plants, herbs, kitchen gardens which have many uses other than decoration, and food, shaded plants, and palms. The second one is hard landscape elements.

It is the creation of man-made and an additional feature that complements the landscape garden's architecture such as gazebos, pergolas, concrete pots, water features, fountains, swings, lighting is also important in the landscape environment, and park benches are preferred as desirable elements in their landscapes (Hussain & Ahmad, 2012).

There is minimal setback space in Malaysia in front of the terrace house, around 20 feet and fully utilised as a car porch. As a result, dwellers tend to use the road in front of the house as a recreational space.

Recreational Activities

Recreation is an endeavour and practice that people engage in, enjoy, and recall spiritually uplifting during their free time. (Veal, 1992). According to Malek et al. (2012), there are a variety of types of recreational activities among neighbourhood residents in different areas or categories such as:

- a) Recreational activities participation (events, programs, design urban landscape).
- b) Sports recreational activities (walking, basketball, tennis, cycling, running or jogging, football).
- c) Outdoor recreational activities (relaxing includes people-watching, sitting and chatting, barbeque).

All these activities are considered as the most typical recreational activities that may be influenced by the residential layout design.

Methodology: Site Observation

A series of site observations are applied in the study area to understand how certain residential designs may influence dwellers' daily recreational activities. This study proposed that several patterns of housing layout patterns may lead to how dwellers utilise recreational space within

the neighbourhood. In this case, the grid and cluster form significantly offered different opportunities for dwellers to do their preferred recreational activities. The planning of residential neighbourhoods, including housing arrangement, the road system, and the surrounding environment, substantially affects people's desire to engage in neighbourhood leisure activities. The result may vary due to the location, size, design, and open space distributed within it, availability of related facilities such as football field, jogging track, outdoor gym, bicycle lane, and playground.

Case Studies

Two different housing schemes in Johor State, Malaysia selected, known as the Taman Mutiara Rini (Presint Bakti), represent the typical grid-layout form and the second of which is the 'honeycomb layout' in Taman Nong Chik Height. It is claimed as the latest innovation housing layout design in these countries. Each type carries different physical characteristics of residential layouts. Next to the details of each case studies:

Taman Mutiara Rini (Presint Bakti)

Taman Mutiara Rini neighbourhood is located in Johor Bahru, Johor and administered by the Iskandar Puteri City Council. It is approximately 13 kilometres north-west of the city centre and is conveniently accessible via the Skudai Highway, which is around 2 kilometres to the east. Mutiara Rini Development Sdn Bhd, a subsidiary developer of Boustead Holdings Berhad, built this housing estate in early 1996. Taman Mutiara Rini extends Taman Universiti's growth and is surrounded by several other existing housing estates such as Taman Ungku Tun Aminah, Taman Skudai Baru, and Taman Sri Orkid. Taman Mutiara Rini's total area is roughly 441.6 hectares. Taman Mutiara Rini has shown positive evolution because each precinct has a balanced mixture of land uses such as residential land use, industrial, utilities, and recreational areas, with facilities situated throughout the area focusing on nature and health landscaped gardens spread across the phases.

Some of them have small sports fields, and others have playgrounds for youngsters. These housing schemes also have kindergarten, petrol stations and Hutan Bandar (a central neighbourhood park), Mutiara Rini Oval (international cricket), primary and secondary schools, and shophouses, all of which contribute to the area's self-sufficiency and convenience for its residents.

The whole residential area in Taman Mutiara Rini consists of six phases of development: Presint Bakti, Taman Mutiara Rini, Presint Jasa, Rini Hills, Rini Height, and Rini Homes. However, for this research, only Presint Bakti only will be selected. This study found that the total area of Presint Bakti is 233 acres with a 7800 population, and it consists of a residential, commercial and recreational area. The residential area covers 47 acres and 1596 residential units of varying ranges, size types and densities, while the commercial area has 12.5 acres and the recreational areas are 13 acres. This study found that Precinct Bakti was applying a centralised and grid-based concept. The development's highlight is the idea of centralization, followed by a linear layout that emphasizes building design, where open spaces are located in the centre of each block of buildings. There are networks of arteries, collectors, and local roads completed with well-paved bicycles lanes. Precinct Bakti was a completed project that comprises mixed land use, which makes street life livelier. In a residential area, there are three types of houses in Precinct Bakti, a variety between detached houses, semi-detached houses

and terrace houses and is not permitted to have more than three storeys of building height as shown in Figure (1).



Figure 1: Distribution of Recreational Space Within The Study Area in Taman Mutiara Rini

Source: Google Map and Author (2021)

It is also composed of two rows of commercial buildings, one on Jalan Bakti 64 and the other on Jalan Bakti 31. Furthermore, it has a public, commercial area that is centrally placed and located on Jalan Bakti 1 facing the arterial road, which has a variety of business activities to meet the needs of residents, such as a few restaurants, a convenience store, and a supplies shop, a polyclinic and pharmacy. Facilities provided in Precinct Bakti are schools such as Thorburn Chinese Secondary School, Mutiara Rini Secondary School and Mutiara Rini Primary School, petrol station, bus stops, Kindergarten, religious buildings (mosque, surau and church). There are different facilities available, including community field, sports field, pocket garden, and vacant areas that have been used for multi-purpose halls or protection and emergency services.

From the observation, some streets applied cul-de-sacs design, making such areas less permeable to access by the community and outsiders. Such a setting may offer local dwellers more convenient communal space due to less traffic passing the local road. Overall, the local dwellers can enjoy the recreational facilities by practising the activities such as walking, jogging and cycling due to the provision of well-designed pedestrian walkways and small pocket space within walking distance. The main football field located in the middle of the neighbourhood makes it accessible from around the community. There are 12 open spaces (11 pocket spaces and one football field) can be found in this area) distributed equally within each block of the house. But some pocket space was found in bad condition due to lack of maintenance.

Taman Nong Chik Heights

In 2003, architect Mazlin Ghazali introduced the Honeycomb housing style, a contemporary Malaysian architecture design featuring a cul-de-sac layout with a courtyard. The honeycomb housing concept is based on tessellation, a geometric modelling technique that involves replicating a pattern structure with no overlaps or gaps. The houses can be designed with small parks surrounded by large shade trees in hexagonal cul-de-sacs, and houses are spread around shared courtyards in linked cul-de-sacs. Each courtyard neighbourhood will be connected with the distribution road junction in the shape of a 'Y'. It's just about 150 feet around the courtyard (Ghazali, Durack and Davis, 2016). One of the projects that applied this concept was the Nong Chik Height located on the outskirts of Johor Bahru city centre (5 km).

It is located on the Malay Reserve Land, this area is known as Nong Chik Heights after the redevelopment and is majority inhabited by the Malay community. The project began in 2009 and was developed by Mudra Tropika Sdn.Bhd., a minor private real estate company. An existing 74 units of government quarters in the Nong Chik neighbourhood were demolished to make way for redevelopment (Samsudin et al., 2020). Taman Nong Chik Heights was constructed on 14 acres of land to a hillside on the edge of the Johor Bahru business district. The redevelopment includes 24 new shop shops, 54 gallery stores, and 40 bungalows and semi-detached homes. The residential area covers 10 acres with a total of 168 units of honeycomb housing completed in late 2011, while the commercial area has one acre and the recreational areas are 0.50 acres.

The honeycomb is the new urban lifestyle that urban dwellers may want. Potentially, honeycomb housing replaces high-rise buildings and impersonal terrace housing that has been too costly for the lower 80% of wage earners or, even worse, the socially intolerable low-cost flats that families are compelled to live in because it is the only affordable housing choice available. Honeycomb housing is set to become Malaysia's third generation of housing (Davis et al., 2012). From the observation, there are three new styles of houses introduced as replacements to new terrace houses: quadruplex, sextuplex, and duplex houses. The facilities provided at Taman Nong Chik Heights are composed of Masjid Kolam Ayer, Pusat Jagaan Impian Syimah Hospital, bus stop and commercial centre located in Jalan Kolam Air 1. All houses in Nong Chik Heights face a shared green garden in the middle of a looping path. Such a setting contributes to the natural surveillance of the exterior spaces.

In addition, it is suitable for younger children to play and utilises recreational amenities in pocket parks and helps aged and disabled people by providing a socially pleasant and healthy atmosphere. The study area has three main entrances in Taman Nong Chik, the first one from the intersection between Jalan Kolam Ayer with Jalan Nong Chik Heights, the second one from the intersection between Jalan Kolam Ayer with Jalan Nong Chik and the last one is from the intersection between Jalan Abdul Samad with Jalan Nong Chik. In this case, there is no significant dedicated open space or recreational area like other conventional housing schemes. From the housing layout (the honeycomb shape), 16 pocket spaces form a cul-de-sac road. Each road forms a small group of the house (semi-detached, terraced and detached) that consist of around 12 units each. Due to this situation, the local road becomes a convenient recreational space for dwellers. A small pocket park in each cluster automatically becomes a local communal space for recreational and social activities (Figure 2).



Figure 2: Distribution of Recreational Space Within the Study Area in Taman Nong Chik

Source: Google Map and Author (2021)

Conclusion

This study discussed a few physical design attributes for two different layouts: grid layout, the conventional one, and the honeycomb layout. The study found that both case studies may offer different recreational settings and opportunities, which lead to the dweller's preference level from observation, series of the site visit and analysing aerial photos. Several factors that may influence the tendency of dwellers to do recreational activities may be identified through survey form in future.

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