

THE APPLICATION OF MENTAL MAPPING TECHNIQUE IN IDENTIFYING THE LEGIBLE ELEMENTS WITHIN HISTORICAL DISTRICT OF KUALA LUMPUR CITY CENTRE

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ABSTRACT

Mental mapping technique has been used by Lynch (1960) in his study on the legibility of several American cities. However, there is no confirmation of the applicability of the mental mapping technique in studying the legibility of Malaysian cities. This paper discusses the applicability of this technique in identifying the legible elements of the historical district of Kuala Lumpur city centre. In a pilot study, 15 respondents were asked to sketch maps and images they recognise within the study area. Results indicate that landmark, nodes, district, path and edges are legible elements for historical district of Kuala Lumpur city centre. This is consistent with Lynch's identification of legible elements. It is found that the mental mapping is a reliable technique to record evidence of people's cognition of the area however respondents find it difficult to interpret the information or their knowledge about the district into drawings. The technique can be improved by restructuring the questions and providing guidelines of the context such as the boundaries and elements that are located surrounding the district.

Keywords: *Mental mapping, legible elements, historical district, Kuala Lumpur.*

1. INTRODUCTION

Asking peoples to draw mental maps has been a frequently used method to externalize individuals' environmental knowledge towards the city layout. Sulsters (2005) defined mental mapping as an individual's selective representation of their known world. Lynch (1960) studied legibility in three American cities by investigating how people structure the image of their environment through mental mapping technique. He found that people construct their mental maps through recognizing legible elements comprise of paths, edges, districts, nodes and landmarks. Here, legibility refers to the situation when people are at ease in understanding the layout of a place toward recall, recognize and organize features of the city into a pattern (Lynch, 1960). While Milgram (1976) and Yeung and Savage (1996) and Samadhi (2001) used similar technique to identify how people structure the layout of the city in various context. There are a few studies on the legibility of Malaysian cities using mental mapping technique. While the studies are focusing on identifying users' perception of place identity, there is no discussion on the applicability of the mental mapping technique used in their study. This paper discusses the applicability of the technique in identifying the legible elements in the selected context.

Shuhana (2004, p.63) found that insensitive intervention of new development affects the physical appearance and the legibility of the historical district in Malaysian urban centres. For example, the demolishing of historical buildings and replacement by high-rise buildings has changed the city skyline thus affecting its legibility. Recently, the diminishing of legibility of Kuala Lumpur city centre has been highlighted in Structure Plan 2020 (DBKL, 2004). This indicates concern of the local authority towards the physical and visual qualities of the city. The area selected for this study is a historical district in Kuala Lumpur city centre considering that the historical area is more legible than its modern counterpart (Bentley *et.al.*, 1985, p.42).

2. MENTAL MAPPING

Mental mapping originates from the field of science cognitive psychology (Sulsters 2005, Brettel, 2006 and McAndrew, 1993). Mental map is constructed from direct experiences and depended on the personal appreciation and values in their own lifestyles. Thus, every human creates its own version of mental map through the process of simplification, categorization, deletion, distortion and generalization (Sulsters, 2005). Mental maps are used for orientation and become more complex when a person gained much deeper understanding towards the area (Sulsters, 2005). Sulsters (2005) believed that people will become panic when mental map is unable to describe spatial familiarity and it will affect people orientation (as cited in Downs and Stea, 1973). Therefore, mental map is not a general convention map but, a map that represents the reality of territory that correspond to individual's familiarity. Sulster (2005) believes that this method enable someone to explore the identity of the area and allows researchers to study the interconnection of mapping levels as well as functional and cultural meanings.

Accordingly, Sulsters (2005) concurred with the idea that mental map is a proficient research instrument to visualize different maps of individuals within groups with specific characteristics. Researchers suggested that respondents should be those who are engaged with the area and comprised of three main groups included inhabitants, tourists and commuters (Sulster, 2005; Arefi and Meyers, 2003). They believed that different people will produce different mental maps, since these are personal and related to their own life-styles. However, similarity might appear between maps of people with a comparable lifestyle, age, interest or level of experience with the area. Mondschein, Blumenberg and Taylor (2005), McAndrew (1993) and Denis and Greenbaum (1991) claimed that the term cognitive map refers to the internal mental representation of environmental information. This representation is

symbolized by elements which are important in manipulating information collected from the environment and from individuals' own behaviour. Here, people recognized these elements as fundamental attributes of all features but this is also depending on their ability to organize these elements into a layout (Denis and Greenbaum 1991). Thus, McAndrew (1993) stated that the cognitive maps are normally in form of sketches which provide useful model in particular environment.

Gray (1998) defines cognitive mapping as a process composed of psychological transformations by which an individual acquires, codes, stores, recalls, and decodes information about the relative locations in his everyday spatial environment (as cited in Downs and Stea, 1973). Mondschein, Blumenberg and Taylor (2005) studies found that components of cognitive maps are comprised of basic geometric features such as points, lines, areas, and surfaces which representing objects in a physical environment. For example, points are stand for nodes and the major point in mental maps are symbolized as landmark. Besides that, lines become an important feature in defining boundaries, edges and paths. In general, cognitive maps functions as layout which enables people to visualize the structure of that particular area. This layout is developed through recognizing elements that are gained from people experience, understanding and believe. It is found that the principle of cognitive maps is compatible with mental mapping in terms of its functions, process and outcome. Accordingly, this study used the term mental mapping instead of cognitive maps. Based on the above findings, it is discovered that the components of mental maps are similar to legible elements generated by Lynch's Theory of Legibility. The need is to examine its applicability to other context such as Kuala Lumpur.

3. APPLICATION OF MENTAL MAPPING IN URBAN LEGIBILITY STUDIES

During the last sixteen and seventeen century, researchers developed the notion of mental mapping as an instrument of to identify how people structure the layout of an environment in various context. Sketch map has been used by environmental psychologists and geographers as primary method of data collection. Drawing from the work of Milgram (1976) who explore the way in which Parisians represent their city. This study examined the image of Paris through mental mapping technique. It began with selecting 218 subjects to draw for 20 subdivisions of French administrative district of Paris. Then, subjects were required to reveal and illustrate their maps with the elements within the city which came to mind as well as monuments, squares,

neighbourhoods, streets, or whatever elements spontaneously occurred to them. Further, they were asked to produce their own sketch that expresses their personal views of the district. Next, the subjects were asked to identify each of the elements using number as they drew it on the spot. The data was then analyzed according to the categories which include identifying fifty elements most frequently mentioned, mental links to twenty stimulus locales, recognition of Parisian scenes, identify least known areas of Paris correspond to subdivision and studying the social perception towards the city.

Blades (1990) attempted to validate the applicability of the technique and the reliability of the sketch maps. His study took place in a university where the subjects were required to draw two different maps in a same study area but on different period of time and in different instructions. The process involved the collection of one map at one point time. Total 109 subjects are students from psychology course in an average of 20 years old took part in the experiment. In concurrence with the process of mental mapping, no clues will be given to guide the respondents and they were required to complete the sketch maps within 20 minutes. Later, subjects asked to follow a set of instruction through projecting the question on a large screen. Each subject was provided a white A3 size paper and they were free to use any drawing material which he/she wanted. Blades (1990) found that subjects tend to draw maps with route and majority of the respondents were using symbols to represent landmarks. Blades (1990) believed that the detail of sketch maps depend on the individual's familiarity towards the area. In the other words, the more familiar a subject with the site, the more detail is the sketch map. The study will examine the mapping process to understand its suitability to the local context. In this study, mental mapping technique is used following the detail processes adopted by Blades (1990) to ensure that the sketch maps are reliable to represent the people mental representation of the historical district of Kuala Lumpur.

4. LEGIBILITY

Legibility is defined as the ease with which city layouts are understood towards recall, perceive and organizes the elements into a pattern (Lynch, 1960, p.2 and McAndrew, 1993, p.37). According to Brettel (2006, p.14) and Lynch (1960, p.6), the legibility process is dependent on mental representations of a city by its inhabitants which involves two-way process between the observer and the environment. Lynch's research was based on three major metropolitan

cities throughout the United States which are Boston, Jersey City and Los Angeles. He studied how people perceive and organize spatial information as they navigate through cities. The research methods used are questionnaire surveys and interviews, along with the drawing of sketch maps. Lynch (1960) developed and utilised a form of content analysis to underline repetitive elements found in the maps. Lynch's findings revealed that people use five key elements when constructing a mental map: paths, edges, districts, nodes and landmarks. These urban elements usually dependent and always overlap between them to serve as a network in producing layout of the cities (Milgram, 1976). Based on (Lynch, 1960), the elements are described as the following :

1. Paths are routes or channel within the city which people regularly, rarely or frequently move and it's comprised of street, walkways, rivers, and railroads or canals. Paths are the predominant elements in people image because when someone explores it, the linking of the others environmental elements will be arranged into a setting.
2. Edges are linear elements serve as divider lines between different parts of the environment. These are horizontal references and it could be barriers that are more or less penetrable. This barrier could be a demarcation lines or linear breaks in continuity forms between two regions that might be related and joined together. It's could be a shorelines, walls, hedges, or legal boundaries are typical examples of edges. Edges are important for people to arrange elements within the boundaries.
3. Districts are medium to large sections of a city that visualized in two-dimensional. Always identifiable from inside, so a person should mentally enter and imagine the area. District is an area which recognizable as sharing similar characteristics.
4. Nodes are strategic points in the city which enable people to enter and serve as transfer points for travelling to and from places. They consist of junctions, places of a break in transportation, a crossing or convergence of paths, moments of shift from one structure to another. Besides that, nodes may be simply concentrations of some use or physical character as well as enclosed square.
5. Landmarks are another external point-reference where the observer does not enter the area. They are defined as physical object such as buildings, towers, mountain, statues, fountains and etc. people frequently depending clues such as identity and structure to guide them within an area. that are unique, prominent, and important.

5. METHOD

This study examines the mapping technique used to determine urban legible elements as categorised by Lynch (1960) for Kuala Lumpur city which possesses different geographical, social and cultural characteristics. According to Yin (1994) a research that needs confirmation, challenge or extend theory, a single case is the most rationale. A single case study approach had been used to examine the applicability of mental mapping technique.

Pilot study was carried out to understand the data collection process. Face to face interviews were conducted within a period one week starting from the 6th to 12th April 2009 and from 8.00 am to 8.00 pm. Interviewers were required to walk within the study area and asked respondents to co-operate in producing the mental maps. The respondents were asked to draw mental maps of a selected historical district within the Kuala Lumpur city centre (refer to Figure 1). To determine the sample size, a reference is made to Lynch's (1960) who conducted the mental mapping with 30 respondents in Boston and 15 respondents in Jersey and 15 respondents in Los Angeles. Milgram (1976) studied 20 districts in Paris with each district comprised about 11 respondents to represent every district. Based on the above strategy, 30 respondents should be selected to represent the area. However, results presented in this paper are based on a pilot study involving 15 respondents who are the users of the district at the time of the fieldwork and familiar with the district. The respondents are categorized into 3 composite groups: residents, workers and commuters (Arefi, 2003). The residents are those who live in the area for at least 2 years. The workers are users who work on the daily basis in the area such as the shopkeepers and officers while the commuters are represented by those who visited the area at least once a month. The respondents are aged between 19 to 55 years old and 9 of them are male respondents.

The mental mapping exercise is conducted systematically by recording one map at one point in time from each subject as adopted by Blades (1990). At first respondents were given structured questionnaire and pen. They were asked to draw a sketch map and fill in their personal particulars. In order to get direct and spontaneous responses from the subjects, the time of the process is limited to 20 minutes (Blades, 1990) The interviewer also conversed with respondents and note down any others additional information mentioned by the respondents. The respondents were also asked to write down or mention the elements that they recognise within the study area. The mapping process is observed to understand how they react to the exercise and issues that are raised during the time of the interview.

In analysing the data, the frequently mentioned elements are listed using Microsoft Excel and sorted from 'a' to 'z' alphabet. Then, all the elements mentioned and sketched by the respondents are filtered and placed into groups according to categorisation made by Lynch (1960). These elements are grouped into 5 : paths, edges, districts, nodes and landmarks. Elements that are located beyond the boundary is grouped as others. For easy categorisation, these elements are listed in SPSS software using coding system. The legible elements are determined based on the frequency of mention and repeated sketching according to each category.

6. THE STUDY AREA

The characteristics of the study area include : (a) located within Kuala Lumpur city centre, (b) consist of historical significance, (c) endorsed as existing historic zone by Dewan Bandaraya Kuala Lumpur (DBKL), (d) demarcation of boundary is limited to district which should consist of paths, edges, nodes and landmarks. The area developed from the confluence of Klang River and Gombak River which is the starting point of Kuala Lumpur city. Following the morphological structure of the district, the boundary of the study area is demarcated by Klang River, Jalan Tun Perak and Jalan Tun Tan Cheng Lock. The area houses some of the early buildings, streets and public spaces of the city.



Figure 1: The demarcation of the selected historical district in Kuala Lumpur city centre

7. RESULTS AND DISCUSSION

The result indicates that the respondents mentioned a total amount of 60 elements. Altogether, 48 elements are located within the boundary and 12 elements are outside the boundary, as shown in Table 1. It was also observed that the respondents have the tendency to recognize the elements that they are familiar with and can be easily seen during the experiment. The legible elements included high-rise buildings, frequently used paths, regularly visited buildings, transportation nodes, and other significant and famous historical buildings. For example, majority of the respondents identified the high-rise buildings and transportation nodes that are close to the edges of the study area, which include Maybank Tower, Daya Bumi, post office, hotel, Puduraya Bus Terminal and Klang Bus Terminal. Meanwhile, 10 out of the 15 participants correctly placed Petaling Street (located outside the area) on their sketch maps after drawing the map of Jalan Tun Tan Cheng Lock. This indicates that people are very familiar with Jalan Petaling, a well-known shopping street located adjacent to Jalan Tun Tan Cheng Lock. The finding also suggests that the respondents also associated their cognition of a place with other stronger elements beyond a defined boundary. This informs the study that the construction of a linkage between the nodes influences their mental mapping. The finding can be used in developing more legible layout within the district in relation to the elements of the city in a larger urban context.

Table 1: 60 Identifiable Elements Mentioned Within and Outside Boundary

Elements located within boundary	Elements located outside boundary
Jalan Tan Cheng Lock, Jalan Hang Kasturi, Jalan HS Lee, Jalan Silang, Jalan Tun Perak, LRT Masjid Jamek, gold smith street, Gombak River, Klang River, banking area, commercial area, transportation hub, 7-Eleven, beef ball mee shop, boutique shop, bus stop Medan Pasar, bus stop Bangkok Bank, bus stop in front Mydin, bus stop next to Mydin, car park next HSBC, coffeeshop, confluence river, HSBC bank, Jukebox, McDonald, photo shop, Sin Nam Coffee shop, Stamford College, Wing Wah watch shop, Bangkok Bank, Cahaya Suria, Central Market, clock tower, Hon Ming building, HSBC Bank, HSBC headquarter, Kota Raya, M.S.Ali Pharmacy, Masjid Jamek, Mydin, RHB Bank, S & M building, Sin Tze Ya Temple, Sinar Kota, Wisma Fui Chiu, Wisma Hamzah and Wisma Heng Sam.	Bus Terminal Klang, Daya Bumi, Guardian, Hotel, LRT Pasar Seni, Merdeka Square, Nando's, Maybank tower, Puduraya, Watson, post office, Jalan Pudu, Jalan Petaling.

Source : The Author (2008)

This study has identified the top 18 legible elements within the district through mental mapping exercises. They are also comprised of objects located within and outside the boundary. Results shown in Figure 2 indicate that all respondents (15 nos.) mentioned the commercial activities and the Central Market as elements that they first identified in the area. In the early time, Central Market functioned as food storage and after independent becomes a fresh market which mainly supplying foods for Kuala Lumpur residents. The building is currently serves as cultural and art centre. The finding suggests the significance of commercial centres as activity nodes and identifiable market buildings as place marker in the district. The lowest mentioned objects sketched by 4 respondents are Cahaya Suria building, HSBC Bank, HSBC Headquarter, Masjid Jamek and transportation nodes.

3 of the most identifiable paths are Jalan Tun Tan Cheng Lock followed by Jalan Petaling, Klang River and Jalan Tun Perak. However, 10 respondents identified Puduraya Bus Terminal although this transportation hub is located outside the boundary. This indicates their strong mental association with the bus terminal. However, result from the mental mapping indicates that the transportation hubs do not recognisable as elements that contribute to the character of the district despite their functional importance. 6 respondents identified banking area as the elements that make the place recognizable. This can be associated with the existence of several banking institutions such as HSBC Bank, Bangkok Bank and RHB Bank. 8 respondents identified with Maybank tower situated next to Jalan Tun Perak because it is an iconic building with unique architectural style. Here, the respondents' mental map is influenced by building scale and function. Even though Masjid Jamek is well known as one of Kuala Lumpur's historical buildings and nodes for religious practices, only 4 respondents recognized this element in their map. This can be because the building and together with other lower-rise historical buildings in the area are hidden by the existing high-rise buildings surrounding them. This finding can be linked to the results shown in Figure 2 indicating the respondents identified modern buildings more frequently than the historical buildings. It can be inferred that the diminishing of the legibility of the historical district is caused by new developments that are not in harmony and unfit to the existing scale and morphological structure of the historical district.

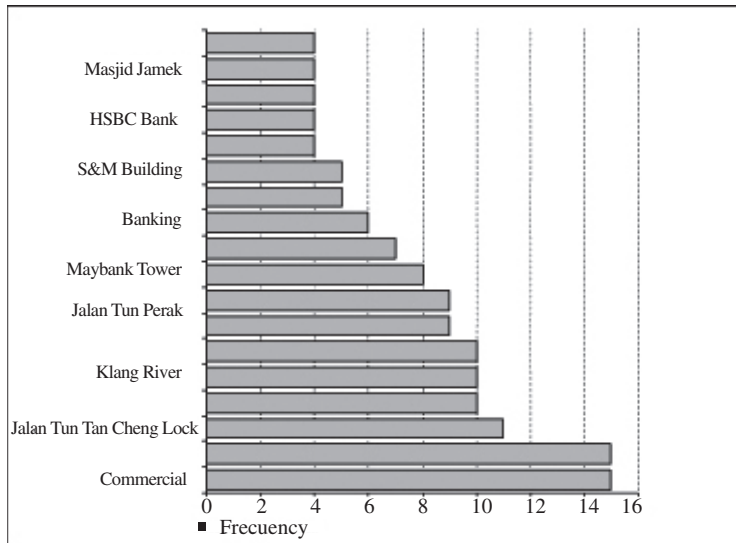


Figure 2: Top 18 Legible Elements Identified through Mental Mapping Technique (Source : The Author, 2008)

Categorisation of the legible elements gathered in the study is consistent with Lynch five legible elements stated in *The Image of the City* (1960). Those are paths, edges, districts, nodes and landmarks (refer to Figure 3). Four frequently mentioned paths are Jalan Tun Tan Cheng Lock, Jalan Hang Kasturi, Jalan Tun Perak and LRT Masjid Jamek. As the main connecting roads, Jalan Tun Tan Cheng Lock and Jalan Tun Perak are identified as more legible. Respondents acknowledged these paths due to the influence of buildings along the path and its surroundings as nodes for shopping attraction or workplaces. This supports the paths as active channels for pedestrian movement. Edges are defined by Jalan Tun Tan Cheng Lock, Jalan Tun Perak, Klang River and Gombak River. Landmarks include the Central Market, Banking Towers and major shopping complexes. The district is mainly characterised by the commercial areas and banking institutions.

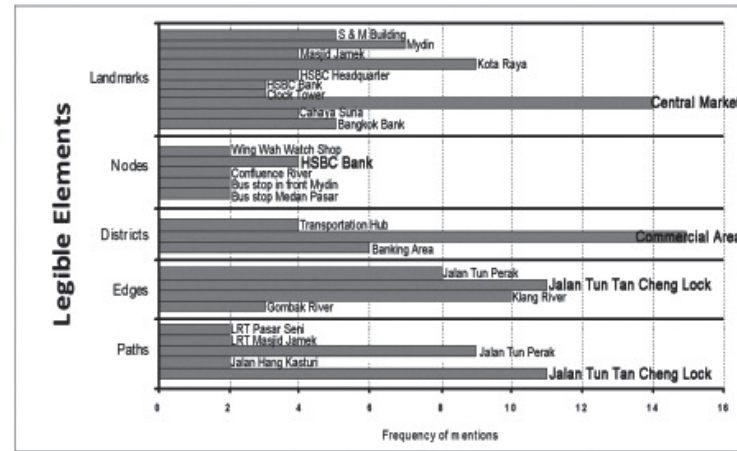


Figure 3: Result of Legible Elements according to Categories (Source : The Author, 2008)

8. THE MENTAL MAPPING PROCESS

The interview process began with explaining the purpose of the study and delivering the instructions or questions for mental mapping exercise to the respondents. Based on the pilot study, it is found that the existing instruction for mental mapping exercise generated by Lynch (1960) cannot be easily understood by the samples that explanation on the meaning of the statements was acquired by the respondents. For example, an instruction “...Make it just as if you were making a rapid description of the city to a stranger, covering all the main features....” is not easily comprehensible. The statement is then changed to “...Please draw or write anything that you remember (streets, buildings, features) within the mentioned boundary...”. This instruction is more specific with regards to the exercise and respondents are free to choose whether to draw or to write according to their convenience, capability and the ease of using both techniques (drawing and mentioning) simultaneously. Therefore, the instruction should be made simple and easy to understand. This is more appropriate to the general public in the context selected with consideration of their level of appreciation of urban elements and personal background.

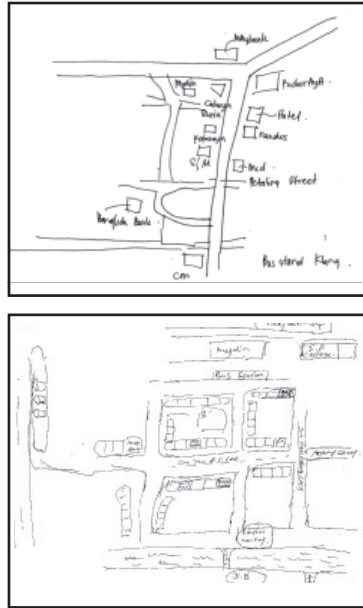


Figure 4 : Examples of mental maps produced by the respondents

Following Blades (1990), in the process of mental mapping, no clues will be given to guide the respondents. This is to ensure the interviewer does not influence the mapping. However, it was observed that respondents acquired for some indications or examples of the types of elements written in the instructions. This may suggest the difference in the level of understanding with regards to the content of the statements and verbal instructions. To ensure the reliability of the technique and considering that the respondents tend to draw the elements that are closely located to where the respondents are interviewed and visually captured during the time, it is suggested that each street should be represented by at least two samples instead of one (as used by Blades, 1990).

To increase the respondents' cooperation in the mental mapping exercise, the strategy for the locations of the interview should be considered beforehand. The places should provide convenience and comfort for sitting, talking and drawing such as restaurants, bus station, spaces along building edges and shaded areas. The physical comfort during the process is to be considered in the hot and humid weather. It is found that older people (who potentially have longer period of attachment) and have daily commitment or work in the area such as street vendor and shop owners were more cooperative and able to respond to the exercise well. They produced more complete drawings of the elements sketched. Blades (1990) found that subjects tend to draw maps with route and majority of the respondents were using symbols to represent landmarks. Similarly, the sketch maps show that respondents were likely to identify main roads and river to demarcate two different areas which have dissimilar characters. This indicates that respondents are able to estimate the boundary (edges) of a district which defined by roads and river. In addition, the elements of edges were also identified as paths when both of these elements are used as routes linking one place to another. However, it was hard for the respondents to imagine the boundary of the district which is not the case to Milgram's (1976) study on the legibility of Paris city.

9. CONCLUSION

The study has identified the legible elements of the historical district in Kuala Lumpur city centre through the application of the mental mapping technique. Identification of legible elements is depending on respondent's experience, familiarity and visibility of the objects. However, it is evident and also agreed by (Blades, 1990) that the ability of person to draw is different and always resulted in some elements may not be recorded in the map. This will affect the accuracy of the result. To increase the reliability of the sketch, length of engagement and familiarity with the area should be included in the selection. This will help getting respondents that have stronger mental association and attachment with the area, greater memory of the elements thus potentially produce more acceptable sketch maps. This paper concludes that mental mapping can be used as a reliable technique in examining place legibility of historical district of Kuala Lumpur city with improvement in the structure of the mapping instruction, the location of the interview and the sampling criteria.

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