Rethinking Urban Public Space: Physical and Functional Analysis through Visual Surveys

N Abdul Rahman¹, I Ghani¹, M Z Teh¹ and K A Ibrahim¹

¹Faculty of Architecture, Planning & Surveying, Universiti Teknologi MARA, Malaysia

Corresponding email: norha776@uitm.edu.my

Abstract. Pedestrian-friendly, liveable, sociable human scale and fun urban environment are the qualities for good cities. Human activities will happen in urban public places if cities can offer choices for people. Increasing the use of the spaces in an urban environment through human activities can turn urban spaces into becoming “places” that is crucial to create good cities. Urban spaces should cater the functional, social, and leisure needs of people. It has positively related to a sense of community that contributes to the identity and image of the city. Therefore, urban street planning and design need to emphasis more on crucial aspects such as the physical, social, cultural, economics and pedestrians to create an urban street environment that is attractive as a destination for economic and social activities. This paper aims to propose and discuss optimal design solutions for a better urban street environment in Ipoh old town, Perak. The objectives are 1) to identify nodes and linkages, qualities of place and fabrics of the spaces and; 2) to determine relationships between the quality of the physical environment of the street and social activities that contribute to the use of the spaces. The study adopted a qualitative methodological strategy. Visual surveys were used to observe the relationship between the physical urban environment and the users’ activities in Ipoh old Town, Perak. Field observation was conducted to gather evidence focusing on the functional aspects of the actual scenes of the place through physical and activity mapping. This study has found that the relationship between the physical environment and the users’ activities significantly influenced the quality of place and fabric of the Ipoh town and in turn, contribute towards reimagining identity of Ipoh as a prominent heritage town.

1. Introduction

In Malaysia, urban planning and design still lack the emphasize on crucial aspects such as the physical, social, cultural and economic and providing priority to people on foot. It has resulted in an urban environment specifically on streets that are unattractive as a destination for economic or social activities that cause failure to create the image of the city itself. This paper aims to propose and discuss optimal design solutions for a better urban environment in Ipoh old town, Perak. The objectives are to identify nodes and linkages, qualities of place and fabrics of the town and to determine relationships between the quality of the street environment and social activities. It will contribute to an attractive street environment that can increase the use of the spaces in the urban environment through human activities and can turn urban spaces in becoming “places” that bring the significant image of Ipoh city.
2. Literature Review
The rapid growth in the cities has a tremendous influence on the relationship between urban users and the social spaces [1]. The needs and perceptions of the users are different from other street users in other countries. The presence of a variety of people and activities on the street affect the liveability of the city [2]. A well-designed of urban spaces that meet the actual needs and preferences of urban users are the most important quality and should be given more attention in order to create a successful urban space [3]. Urban spaces become “places” through human activities, urban space is a sense to its users and user belongings to space increase.

Good cities are places of social encounter [4]. The qualities of good cities comprise of the physical environment qualities; the activities and functional qualities; and the social qualities of urban spaces. The actual needs of the urban users are the most important quality and should be given more attention in order to re-evaluate the quality and design of the space over time and to create a successful urban space [3]. Quality of place and fabric of the town do contribute to place identity and ultimately to self-identify, health, sense of community and sense of place that gives the users sense of distinctive character; satisfies important functional needs; evokes emotions or feelings; and is served as reminders of personal accomplishments and concerns. The character of the urban spaces varies according to the purpose and function of the location, physical form, and appearance, socioeconomic and cultural characteristics of the user as well as the inhabitant [5]. The actual needs of urban users are the most important quality in order to re-evaluate the quality and design of the space over time [6].

The categories of outdoor urban spaces are influenced by the quality and the character of the outdoor space [7]. Outdoor activities in open space can be divided into three categories namely necessary activities, optional activities and social activities [8][9]. The physical and functional qualities of the urban environment will influence the level of attachment to public places as a platform for activities and social interaction [10]. The physical elements and appearance play important role in making places more legible to users. The elements can be identified, organized and navigated by the users by the clarity of the urban environment in terms of its physical form and function [11]. Streets constitute a significant part of the public open spaces and are the most important symbols of the public realm [12][13]. For many urbanites, it is the streets that represent the outdoors [14]. People depend on streets for functional, social, and leisure activities; for travel, shopping, play, meeting, and interaction with other people; and even for relaxation [2][8][13]. The characteristics of the environment that are place-based and ones that are people-based; that is, some are a result of the characteristics of the physical environment, and others, a consequence of human actions and management [4]

3. Methodology
The study adopted qualitative methodological and strategy in data collection and analysis. Visual surveys were conducted to observe the relationship between the physical environment and the functional user’s activities in Ipoh Old Town. The methodology for this study is governed by the methodology adopted by previous research and the background of the study. There are many studies from the Western and European context that are related to the environment and behavior survey [15], users and pedestrian needs and preferences on open spaces [16][15] in his environment and behavior survey used a combination of observation of physical traces, observation of behavior and record analysis. Field observation was carried out to gather evidence focusing on the functional aspects of the actual scenes of the place through physical and activities mapping. According to [17], different groups of users may have different perceived environments. Therefore, approach to understanding the city and the criteria used for design must be different. [2][18] and [19] used direct observation in studying human behavior in urban space. This paper seeks to identify nodes and linkages, qualities of place and fabrics of the town and to determine relationships between the quality of the physical environment of the street and social activities in Ipoh town. There are two complementary research methods used, field studies and a visual survey.
3.1. Visual survey

The visual survey technique was conducted to record the physical characteristics and the qualities in urban environments and to study human activities in urban spaces. [15] and [16] employed observation techniques to collect data on the behavior of the users on the street and to understand the relationship between the temporal and spatial form of the physical setting and to examine how people used the streets. Behavioral mapping was applied to link the design features of the setting with behavior in both time and space. The techniques used by [15] were employed to look at the users’ activities in the urban commercial street. The observation include the type of activities in the city such as street activities, location and its conditions using photographic recording and mapping. In the field observations, two main pieces of data are sought (Table 1).

| Framework of observation and techniques of recording information | Method | Elements                        |
|-----------------------------------------------------------------|--------|---------------------------------|
| Periodic observation, photographic and field notes               | i. Street activities  |
|                                                                  | ii. Uses and activities |
|                                                                  | iii. The type of activities and its location |
|                                                                  | iv. Physical characteristics |

3.2. The study area

Ipoh is the capital city of Perak. Ipoh is popular as a tourist destination and has been significantly boosted by efforts to conserve its British colonial-era architecture. The Ipoh city is also well known for its cuisine and natural attraction. The study area is selected because it is identified as one of the main traditional streets in the Ipoh city centre due to its inherent socio-cultural stronghold and historical significance, high concentration of shoppers, visitors and pedestrians which has been dedicated for urban revitalization initiatives. The streets chosen for this research are Dato Sagor Street, Panglima Street and Market Street located in Ipoh City (Figure 1).

Figure 1. Map of the study area
4. Findings and Discussion
This section discussed the factors that make people use the street, which contributes to a successful urban environment in city centre.

4.1. Nodes and linkages, qualities of place and fabrics
In creating functional urban open spaces, the quality of urban open space has been proved to provide positive social activities, psychological, and economic benefits that contribute to the sustainability of urban development. The qualities of the nodes and linkages in the urban environment contribute to right urban setting for urban dwellers.

Based on observation on site study (Figure 2), there are significant qualities of place identified that bring to the good urban environment and to the users that create nodes for behaviour setting. Observation shows that attraction was shown to be an essential factor that can persuade people to use the street. Attractive streets in urban areas in producing the feeling of comfort or well-being to the users are categorized in terms of physical, social and cultural [7] It is strongly associated with the mixed-use of streets, a variety of activities and good places with buildings and architectural features [7].

The findings of this research show that functional factors are the strongest form that contributed to the use of the street rather than physical factors. Based on observations on the site, the most vital generators are business and commercial activities. It was also found that results from the observations survey on the activities in site are found that nodes of activities are more focused around shopping areas. People meet friends together, then enjoying food in restaurants or shopping together. The presence of outdoor cafes and restaurants that provide wireless internet and air conditioning make the place suitable as a meeting place for people. From site observation, it is observed that the people use the places for sitting,
meeting and walking where is found that most of the social activity appeal is passive contacts like seeing and hearing.

Quality of public spaces is one of the reasons people use the street. Ipoh has a rich public realm in which the shops, offices and restaurants offer leisure facilities to the public (Figure 3, Figure 4). There are needs for improvement of the public spaces in this area to provide potential communal space for users to socialize.

This is supported by some of the findings from the observation which found that Ipoh has many potential open spaces such as parking areas that can be converted into good public places (Figure 5, Figure 6, Figure 7, Figure 8). Most users who spend more time in outdoor spaces and involved more in outdoor activities are male group of users. This finding concurs with [20] who found that female is the minority group that use urban space. It was proven from observation that the presence of people and activities in a space can attract other people to use the space.
Proximity is also one of the important factors that a city should have in order to create a good urban environment. The presence in proximity in Ipoh contributes to an accessible street that gives pedestrians comfort of the street that helps the street users to move between and within the zones (Figure 9, Figure 10). [21] noted that 10 minutes (about 800 meters) is a comfortable walking time for the pedestrian to reach services and facilities. Therefore, the locations for the services and facilities, such as shops, public transport and other facilities should be located or situated within a 10-minutes walking distance.

Less congestion in the street plays an important role that makes people use the street. Congestion in this research can be divided into traffic congestion and pedestrian congestion, which contribute to the reasons why they avoid using the street. Pedestrian congestion is one of the main reasons people avoid using the street. This finding is supported by the findings from the observations along the street study. The feeling of crowding was also contributed by the speed of the people on street. People who walk along this street tend to walk much slower for shopping. Pedestrians walked much slower when shopping than for other trip purposes.

Public amenities are another factor that needs to be considered in creating a good urban space. Lack of public amenities is one of the main reasons people do not use the street. Facilities on the street such as street furniture and pedestrian facilities such as seating, signages, dustbins, telephones and toilets are among the attributes to create a convenient street. Proper maintenance and cleanliness of the street is another factor that users need most on the street. Based on the observation on the site studied, it was proven that there were some areas along the street that was not well maintained and were poor in terms of cleanliness. This not only gives a bad impression and bad views to the street users but also creates the feeling of a lack of safety and discomfort to the street users.

Freedom of action in public space is one of the important factors that contribute to a good space. Freedom of action is related to spatial rights, as, according to [11], it is related to behaving freely in a
place. The feeling of self-belonging with the street increases the social interaction in the public space. The level of caring for each other contributes to the use of the street. Meeting personal needs also contributes to the freedom of action that relates to the use of the street. Freedom of action is also about satisfying personal needs [22].

4.2. Relationships between the quality of the physical environment of the street and social activities that contribute to the use of the spaces

Social activities are defined based on user’s activities in urban environment and then classified according to behaviour setting. Therefore, quality of the physical environment of the urban space and the activities and behaviour are strongly related. This was proved by [7] in that there is a strong connection between the qualities of the physical environment on site. The increase in environmental quality will give a boost to optional activities and at the same time will increase the social activities. In this study, there are three main qualities identified that significantly contribute to the use of urban space. These qualities are safety and security; comfort and convenience; and accessibility. These findings concur with much of the literature such as in [7] and [21], which not surprisingly stresses that safety is an important characteristic for street life and to attract people to use a street.

Safety and security attribute that are identified as being the most important that contribute to the use of the urban space. Based on the observations on the street, increasing pedestrian visibility by placing windows, doors and “eyes on the street” can increase the pedestrian’s sense of security on the street and at the same time increase the number of people using that place. [14] suggested that in creating a safe environment there must be eyes on the street who act as natural surveillance upon the street, the buildings along the street must be also oriented to the street and the street must continuously have users on it in order to increase the number of surveillances on the street. This theory is supported by [19] and [20] who stressed that the design of space on street level and building facing the street make people using the street feel safer. Previous study found that safety and security attributes that were identified as being the most important from respondents’ perceptions were “the presence of police surveillance”, “free of accidents and low crime statistics”, “safe crossing devices”, “safe environment for the elderly, disabled and children” and “free of the presence of anti-social behaviour” [3]. As highlighted by [7], safety is an important characteristic for street life and to attract people to use a street. Safe crossing devices are the facilities most needed in an urban street. The findings are confirmed by [23] who mentioned that making pedestrian crossing safe, comfortable and more frequent is one of the important elements in creating user-friendly street.

The findings from observation indicate that being “free of pollution, noise, poor smells and vibration” are the main attributes under comfort and convenience quality that contribute to a user-friendly street in the context of site study. The research also reveals that covered ways and shade and other protection from the sun and rain affects the level of comfort and the convenience of the street. The use of outdoor space is strongly related to the environmental microclimate. Observation shows that even though the facilities provided are safe, comfortable and sufficient, but if the urban environment is not conducive, people will not use the place. The finding proved that social activities could only exist in places that are conducive and safe to them. The need for shade and shelter is essential to reduce the heat and mitigate the effects of the climate in an urban area. The planting of greenery and trees in case study area needs to increase if the environment is to improve for users. The findings confirm the theory that in urban areas, there is a strong relationship between microclimate conditions and the use of open space [14][17] [24].

Another important quality that open space must have to make it successful space is accessibility. Findings indicate that accessibility and proximity are important criteria for street users in order to encourage them to use the street. The findings also indicate that easy access by foot attracts more people and increase activities on the street. “Easy to get by foot” is based on several criteria and is a basic requirement for people [11][14] and [22]. It is dependent on the conditions of the walkway, well connected to path, services and facilities, wide, flat footways and no clutter blocking pedestrian movement (Figure 11, Figure 12).
It is also relate to a safe environment to the pedestrian, especially people with disability. The research also reveals that the main aspects contributing to the ease of pedestrian movements are the conditions of pedestrian walkway (also related to maintenance), the presence of elements (clutter) and the material used for the pavement. Observation shows that the street has not been designed to be friendly for pedestrian especially for people with disabilities. Most of the finishes used have not been carefully selected and arranged to ensure safety and unobstructed access for all. Furthermore, the location of signage, dustbins, phone booths and other street furniture along the pedestrian walkway create clutter for pedestrians to walk unimpeded. The width of the pedestrian walkway also affects the feeling of comfort in using the street.

Based on observation, some of the areas in site studied have narrow sidewalks that may cause danger to the pedestrian and make it less accessible. Continuous pedestrian linkage, location of street furniture, the design of pedestrian walkway and maintenance must be easy for the pedestrian. Continuous pedestrian linkage along the street is essential, as per mention in [25] the obstacles as having to cross from one zone to another make it difficult and can give danger to the pedestrian to walk or conduct activities. It has also found that easy to get to by foot, where there are shops and other facilities within walking distance, can attract more people, and, at the same time, increase the activities on the street. Observation shows that inaccessibility by foot also increases the number of cars on the street.

5. Conclusion
This paper highlighted physical and functional qualities analysis through visual surveys that make Ipoh one of good cities in Malaysia. It examines these qualities from three broad aspects, that is the socio-cultural, behavioural and the physical attributes to suggest an excellent model of a sustainable city for the future, especially those in the developing nations. From observation it was found that the urban form of the old towns displays an exciting pattern of urban living which integrates the essential parts of life such as social-cultural activities within an ensemble that responds to the behavioural pattern in terms of design. It was discovered that the qualities; attractions; the presence of public spaces, activities; proximity, and level of congestion are important factors that make people use the urban spaces. There are also other supportive factors that users need in the street that can contribute to a good urban space. The factors are the presence of public amenities, maintenance and cleanliness and freedom of action. This study has found that the relationship between the physical environment and user activities on the street, significantly influenced the quality of place and the fabric of the cities and in turn, contribute to a strong image and identity of the place (Figure 13, Figure 14).
Findings of this study will contribute towards reimagining identity of Ipoh as a prominent heritage town. The research has examined the relationship between the physical qualities and activities of the urban street from the perspectives of the users’ needs and perceptions in Ipoh. The finding of this research shows a significant correlation between the criteria of physical characteristics with the social activities of the street in the urban area in the street in Ipoh city centre. The finding found a positive relationship between physical qualities of the street with the activities on the street. Positive perception towards safety, comfort and accessibility for walking in urban environment will be related to high levels of walking activities. Urban designers are highly recommended to investigate the activities in the urban spaces in order to exploit for future design. The model that could be developed from the traditional towns can be seen as a way in which the design and planning of the cities can be made more sustainable by creating a living city that enables the community to function effectively and allow for the fostering of cultural values. This may create a sense of place for future cities in developing nations. The findings fulfil the gap in knowledge by identifying the most significant users’ needs of a street based on the situation in Malaysia. A good street will facilitate the creation of a walkable environment that is seen as the most sustainable approach towards city planning and design in the future. This study has found that the relationship between the physical environment and user activities on the street, significantly influenced the quality of place and the fabric of the cities and in turn, contribute to a strong image and identity of the place. Findings of this study will contribute towards reimagining identity of Ipoh as a prominent heritage town.

References
[1] Rahman N A, Shamsuddin S and Ghani I 2018 Factors Determining Usability of the Streets Asian J. Behav. Stud. 3 73–80 [crosref]
[2] Appleyard 1981 Liveable Streets (Berkeley and Los Angeles, California: University of California Press)
[3] Rahman N A, Sakip S R M and Nayan N M 2018 A User-Friendly Shopping Street Asian J. Qual. Life 3 1 [crosref]
[4] Mehta V 2013 The street: a quintessential social public space (Routledge)
[5] Rahman N A and Sakip S R M 2014 Relationship between accessibility and safety criterias with the uses of the street: A case study of urban commercial street in Kuala Lumpur city centre Res. net
[6] Jansson M and Persson B 2010 Playground planning and management: An evaluation of standard-influenced provision through user needs Urban For. Urban Green. 9 33–42 [crosref]
[7] Gehl 2010 *Cities for People* (Washington: Island Press)
[8] Gehl J 2011 *Life between buildings: using public space* (Island press)
[9] Rahman N A, Ghani I, Bahaluddin A and Hussain N H 2017 The need for good social behavior through people friendly urban streets *Environ. Proc. J.* 2 469–77 [crossref]
[10] Ujang N 2012 Place attachment and continuity of urban place identity *Procedia-Social Behav. Sci.* 49 156–67 [crossref]
[11] Lynch 1981 *The image of the city* (Massachusetts: MIT Press)
[12] Carmona M, Heath T, Oc T and Tiesdell S 2012 *Public places-Urban spaces* (Routledge)
[13] Jacobs J 1961 *The Death and Life of Great American Cities* New York Vintage
[14] Jacobs 1999 *Great Streets* (Massachusetts: MIT Press)
[15] Marcus C C and Zeisel J 1981 Inquiry by Design: Tools for Environment-Behavior Research *JAE* 35 57 [crossref]
[16] Papionmou and Basbas 2007 Evaluation of Policy Measures and Infrastructure Provided for The Needs of Pedestrians in the City of Thessaloniki, Greece (Toronto)
[17] Rapoport A 1976 The Mutual Interaction of People and Their Built Environment ed A Rapoport (Mouton, Hague) *Socio-cultural Asp. man-environment Stud.* [crossref]
[18] Whyte W H 1980 *The social life of small urban spaces.*
[19] Mehta V 2007 Lively streets: Determining environmental characteristics to support social behavior *J. Plan. Educ. Res.* 27 165–87 [crossref]
[20] Sisiopiku V P and Akin D 2003 Pedestrian behaviors at and perceptions towards various pedestrian facilities: an examination based on observation and survey data *Transp. Res. Part F Traffic Psychol. Behav.* 6 249–74 [crossref]
[21] Burton E and Mitchell L 2006 *Inclusive urban design: Streets for life* (routledge) [crossref]
[22] Carr S, Francis M, Rivlin L G and Stone A M 1992 *Public Space* (New York: Cambridge University Press)
[23] LaPlante J 2007 Retrofitting urban arterials into complete streets 3rd Urban Street Symposium: Uptown, Downtown, or Small Town: Designing Urban Streets That Work *Transportation Research Board* *Institute of Transportation Engineers (ITE) US Access Board*
[24] Nikolopoulou M and Lykoudis S 2006 Thermal comfort in outdoor urban spaces: analysis across different European countries *Build. Environ.* 41 1455–70 [crossref]
[25] Latip A and Syala N 2011 *Contextual integration in waterfront development* (University of Nottingham)