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Surveillance by Design: Assessment using principles of Crime Prevention through Environmental Design (CPTED) in urban parks

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Abstract

This study is conducted to assess the perceived safety of the public during recreational activities in selected urban parks. The objective of this study is to define the Crime Prevention through Environmental Design (CPTED) principles and their safety elements that are significant in designing an urban park. The case studies include three different urban parks in the vicinity of Shah Alam City, which are Shah Alam Lake Park in Section 14, Recreational Park in Section 28 and SUK Urban Forest Park in Section 14. Several criteria of CPTED that could contribute to the better park design have been identified.

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Keywords: Urban park; users' perception; development component of CPTED; safety design principles

1. Introduction

Park is a space that has built as a place for recreational activities, social gathering, and to rejuvenate the people, especially to the urban dwellers from the routine hectic lifestyle. It is a place that should content us in term of supplying leisure through outdoor recreational activities, and provide comforting values in an outdoor environment.

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However, due to certain circumstances, a park is also a place where some crime incidence happened to occur. Even though it might have happened occasionally, the reduction of safe feeling to the users has lessened its value as a place that supposed to meet enjoyment and peace of mind to its visitors. To achieve this, physical layout and the design of urban park should follow the principle of Crime Preventive through Environmental Design (CPTED) that includes the natural surveillance, access control and territorial reinforcement (Department of Town and Country Planning, 2013). The complexity of social structure, environmental and physical factors contribute to the crime and fear of crime among urban community (Cinar et al., 2013).

Recent years, there are many researchers and practitioners in the built environment have given consideration on the importance of designing out crime within the planning and design professions, to the extent that the proper design and effective use of the built environment can lead to a reduction in the fear and incidence of crime, thus contribute to an improvement in the quality of life (S Yasmin et al., 2015). The objective of this study is to assess the CPTED principles and their safety elements that are significant in an urban park in Shah Alam city through the perception of the users. The current issues and problems that are affecting user's recreational activities in an urban park regarding the element of safety were investigated. This is to outline the suitable recommendations towards safety in the urban park for user's satisfaction during recreational activities.

2. Literature review

2.1. Planning guideline for open space and recreational area in Malaysia

2.1.1. Hierarchy of open space

- Urban Park: Area is more than 40 hectares that consists more than 50,000 size of population. The function of this park as recreation area for the resident of a district and it's surrounding for recreational activities sports and to enjoy the natural beauty
- Local Park: the area is more than 8.0 hectares to less than 40 hectares that can consist between 12,000 size of population to 50,000 people. Recreational area that housed some of the neighbourhood for recreational activities, sports and social activities of local residents.
- Neighbourhood Park: the size of area is 2.0 hectares to below than 8.0 hectares that can consist the people around 1,000 between 12, 000 people. Recreation area in a particular neighbourhood for recreational activities, sports and social activities of local residents.
- Special emphasis in the development of recreational area and open spaces includes providing good accessibility, traffic systems and circulation and proper used of garden furniture.

2.2. Safe city concept

According Kamalruddin (2004), the safe city can be defined as a city free from all threats of physical, social and mental. A city can be defined as a safe city as a city free of violence that destroy property and lives, free from the threat of destruction due to natural disasters and disasters, independently of social and moral decline of the population, and the city also is said to be safe of the accidents were of independently indoors or outdoors.

Safe City program has outlined a 23 approach of crime prevention involving local authorities the power to implement it. Strategy 1: Designing the Physical Environment under Research Crime Prevention through Environment Design Methods.

2.3. Implementation of guide of crime preventive through environmental design (CPTED)

According to Department of Town and Country Planning (2012), CPTED is the design principles that detailed out the effective physical environment that can influence human behaviour from involvement in crime, as well as to reduce the fear of crime. Hence, it can increase the quality of life.

CPTED Principles:

- Natural Surveillance – ensure that the environment are well maintained so that it could keep the safer surrounding
- Natural Access Control – vegetation design such as fence, flower bed, hedges, planting bed
- Territorial Reinforcement – segregation between public and private spaces
- Maintenance – park has to be maintained as to avoid criminal behaviour

Development Component of CPTED:

- Layout Design
- Access and Pedestrian Walkways
- Soft landscaping and urban design element
- Car parks
- Lighting
- Security devices
- Management and Maintenance

Many studies have shown that the use of the perfect design and construction environment that can effectively reduce the chance of crime and fear. CPTED concepts have been widely used globally to minimise the potential for that site to facilitate and support criminal behaviour.

3. Study areas

The selected urban parks that have been chosen to conduct this study are located within the vicinity of Shah Alam city. Shah Alam has been selected due to its suitability as it is one of the rapid growing cities in Klang Valley, and has said as one of the municipality that practiced integrated planning development. Thus, make it reliable to observe the development component of CPTED in its urban parks, and to assess the needs of user’s perceived safety towards recreational activities in an urban park.

Three public urban parks have been chosen for this study namely Shah Alam Lake Park, SUK Forest Park, and Section 28 Recreational Park. Shah Alam Lake Park is located in Section 14 nearby to the central business area. The size of this park is 43 hectares, and has been a focal recreational park among Shah Alam’s residents. SUK Forest Park is located in Section 5, and surrounded by residential areas. The size of this park is 29 hectares. The four hectares recreational park at Section 28 is likely served as an open green space due to its location within the neighbourhoods. Figure 1 shows the selected urban parks in the study area.

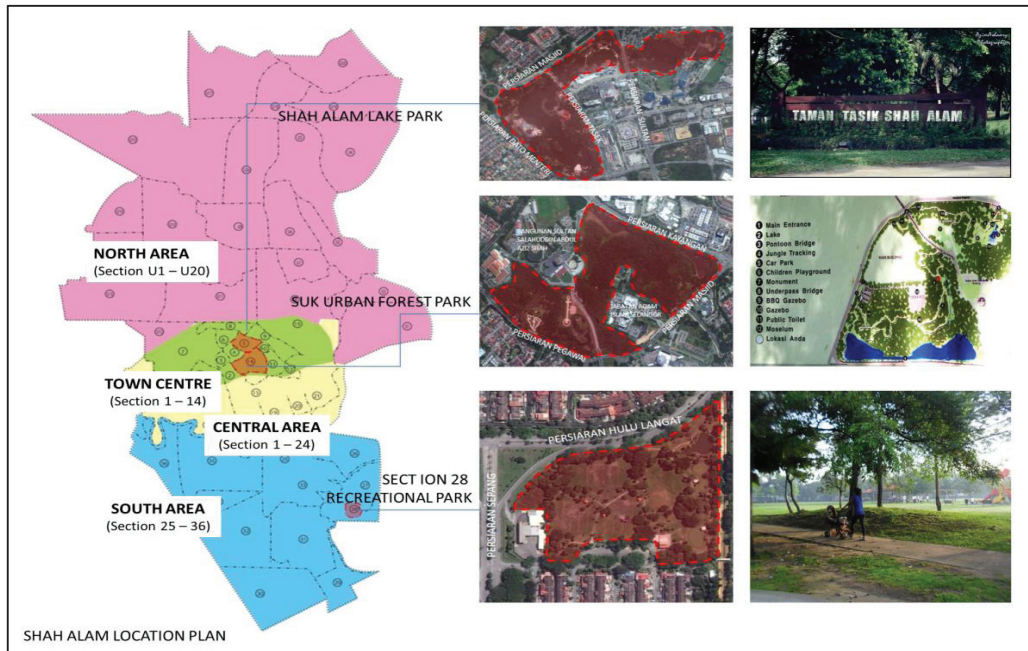


Fig. 1. Location of selected urban parks in Shah Alam (Source: Adapted and modified from Google Earth, 2015)

4. Methodology

4.1. Research design and data collection

To identify the component of CPTED principles that have been implemented in urban parks, the study used quantitative method where the assessment of the development component was investigated through the distribution of the questionnaires. The questionnaires were outlined based on certain criteria that emphasis the CPTED principles in order to get feedbacks from the users on the development components of CPTED that they believed have been implemented in the selected urban parks in Shah Alam city. The questionnaires were then distributed to the users’ to get their feedbacks and assess the implementation of CPTED principles.

The content of the questionnaires as follows:

- Part A categorised as ‘Respondent Background’ and listed variables consisting of general information on respondent information.
- Part B categorised as ‘Respondent Participation’ and listed five questions related to visitor information on their participation for recreational activities in urban park.
- Part C categorised as ‘Respondent Perception’ and consisted of 17 types of questions that related to the assessment of CPTED principles.
- Part D categorised as ‘Respondent Comment and Suggestion’ consist of overall perspective towards safety in urban park and its surrounding.

The sampling size of the respondents for this study was determined through the selection of the values for which the optimal sample size calculated according to population size and a certain margin of error and confidence interval required (Confidence Level is 95%, margin of error = 5%). From the calculation, the size of the population of Shah Alam residents were 541,306 people, therefore the number of respondents were determined as 384 people. The number of 384 peoples was then equally divided by three selected areas, where each area consists of 128 respondents. The selection of respondents were based on certain category; which mainly include the residents and users of those parks. The respondents were diversified through their age, gender, race and social activities that they are usually doing in the parks. This is to ensure the comprehensiveness of that the data collected in the site.

4.2. Data analysis

Data analysis for the questionnaire was done by using the common statistical software SPSS (Statistical Package for Social Science). All questions were individually analysed, taking into considerations all the available factors and supported with descriptive and inferential analysis. Analytic Hierarchy Model (AHP) to identify the best location that practiced the CPTED principles was used to analyse the collected data during site observation and through questionnaires.

5. Results and discussions

Generally, the overall findings for this study could be concluded as follows:

5.1. Development Component of Crime Preventive through Environmental Design (CPTED)

In general, the assessment of development component in selected parks could be summarised in Table 1 and Figure 2.

Table 1: The mean value of development component of CPTED in selected urban parks

| Development Component | Higher Mean | Best location that applies the component within the case studies |
|-----------------------|-------------|--|
| Design of park | 3.09 | Recreational Park in Section 28 |

| | | |
|-----------------|------|-----------------------------------|
| Lighting | 2.41 | Lake Park Shah Alam in Section 14 |
| Signage | 3.17 | Recreational Park in Section 28 |
| Visibility | 3.07 | Lake Park Shah Alam in Section 14 |
| Walkway | 3.20 | SUK Urban Forest Park, Section 5 |
| Seating | 3.33 | Lake Park Shah Alam in Section 14 |
| Parking | 3.50 | SUK Urban Forest Park, Section 5 |
| Landscape | 3.20 | SUK Urban Forest Park, Section 5 |
| Fence | 3.78 | Lake Park Shah Alam in Section 14 |
| Maintenance | 3.19 | Recreational Park in Section 28 |
| Entrance | 3.23 | Lake Park Shah Alam in Section 14 |
| Accessibility | 3.95 | Lake Park Shah Alam in Section 14 |
| Security patrol | 2.59 | Lake Park Shah Alam in Section 14 |

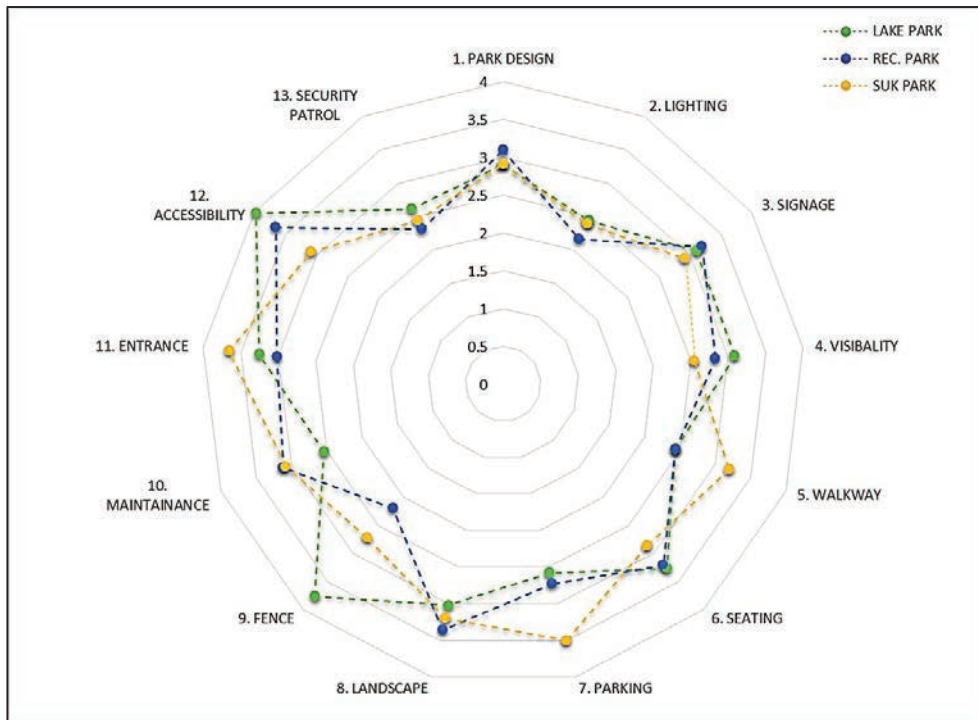


Fig. 2.The Analytic Hierarchy Model of the assessment on CPTED components in the selected urban parks

5.1.1. Design of the park

35.9% of the respondents expressed that current urban park design is at an acceptable level or garden design can still be considered as providing safety feelings for the users of the park. Most of the respondents believed that the design of the park should incorporate the safety design principles to reduce crime occurrence in an urban park.

5.1.2. Lighting

For the lighting category, the mean value is 2:41, which still has to be at the unsatisfactory level. The value mode is 43.8% of the 128 respondents agree that the lighting conditions around the park is less than satisfactory, especially at night, which encourages more incidence of crime especially during night time. This agreed with a study by Mohd

Riduan Ngesan et al (2013) where they found that lighting is one of crucial elements that give safety feeling during night time leisure activities in Shah Alam urban parks.

5.1.3. Signage

The mean value of the signage is 3.17 where 41.4% of the 128 respondents feel that the signage needs to be improved as it shows information of the overall park layout, visibility and accessibility. It could be useful if there are circumstances where it alerts users' on the wayfinding if there is any occurrence of bad incidences.

5.1.4. Visibility

The mean value is 3:07, where 41.4% of the 128 respondents indicated that visibility in Shah Alam Lake Gardens is located at the appropriate level. The other two parks need some improvements.

5.1.5. Walkway

Overall, the respondents believed the existing walkway was at unsatisfactory level and need some maintenance. They feel that good pedestrian walkway give comfort feeling during their recreational activities.

5.1.6. Seating

The seating is also one of the components that are included in the development of CPTED, which need to be considered especially the position of seating area that proposed at the location of very least potential of criminal incidence to happen. The mean is 3.33 where 34.4% of the 128 respondents said that the location of seating area needs improvement.

5.1.7. Parking

46.9% of the respondents indicate that the state of the parking area at an unsatisfactory level in terms of visitors' safety. This is especially on weekend where there is no ample parking space to cater all vehicles, therefore visitors need to parking their car far from the urban parks. This bothers them as they do not feel safety as they need to walk a bit far.

5.1.8. Landscape and vegetation

The above table shows the mean value is 3:20, where the landscape level in Shah Alam Lake Park is at an appropriate level which does not disturb the landscape and outdoor visibility to the surrounding of the park. 35.2% of the respondents indicate that the landscape and planting should be properly design to promote natural accessibility and visibility of park to the users.

5.1.9. Maintenance

Poor maintenance also gives bad feelings to the users as it seems inviting to the criminal behavior.

5.1.10. Security patrol

Some of the respondents responded that the security patrol is needed based on the location and condition of the park. If it is located nearby public spaces and crowd, they feel safer than at park that isolated and remotely located. This study agree with the findings of Muhammad et al. (2014), and Atoosa et al (2015) where they found out that social surveillance also plays an important aspects in improving outdoor quality of life.

5.2. Implementation of CPTED Principles in Shah Alam Urban Parks

Table 2 summarised the best location of Shah Alam's urban parks that used the principles of CPTED. Through the site observation and gathered data from respondents, it could be concluded that Recreational Park Section 28 was chosen as the best park among the selected case studies, to implement the CPTED principles. The respondents agreed that it is strongly practiced the CPTED principles as compared to SUK Forest Park Section 5 (moderately practiced CPTED), and Shah Alam Lake Park which is the least practiced of CPTED principles.

From this findings, it can be concluded that the aspect like the location of the park (Recreational Park Section 28) that located within the neighbourhood area, have several physical environmental qualities that served as natural , social, territoriality connected, and good maintenance that meets the principles of CPTED. Thus, make it a good location for leisure and recreational activities whilst providing equality in term of safety. According to Norsidah et al. (2015), public attachment to their surrounding could promote sense of belonging and well-being, thus improve their awareness towards what transpired in their routine life.

The safety design elements that can be seen in promoting safer urban park includes the visibility and accessibility of the park where it can be clearly seen from the neighbourhood, good maintenance, proper garden furniture, proper design layout, vegetation design that allow natural surveillance and other. On the other hand, the Shah Alam Lake Park has several aspects to improve. Although it has recorded the least practiced of CPTED principles, however, overall it still has physical quality that could be redesign to meet the safety needs of users from fear of crime. As one of the earlier urban parks in Shah Alam, the Lake Park is lacking in term of good maintenance, proper garden furniture like seating, lighting, spatial and configuration of planting design. These aspects should be taken into consideration should it needs an improvement.

Table 2: Summary of identification of best location that practices CPTED principles in Shah Alam urban parks

| Dev-Component Location | Design | Lighting | Signage | Visibility | Walkway | Seating | Parking | Landscape | Fence | Maintenance | Entrance | Accessibility | Security patrol | Criteria Ranking EigenVector | Overall Ranking | Scale Hierarchy | Indicator | |
|------------------------------|--------------------------------|----------|---------|------------|---------|---------|---------|-----------|-------|-------------|----------|---------------|-----------------|------------------------------|-----------------|-----------------|-------------------|----------------------------|
| | Shah Alam Lake Park Section 14 | 0.539 | 0.164 | 0.172 | 0.141 | 0.304 | 0.141 | 0.350 | 0.350 | 0.159 | 0.889 | 0.252 | 0.159 | 0.053 | 0.06 | 0.262 | 3 | Extreme Importance |
| Recreational Park Section 28 | 0.297 | 0.539 | 0.350 | 0.334 | 0.172 | 0.334 | 0.478 | 0.172 | 0.589 | 0.352 | 0.589 | 0.589 | 0.196 | 0.088 | 0.394 | 1 | Equal Importance | Strongly practised CPTED |
| SUK Forest Park Section 5 | 0.164 | 0.297 | 0.478 | 0.525 | 0.524 | 0.525 | 0.172 | 0.478 | 0.252 | 0.259 | 0.159 | 0.252 | 0.084 | 0.064 | 0.348 | 2 | Strong Importance | Moderately practised CPTED |
| | | | | | | | | | | | | | | 0.115 | | | | |
| | | | | | | | | | | | | | | 0.054 | | | | |
| | | | | | | | | | | | | | | 0.127 | | | | |
| | | | | | | | | | | | | | | 0.057 | | | | |
| | | | | | | | | | | | | | | 0.089 | | | | |
| | | | | | | | | | | | | | | 0.041 | | | | |
| | | | | | | | | | | | | | | 0.061 | | | | |
| | | | | | | | | | | | | | | 0.073 | | | | |
| | | | | | | | | | | | | | | 0.132 | | | | |
| | | | | | | | | | | | | | | 0.039 | | | | |
| | | | | | | | | | | | | | | 1 | | | | |

This finding agrees with Sakip et al. (2013) that physical environmental elements have impact towards reduction of fear of crime in the urban neighbourhoods. From this study, the findings indicated that the users’ believed that the integration of CPTED principles in physical planning and design of their surrounding; in this case, an urban parks, could help in providing a safer outdoor environment for recreational activities.

6. Key aspects for designing out crime in urban park

From the findings, these aspects could be recommend:

Short-term planning of crime prevention

- Controlling the vegetation design

- Lighting or illuminate a target area such as roadsides, public recreational areas
- Overall Research Crime Prevention through Environmental Design Methods
- Increase patrolling around the neighbourhood
- Enforcement of design guidelines

Long-term planning of crime prevention

- Running Achievement Level Evaluation Program "Safe City Initiative"
- Conducting Research "Crime Prevention through Environmental Design" (CPTED) and the principle of "defensible space"
- Cooperation between the public, local authorities and Police
- Civic Awareness and Application of Values among Public (Informal Social Control)

Special Recommendation

- Shah Alam Lake Park, Section 14: Maintenance of landscape and prevent the routes and develop clear space
- Recreation Park, Section 28: Increase exposure and parking area
- SUK Urban Forest Park, Section 5: Maintenance and Management

6.1.1. Safety design principles

Emphasis should be made toward providing good visibility around the park, connecting spaces, promoting good pedestrian linkages and walkways, and reducing 'blind spot' of potential criminal behaviour by configuring the vegetation design.

6.1.2. Social surveillance

From the study, most of the respondents believed that security patrol and involvement of the publics to report any suspicious criminal behavior to the police would contribute to the safer community. Therefore, it could be concluded that the awareness of the residents as well as the security provided by relevant stakeholders could act as a social surveillance in order to curb the fear of crime among peoples.

7. Conclusion

Overall, from the findings, it could be seen that the focus on the physical layout and the landscape design of the park have an influence in term of enhancing the safety aspect. The design layout is clearly served as a visible key concept that should be emphasized in the planning stage where all design elements should consider the safety principles toward minimising crime, and enhancing safeness to the users. This could be achieved by applying an optimum design option where the combination of physical layout, safety elements like garden furniture, spatial arrangement of social spaces, composition of vegetation, linkage and accessibility have to be incorporating the CPTED principles. For future park development, the focus should also been given to the combination of natural and social elements where the interrelationship between the landscape design and the user's activities are efficiently correlated. This will encourage people to communicate with each other. Absence of interaction between visitors could give potential for criminals to commit crimes. Through good spatial arrangement and design layout, the connectivity of human interaction could be derived, and it could serves as a natural and social surveillance toward preventing crime in an urban park. The aspect of maintenance should be considered too as it is also give merit toward enhancing safety in urban park. The well maintained park will helps to prevent crime as it gives a good 'visual quality' and seems uninviting for criminal behavior.

The physical planning and design of the urban environment, especially in public spaces like parks can promote in minimising crime by improvisation on the lighting, fencing, landscaping and surveillance elements of its surrounding. Through the assessment from perceived safety by users and observing peoples' behaviour in term of offending, this could contribute the influence to proposed good surveillance by the design of the environment. Thus, contribute to the better park design, and reduce the opportunities for crime. The professionals could incorporate the safety design principles at the initial stage of the design development. This ensures the surveillance of the urban parks for future developments, and towards an improvement in the quality of outdoor lifestyle

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