



***LEGIBILITY OF NEIGHBORHOOD PARKS AND ITS IMPACT ON SOCIAL
INTERACTION IN PLANNED RESIDENTIAL AREAS IN PUTRAJAYA,
MALAYSIA***

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MALAYSIA**

By

AMINE MOULAY

**Thesis Submitted to the School of Graduate Studies, Universiti Putra
Malaysia, in Fulfillment of the Requirements for the Degree of Master of
Science**

March 2015

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DEDICATION

I dedicate this thesis to my parents who never stop giving of themselves in countless ways; to my dearest wife for her endless love, support and encouragement; to my lovely kids Louai and Wassim and all the people in my life who touch my heart ... I dedicate this research.



Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfillment of the requirement for the degree of Master of Science

LEGIBILITY OF NEIGHBORHOOD PARKS AND ITS IMPACT ON SOCIAL INTERACTION IN PLANNED RESIDENTIAL AREAS IN PUTRAJAYA, MALAYSIA

By

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March 2015

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Public park is one of the principle elements in a cityscape. A neighborhood park within a planned residential area has a significant role in strengthening social interaction by providing residents with various opportunities for leisure and community activities. However, in many situations, these parks are not fully utilized to the benefits of the users. Studies have indicated that social interactions in public spaces within planned residential areas are not at a satisfactory level. The parks are not fully responsive to the needs of the users because of its inability to attract them to visit. This could be due to the lack of legible elements that make the parks physically and visually unattractive for social activities. The aim of this research is to examine legibility of neighborhood parks and its impact on social interaction. Legibility, defined as the apparent clarity of the cityscape, is an essential attribute in making public spaces responsive to the social needs. This study was conducted in the Precinct 8 and Precinct 9 neighborhoods parks, in a planned residential area in Putrajaya, Malaysia. Quantitative methodology was applied to measure the impact of the legibility attributes (clear structure, view obstacles, accessibility and visual aesthetic) on social interaction (park engagement and type of contact) within the parks. Questionnaire surveys were conducted with 378 respondents who were randomly selected among the neighborhood parks' residents of the Precinct 8 and the Precinct 9. In addition, a cognitive mapping was conducted to support the survey results. To clarify the survey results, qualitative data from field observations were recorded in a form of notes and photographs to understand the real condition of the study areas. This research suggests that legibility of the neighborhood parks influences the duration of park use among residents which in turn could encourage social interaction. The clarity of the structure of the parks was mainly defined by the quality of the paths and the landmarks, while the accessibility was influenced by the number of entrances. The research identified that the visual obstacles were influenced by the quality of the edges, the distance between

park's activities and the overall form and shape of the park. The finding proves that the intensity of social interaction within the neighborhood parks is as a result of the combination between the legibility attributes and certain critical population density of the residential areas. These research findings contribute to the development of physical aspects of park design to increase social activities among the communities that could strengthen the social ties among residents. The study denotes the importance of legibility in the planning and design of public spaces that are responsive to the social needs of the urban communities.

Key words: sense of place, legibility, social interaction, neighborhood park



Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia
sebagai memenuhi keperluan untuk ijazah Master Sains

**LEGIBILITI TAMAN KEJIRANAN DAN KESANNYA TERHADAP
INTERAKSI SOSIAL DI KAWASAN PERUMAHAN TERANCANG DI
PUTRAJAYA, MALAYSIA**

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Taman awam merupakan salah satu elemen utama di dalam skap bandar. Sebuah taman kejiranan dalam kawasan perumahan terancang mempunyai peranan penting bagi mengukuhkan interaksi sosial dengan menyediakan pelbagai peluang untuk aktiviti santai dan kemasyarakatan. Walau bagaimanapun, dalam banyak keadaan, taman ini tidak digunakan sepenuhnya untuk manfaat pengguna. Kajian telah menunjukkan bahawa interaksi sosial di tempat awam dalam kawasan perumahan terancang berada di tahap yang tidak memuaskan. Taman tersebut tidak responsif sepenuhnya terhadap keperluan pengguna disebabkan ketidakupayaannya untuk menarik mereka untuk berkunjung ke taman tersebut. Ini mungkin disebabkan oleh kurangnya elemen legibiliti yang menjadikan fizikal dan visual taman tersebut tidak menarik untuk aktiviti sosial. Kajian ini bertujuan untuk meneliti legibiliti taman kejiranan dan impaknya kepada interaksi sosial. Matlamat kajian ini adalah untuk meneliti legibiliti taman kejiranan dan kesannya ke atas interaksi sosial. Legibiliti yang ditakrifkan sebagai kejelasan skap bandar adalah atribut yang utama dalam membentuk ruang awam yang responsif kepada keperluan sosial. Kajian ini dijalankan di taman kejiranan Presint 8 dan Presint 9, di dalam kawasan perumahan terancang di Putrajaya, Malaysia. Kajian ini menggunakan metodologi kuantitatif untuk mengukur kesan legibiliti atribut (struktur yang jelas, halangan pandangan dan estetik visual) ke atas interaksi sosial (penglibatan di taman dan jenis interaksi) di dalam taman tersebut. Tinjauan soal selidik dijalankan ke atas 378 orang responden yang dipilih secara rawak di kalangan penduduk taman kejiranan di Presint 8 dan Presint 9. Selain itu, pemetaan kognitif telah dijalankan untuk menyokong dapatan tinjauan soal selidik. Untuk menerangkan keputusan soal selidik, data kualitatif dari pemerhatian lapangan telah direkodkan dalam bentuk nota dan gambarfoto untuk memahami keadaan sebenar kawasan kajian. Kajian ini mencadangkan bahawa legibiliti taman kejiranan tersebut mempengaruhi tempoh masa

penggunaan taman di kalangan penduduk yang boleh menggalakkan interaksi sosial. Kejelasan struktur taman tersebut ditentukan oleh kualiti laluan dan mercu tanda, manakala kebolehsampaiannya dipengaruhi oleh bilangan pintu masuk. Kajian mengenalpasti bahawa halangan pandangan dipengaruhi oleh kualiti sisi taman, jarak antara aktiviti di taman dengan bentuk keseluruhan dan bentuk taman. Dapatan kajian membuktikan bahawa kekerapan interaksi sosial di dalam taman kejiranan tersebut adalah kesan dari gabungan di antara legibiliti atribut dan kepadatan populasi di kawasan perumahan. Kajian ini menyumbang kepada pembangunan aspek fizikal reka bentuk taman untuk meningkatkan aktiviti sosial di kalangan masyarakat yang akan mengukuhkan ikatan sosial di kalangan penduduk. Kajian ini menunjukkan kepentingan legibiliti terhadap perancangan dan reka bentuk sesebuah taman awam yang responsif terhadap keperluan sosial masyarakat bandar.

Key words: *sense of place*, legibiliti, interaksi sosial, taman kejiranan

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LIST OF ABBREVIATIONS

POD	Point of departure of the research
Leg	Legibility
SI	Social interaction
P	Precinct
et al.	and others
etc.	et cetera
m	Means
f	Frequency
Sd	Standard Deviation
Se	Standard Error
SPSS	Statistical Package for the Social Sciences



CHAPTER 1

INTRODUCTION

This chapter illustrates the general framework of the study. Initially, the background of the study describes the key words and sheds light on the relationship between legibility of neighborhood parks and social interaction, i.e. the relationship between the physical and the social aspects among residential area. In the second section, the problem statement highlights the current issues of park's legibility in residential areas and its effect on social interaction. It also covers a general overview of parks' opportunities and issues. It is followed by a discussion on Putrajaya's neighborhood parks, i.e. the focus area of the study. From there, successions of research questions, aims, objectives and assumptions are developed. Also an overview of the methodology conducted in this study is explained, followed by the scope, limitation and significance of the study. In the final section of this chapter, the structure of the thesis is described.

1.1 Background of the study

It is becoming increasingly difficult to ignore the importance of recreational outdoors areas and the seeking of pleasure and wellbeing from residents in planned residential areas, especially after the 1950's. Many factors strengthen these social needs, including the strong post war economy and the spectacular speed of urban growth (Hultsman et al., 1987). Accompanied with the "Brasilia syndrome" of our modern cities. Most of these cities are planned using mainly the large and middle scale, which means that the planners are focused more on the quarters, functions, traffic facilities, organization of buildings and spaces, and almost abandoned the need to consider the small scale, the human landscape or what Jan Gehl called "the eye level"; the basic human right, to walk, stand, sit, watch, listen and talk (Gehl, 2009). Needless to say that ignoring human being's welfare as the core of city planning generated several social dysfunctions.

The opportunity for residents to spend more time outdoors and to interact with their environment will strengthen liveliness of places. This is because their interaction influences their perception of the physical attributes and activities which form the identity of a place (Ujang, 2012). It is the personal and shared sense of place that maintains people's relationship with the environment, thus facilitating social cohesion (Bounds, 2008). Therefore, the quality of the public spaces' physical environment is one of the factors that influences residents' outdoor activities while the intensity of life outside is the result of duration or length of outdoors stay (Gehl, 2009). In the entire history of human settlement, streets, squares and market places have been the principal elements around which various human activities in cities have been organized. History has proven the values of such elements that which reflect the origin of city development.

Various studies identified the lack of social interaction as being the shared experiences between residents (Hari and Kujala, 2009), in the majority of planned residential areas (Neutens et al., 2012; Peters et al., 2010; Wood, 2003; Atkinson and Kintera, 1999). This scenario occurs, despite the existence of public open spaces that are designed to promote social connectedness and offer areas for group activities. To deal with this issue, it is vital to start with the core of urban design, i.e. making better places for people (Carmona, 2009). In order to comprehend what stimulates people to interact with their environment, it is central to primarily understand the concept of “sense of place”, which supports environmental and cultural sustainability in cities. Sense of place is associated with meanings and attachment that human beings, whether individual or group, confer to a given place which in turn became a significant part of their identity. It is the cognitive and affective part of people that is refined through an ecological living relationship with a certain place (Lim, 2006). Sense of place is a multidimensional concept resulting from the high tie between self and place. It is the principal concept relating to place that incorporates other concepts describing the liaison between human beings and spatial setting (Jorgensen and Stedman, 2001). In fact a crucial sub-concept is “Place identity” which is the bond between the personal identity and the physical environment (Proshansky, 1983), which in turn depends on the interaction between people and places (Altman and Low, 1992). The more the interaction with a physical environment, the stronger is the perceived safety among residents (Schmidt and Németh, 2010; Gehl, 2009). This therefore increases a resident’s time spent outdoors and strengthens the intensity of life. Thus, social interaction occurs (Gehl, 2009).

Place identity includes psychological, social, and physical aspects of an environment. This study focuses on the legibility of neighborhood parks that define the quality of a physical environment. Legibility is the characteristic of being clear enough to be understood (Lynch, 1960). Legible landscape means having easily recognized elements due to their clarity, simplicity, continuity, rhythm, and the dominance of unites over each other (Gehl, 1971). It is one of the main physical attributes that affect the frequency of park’s utilization (Karuppanan and Sivam, 2012), and encourages users to interact with each other. It strengthens residents’ attention, clarifies their perception as well as their cognitive map towards public areas, thus, promoting connectedness and social interaction (Bounds, 2008).

Urban Design Group (1998) advocates the need to build legible environment. Moreover, it can be seen that several empirical studies focus on the relationships between the legibility of streets, markets and social interaction (Ujang, 2012; Karuppanan, 2012; Saffer, 2008; Chow How, 2001; Yeung, 1996). However, non-studies focus on the legibility of neighborhood parks and in turn its impact on social interaction within planned residential areas. There are lots of examples of well-designed parks over the world, but which are under used because of their isolated location, lack of accessibility and visibility, connectivity, lack of permeability, marks and perceived safety. Examples of those are Putrajaya’s parks (Azmi and Karim, 2012; Moser, 2010), Phoenix parks in the USA (Talen, 2010), Singapore and Delhi

(Karuppannan and Sivam, 2012). The common ground between all these parks is their appearance of well-designed green open spaces but paradoxically have low levels of utilization. Therefore, it is very important to examine the physical and functional characteristics of these spaces by determining how these parks support social interactions among the residents.

Physical spaces are designed to intersect human needs (Al-Bishawi and Ghadban, 2011). Furthermore, the core of urban design is to provide responsive places for residents, lively and sustainable. However, the real significance of such places lies in the interaction between people and their environment. Lack of social interaction among residents leads to many psychological problems such as anxiety and depression (Wang et al., 2012; Heimberg et al., 1992). This in turn leads to increased interethnic tensions (Peters et al., 2010). On the other hand, places with strong sense of place and identity are able to attract social activities like meetings, greeting exchange, and conversation that all lead to social cohesion (Gehl, 1971). Hence, neighborhood parks are very important places for socialization and exchange between residents. Responsive parks meet residents' social needs, provide visual pleasure, and create passive and active recreational opportunities. They are an excellent means to strengthen sense of identity among residents by connecting them with their living area (Karuppannan and Sivam, 2012). They have an encounter function where residents can sit, relax and meet each other (Peters et al., 2010). They positively affect resident's quality of life by encouraging physical activities, social interaction, and providing escape areas and enjoyment of nature (Brown et al., 2013). In this regard, it is imperative to examine residents' needs towards such places as a basis in providing responsive social spaces.

This study focuses on the physical aspect of place identity, in particular the legibility of neighborhood parks in supporting social interaction. The visual and spatial characteristics of landscape elements reflected in its coherent structure; determine the successful function of parks as socially responsive spaces (Blokland, 2009). Therefore it is argued that parks in planned residential areas in Malaysia have been planned and designed with a lack of consideration of its legibility, visibility and accessibility. This deficiency in turn has failed to encourage social interaction and group activities. Hence, it is imperative to examine these aspects and analyze its significance for human wellbeing and social ties, within planned residential neighborhoods.

1.2 Problem statement

In the entire history of human beings, the shifting from nomadic to sedentary life was the beginning of actual civilized world, where lifestyle changed from few gathering people to living in a crowded modern and sedentary society. As humans are naturally sociable (Sussman, 2011), social interaction becomes a human need (Cacioppo, 2008). Hence, one of the most important places in the development of cities was the public open space which found its origin in the "commons" where fairs and festivals took place, and the "agora" or the market place, where the concept of citizenship had its beginning (Bounds, 2008).

In previous human scale cities, before industrialization, social interaction occurred in a very natural manner between residents of the same neighborhood due to the small scale of people gathering. Following the Second World War, cities and population of the world witnessed a spectacular urban growth. This led the city planning change from “functionalism”, focused only on the healthy criteria as lights, sun etc, to the psychological and social aspect of buildings and public places (Gehl, 1971). Few decades later the developing cities focused more than ever before on the quality and quantity of parks within cities simply because of their function as meeting places (Peters et al., 2010). Their ecological and social benefits include promoting the resident’s wellbeing (Brown et al., 2013), and contributing to the community health (Ren et al., 2012), by providing an escape from the stress of city life. In brief, parks are perfect places to promote social interaction and social cohesion.

In spite of all the efforts to promote parks in cities during the end of the last century, the increasing urban growth was accompanied with the weakness of social cohesion in residential areas (Greenbaum, 1985). Indeed, several empirical studies on social interaction in planned residential areas revealed how social bonds within residential areas in several cities over the world were being lost (Graham et al., 2009; Wood, 2003; Atkinson and Kintrea, 1999). For example a study by (Siong, 2005) in the city of Putrajaya, Malaysia, highlighted the evidence that underutilized parks are the sole public gathering locations within residential areas. This has a negative influence on the level of social interaction, since social interaction is influenced by spatial configuration which leads to opportunities for social contact and social ties (Lelévrier, 2013). In response to these social issues, some groups denunciate the increasing tension generated by the modern lifestyle, due to the new climate of the economy and globalization (Kamierczak, 2013). Other groups pointed out the unpleasant impact of social media on the resident’s time spent outdoors, in turn affecting social interaction (Freeman, 2001; House & al, 1988). Nevertheless, social interaction are fully satisfied when people use their whole natural senses (Argyle, 1979), which makes public places all the while more important. On the other hand, urban designers consider physical environment as one of the main factors that influence resident’s outdoor activities, thus, naturally lead to promote the use of public spaces and increase social interaction (Adams and Tiesdell, 2008).

Indeed, social interaction is influenced by the configuration of spaces that lead to numerous opportunities for social contact in public places (Lelévrier, 2013). Findings from previous studies lead us to ask a legitimate question: why in spite of the presence of all the ingredients of social interaction and welfare, there is still a lack of social interaction within planned residential areas? This scenario is evident in numerous cities over the world (Graham and al., 2009; Wood, 2003; Atkinson and Kintera, 1999), in addition to the focus area of this study, which is the planned residential areas in Putrajaya (Moser, 2010), where despite the apparent well-designed parks they remain underutilized.

Such situations lead us to a crucial question: why neighborhood parks do not fulfill their roles of encounter areas and do not promote social interaction? In this regard, several studies emphasize only on one aspect of the solution. Among them the problem of perceived safety (Argent, 2008), suitable micro-climate (Siong, 2005), proximity and diversity (Talen, 2010), accessibility, permeability, comfort, quality and aesthetic (Karuppannan & Sivam, 2012), and finally problem of maintenance (Hultsman et al, 1987). But the core of all these sub-solutions is the weakening of the “sense of place” that is reflected in the physical identity and the meaning for a given place.

The real importance of residential development remains in the interaction of its residents with the environment. The relationship between residents and their environment is expressed by their personal and shared sense of place (Bounds, 2008), which is developed basically on their level of rootedness and social interaction (Hay, 1998). The lack of social interaction in residential areas may lead to several psychological and physical problems (Mehdipanah et al., 2013). On the other hand, legibility has a positive impact on social interaction by allowing residents to directly find their destination without hesitation and detours. It gives physical areas a clear structure and visual characteristics in providing them by a kind of hierarchy of spaces, from the most important to the less (Gehl, 2009). Therefore, the need to examine legibility of parks in new residential areas is eminent.

This study argues that lack of social interaction in new residential areas, although with the presence of neighborhood parks which provide excellent green areas for social connectedness and group activities, is due to the lack of park’s legibility. This is determined by the qualities of the built environment, its clarity, simplicity, continuity, rhythm and coherence (Bounds, 2008). Results of this study should indicate qualities that encourage better utilization of the parks as social spaces.

1.3 Research Questions

Main Research Question

How to improve the planning and designing of parks in planned residential areas in order to encourage social interaction?

Sub Research Questions

- 1- What are the parks’ legibility influences on social interaction?
- 2- What types of social interaction take place in neighborhood parks?
- 3- What are the relationships between park’s legibility and social interaction?

Research Aim

The aim of this research is to understand how physical and functional characteristics of neighborhood parks influence social interaction.

1.4 Research Objectives

To achieve the aim, the following research objectives are formulated:

- 1- To determine the impact of legibility on social interaction in neighborhood parks in planned residential areas.
- 2- To examine the types of social interaction that take place in neighbourhood parks.
- 3- To determine the relationship between park legibility and social interaction.

1.5 Hypothesis

The main research question in the study is:

RQ : How to improve the planning and design of parks in order to encourage social interaction in planned residential areas.

From the literature review (see Chapter 2 pg 13, 14), several authors' point of departures "PODs" referring to the main constructs of this study namely, a) improving the planning and design of parks and b) encouraging social interaction, were combined with each other to formulate new PODs without redundancy. This process aims to refine the PODs in such a way to fulfill the knowledge gap identified in the problem statement (pg 3) which is the impact of neighborhood parks' physical attributes on social interaction, within planned residential areas. Then, a proposed explanation was made on the basis of the previous PODs, which is the research recommendation about how to overcome what is missing from the authors' works that do not support the context of this study (Ibrahim, 2012). Thus, the hypothesis as the proposed outcome of this study was formulated as follow: Legibility of parks influences the outdoors duration of residents which encourage social interaction (see Figure 1.1).

To improve the planning and design of parks

To encourage social interaction

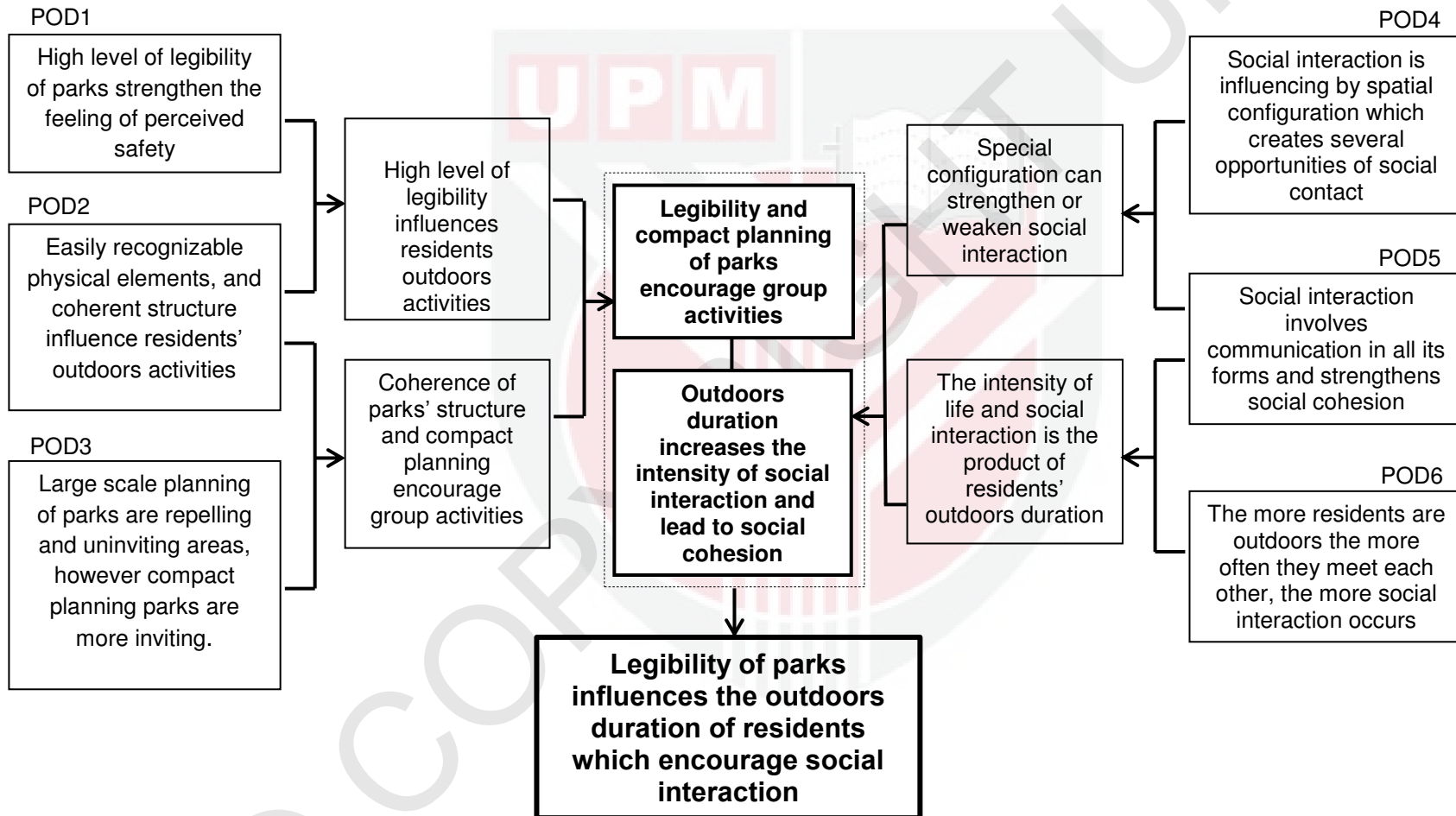


Figure 1.1 Combination of PODs
Source : Author

1.6 Scope and Limitation of the Study

This study is about how to improve the planning and designing of parks to encourage social interaction within urban residential areas. Therefore, the physical and functional aspects of two neighborhood parks in new residential precincts in Putrajaya that shape their legibility were identified, followed by measurement of their impact on social interaction. Thus, the study contains specific scope and limitations, as described below:

a) Legibility of parks:

Sense of place concept encompasses the psychological and physical aspects of human bond with their environment. This study emphasizes the physical attributes that affect a parks' utilization, more precisely, the park's legibility aspect. It is believed that park's legibility is one of the most important physical attributes that affect residents' outdoors activities (Gehl, 2009).

b) Neighborhood parks :

Public places as an important area for meeting and gathering include several kinds of open spaces. This study focuses on neighborhood park which is the most important social space for the development of social ties and resident's connectedness (Neal, 2003).

c) New residential neighborhood :

This study emphasizes on newly developed residential neighborhood rather than an older one, due to the sense of place for residents. It is obvious that sense of place increases with time in the mind of users. When several generations having lived in the same place, their public places are more integrated in their daily life. Thus, within new urban residential areas, the need to strengthen the sense of place is crucial.

d) The administrative city of Putrajaya:

The context of the study is the city of Putrajaya, the new federal government administrative center for Malaysia. The reason of this choice of study area is due to the Malaysian government's aim to create healthy urban environment. Thus, the city was planned as a model for other future sustainable cities in the country. Additionally, several studies proved the fact that it has underutilized parks even when considering their apparent well-design aspects (Moser, 2010; Siong, 2005).

Due to the large area of the city, two neighborhood parks were selected as the sample areas, chose among the major residential area with complete public facilities and advantageous environment for living. The first one in Precinct 8 with lower density and the second one in Precinct 9 with higher density, to examine the correlation between population density and the frequency of use of the neighborhood parks. However, due to the specific administrative nature of the city of Putrajaya, with a majority of Malay resident, it would be difficult to generalize the findings to the whole cities of Malaysia.

1.7 Reliability and Validity

In this study, to determine the impact of park's legibility on social interaction in a new residential neighborhood, a quantitative methodology was applied, which is suitable for descriptive research (Creswell, 2009). Therefore, questionnaire survey was adopted as the research strategy to describe the degree of the park's legibility and in turn measure its impact on the neighborhood's social interaction. This method permits generalizing from a sample to the entire population in such a way that will describe the characteristics of the larger population. In addition, a cognitive mapping exercise was conducted to confirm the survey results. For further reliability and to support the survey findings, qualitative data including notes and photos gathered from field observation was used to provide information on the real condition of the study areas.

Data gathered in this study was validated by several processes. Those include the content validation through the literature review, and the constructs validation through the support of data collection. The reliability was mainly done through the test of Cronbach' alpha applied on the data collection. Finally, the findings of this study were compared with the established theories and similar research findings for External Validation.

1.8 Significance of the study

The increasing sense of isolation among residents due to their modern lifestyle is accompanied with several social problems such as, the spreading of ethnic tensions, anxiety, lack of physical activity, lose of social bonds, and social cohesion in new urban residential areas. This research intends to inform the urban planning and design professionals, local authorities and related agencies on the value and the importance of park's legibility in new residential areas for the social well-being of the community. The results of this study will identify the legibility features of neighbourhood parks and its influence on the neighborhood's social interaction. It contributes to the development of the physical aspect of parks design in order to encourage more social activities among the communities. This can be achieved by giving special attention to the spatial and physical elements of parks, particularly its legibility.

The study is important for urban designers since it will allow them to improve the neighborhood parks' legibility in terms of becoming more responsive and ability to play their entire role as social integrator. The topic is significant in providing knowledge and specific physical features of neighborhood parks that can improve social interaction for a lively neighborhood. It can also give the local authorities and decision makers more guaranties about their investments in neighborhood parks with predictions of more social interaction among park's users for more attractive neighborhoods.

1.9 Research framework

Figure 1.2 shown below highlights the framework of this study.

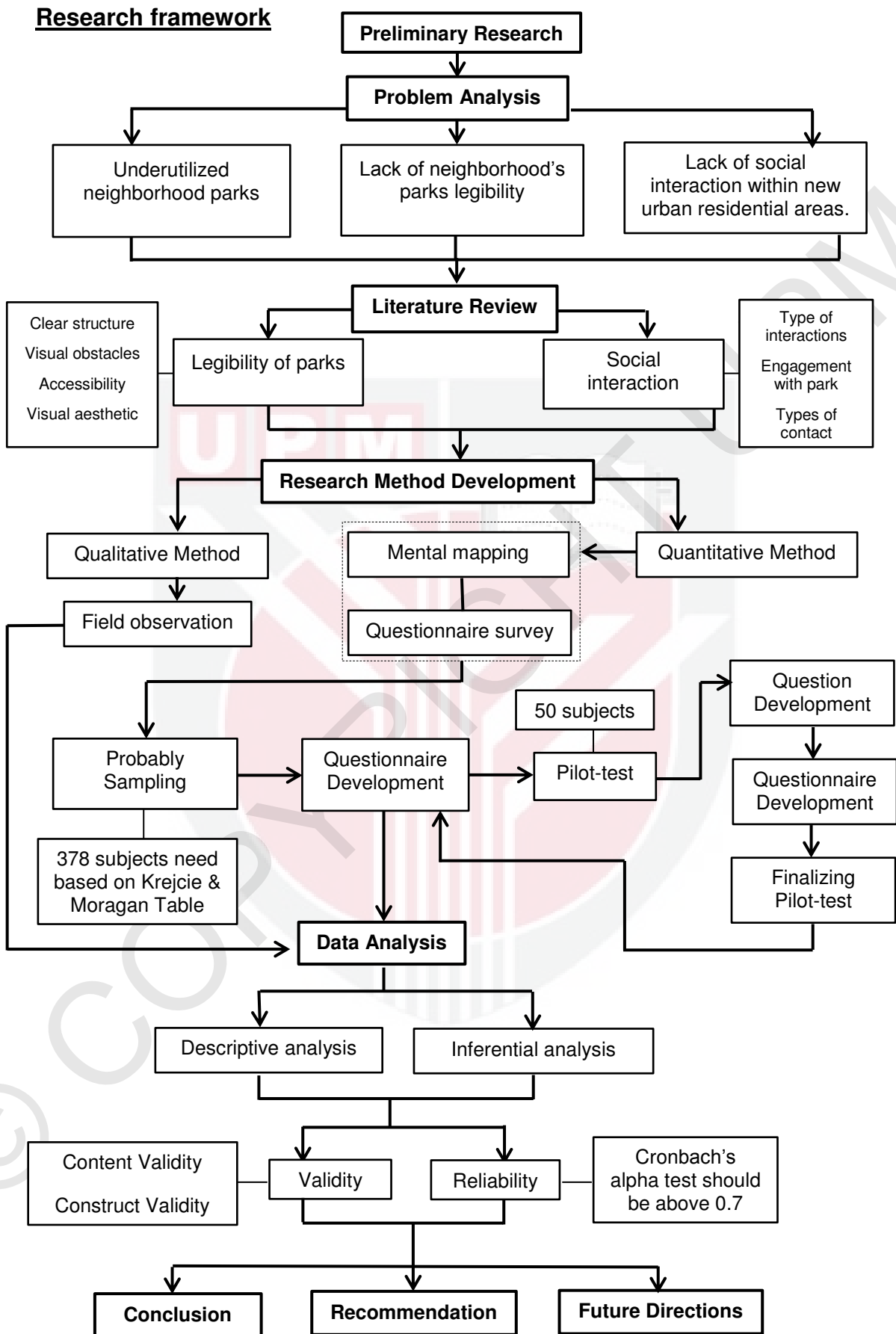


Figure 1.2 Research framework
Source : Author

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BIODATA OF STUDENT

Amine Moulay is presently a student in Master of Science (Urban Planning and Design), Faculty of Urban Design and Architecture, Universiti Putra Malaysia (UPM), Malaysia. He received his Bachelor of Architecture from the high school of Architecture and Urbanism of Algeria in 2002, then an equivalence of French Bachelor degree in the School of Paris-Val-de Sein in France in 2003. From 2003 up to 2012 he worked as an architect then a manager in his own company of building. To perform his skills of manager he decided to make a Master in business administration in the Algerian high school of Business then received his Master degree in 2013. The author's particular interest is in urban design specifically in the impact of the build environment on the citizen behavior. His academic aim is to develop an expertise on the neighborhood issues especially on the public infrastructures.

LIST OF PUBLICATIONS

ONGOING PAPER

Moulay, A and Ujang, N (2015). Legibility of Neighborhood Parks and Its Impact on Social Interaction in Putrajaya Residential Areas, Malaysia. Under review in ARCHINET; International Journal of Architectural Research.

