A study on crime prevention through environmental design concept application in a private house in Yogyakarta, Indonesia

Bunga Sakina

1 Architecture Department, Faculty of Engineering, Bina Nusantara University, Jakarta, Indonesia 11480

Corresponding author: bunga.sakina@binus.ac.id

Abstract. Crime Prevention through Environmental Design or CPTED has become a popular topic in architecture. Through this concept, proper design and use of the built environment and its surroundings can be realized in order to achieve social sustainability. This paper tries to see the awareness of architects in creating a secure and safe built environment by examining a private house in Yogyakarta based on the application of CPTED design strategies. Result of the study revealed that Vignette as the architectural firm has awareness on designing a secure and safe environment by applying CPTED design strategies such as access control, surveillance, territorial reinforcement/territoriality, and maintenance.

Keywords: CPTED, architecture, social sustainability, built environment

1. Introduction

Over the years, sustainability has become one of the popular topics including in the building industry. The idea of sustainability involves three important aspects such as environmental, economic, and social [1]. This paper will focus on the social aspect of sustainability, where the intention is to add quality of life for people as the users.

Safety and security have been major issues worldwide due to rapid population growth and urbanization. Crime and fear of crime emerge for complicated social, cultural, and economic reasons [2]. The increase of crime and social damage will cause many problems in man-made environments, especially urban areas. The contribution of the built environment towards the reduction of crime has received considerable attention in recent years [3]. Considering these issues, it is necessary to add design approach relating to security and safety in architecture and urban planning. One of these approaches is an idea for crime prevention through environmental design (CPTED) concept. CPTED is a theory of crime prevention and community activation composed of four design principles: access control, surveillance, territorial reinforcement/territoriality, and maintenance [1] [3] [4]. By applying this social justice concept can create an environment of proper sustainability, including economic prosperity and ecological integrity in an unsecure neighborhood [2].

This study will try to discuss about application of CPTED concept in a private house. The private house was selected because it is an essential place for human being to settle and have activities thus it
is important for it to be secure and safe. A private house named Mesvara House designed by Vignette architecture firm in Yogyakarta was chosen to be the case study. From this research, it is expected to have a view on the awareness of architects in designing secure and safe built environment by applying CPTED concept to enhance users’ quality of life and support social sustainability.

2. The concept of Crime Prevention through Environmental Design (CPTED)

The notion of Crime Prevention through Environmental Design (CPTED) appeared in a 1971 book by criminologist and sociologist C. Ray Jeffery. The concept of CPTED is based on a hypothesis that “the proper design and effective use of the built environment can lead to a reduction in the fear of crime and the incidence of crime, and to an improvement in the quality of life” [3]. By enhancing safety and security through this concept, proper design and use of the built environment can be realized in order to achieve social sustainability [2]. CPTED concept has four strategies such as access control, surveillance, territorial reinforcement/territoriality, and maintenance [1] [3] [4].

1. Access control: Access control aims to tighten access points to selected people and reduce opportunities for criminality. It can be done by physical design elements like doors, shrubs, fences, gates, etc., or even security officer;

2. Surveillance: refers to the arrangement of physical design features involved with the activities and the people in order to maximize opportunities for surveillance, consequently leading to crime discouragement. It can be achieved by placing windows, providing adequate lighting and landscaping that allow for unobstructed views, and also human for patrol or security;

3. Territorial reinforcement/ Territoriality: defined marking of an area that is limited to one’s needs, which is the identity of ownership of a person or group of people in a place. It can be applied by sidewalks, landscaping, porches, and other elements that establish the boundaries between public and private areas;

4. Maintenance: Maintenance is an aspect related to territorial strengthening. Buildings that are not properly maintained will become fertile ground for criminal activity because they indicate a lack of control.

3. Research Method

This research is a descriptive-qualitative research [5]. The data was assessed and analyzed based on the CPTED concept design strategies and the result will be discussed through descriptions. The data collection is done through direct observation and interviews with the architectural firm, Vignette, and also with the client.

4. Case Study

Mesvara House was built in November 2017 and finished in May 2018. The U-shaped house is located in Gang Antasena no. 42, Jl. Candi Gebang, Sleman, Yogyakarta. It was designed and built by Vignette architectural firm and owned by Mrs. Risa Kurniawati and her family. The 2-storey house was built on a 91 m² land, where the ground floor area is 40 m² and the rest 51 m² areas left was provided for open spaces. The client wanted the house to accommodate as residential as well as the office for the husband. The client's husband is a building contractor and made a private consultant office in this house. The house is located in hook land, where the east side becomes access to enter the house, the north side becomes the office entry access. The office is used during business hours every Monday to Friday and also half a day on Saturday.

The first floor of the house is for public and semiprivate zone, while the second floor is specifically for private zone. The house has a living room, family room, 1 master bedroom, 1 guest bedroom, 2 bathrooms, 2 kitchens, and also facilitated by an office for the husband to work. The Mesvara house floor plans can be seen in Figure 1.
5. Result and Discussion

This part of the study will try to discuss the case study based on the CPTED concept. The design strategies that will be discussed based on the four strategies: access control, surveillance, territorial reinforcement/territoriality, and maintenance.

5.1 Access Control

This house accommodates not only as a residential house for the client but also as an office for the husband. Located on the hook site, this house has two main accesses, east side for the residential house, and north side for the husband’s office. These accesses can be seen in Figure 2 and 3. Vignette designed the house entrance on the wider side of the land (east side) as a sign that this side is the main entrance with a more welcoming impression. As for the office that have certain and limited visitors, the entrance uses the narrower side of the land (north side) to “filter” out incoming guests.

The outer access control for each side is by a plastered brick fence with wooden gate. The gate of the house is regulated directly by the owner so that outsiders who are unauthenticated cannot enter. Residents can also directly supervise visitors. Each side also provided by doors with conventional key lock system. This system is considered as a security device which is also a mechanic access control [4] [6].

Other attempt to control access is by the landscaping design. The main paths direct visitors to the proper entrance of the house and away from the more private area (husband’s office). Landscaping is also a way to control access for visitors [3].
5.2 Surveillance

For optimizing surveillance, Mesvara House provides many openings, adequate lighting, landscaping, and also human for patrol. Vignette gave many windows and open spaces to Mesvara house. Windows placement allows the visitor to monitor visitors [1] [6], especially for windows from the second floor that can see clearly the front gate area (Figure 4). These allow users to see or be seen while ensuring that intruders will be observed as well [1]. The form of the building with U-shape typology also becomes an advantage for surveillance. This form makes the orientation is focused to the middle area of the house, the owner can easily surveillance to every side of the house.

In front of the house there is a public fishing area. It has guards who also act as “watch-men” to help supervise people passing by. This can be considered as community participatory that can support crime prevention [6]. Mesvara house has also provided adequate lighting, not only for the house but also for street lighting. This can improve surveillance opportunities in terms of visibility and effective in reducing property crime [7] [8]. The public fishing area and lighting of the house can be seen in figure 5 and 6.

Figure 3. house main entrance on the east side (left) and office entrance on the north side (right).

Figure 4. View from the second floor window.

Figure 5. Public fishing area in front of the house.
5.3 Territoriality
Landscape arrangement in this house such as sidewalks, landscaping, and other elements has establish the boundaries between the house and office. In addition, the difference in floor functions, where the first floor of the house is for the public and semiprivate zones, while the second floor is specifically for private zones, also divides the zoning territories in this house. The establishment of a hierarchy of spaces (zoning) can help achieve an effective layer of defense [8]. It can delay the criminal activity by increasing the effort and make it more difficult for the intruder to commit the crime.

5.4 Maintenance
The Mesvara house is also well maintained, it can be seen from the cleanliness of the house and garden, as well as the integrity of the property. The garden is cleaned and tidied periodically, while the interior of the house is cleaned every day by the owner of the house. The architect also designed the house with easy-maintenance building material. In addition, no part of the house is left damaged.

6. Conclusions
The result of the study has shown that Vignette has applied the strategies of CPTED concept in Mesvara House. The strategies were access control, surveillance, territorial reinforcement/territoriality, and maintenance. Access control was achieved by providing different access for the house and office, wooden gate as the outer barrier and landscaping design. Surveillance was applied by openings, adequate lighting, landscaping, and also human patrol. Landscape arrangement and zoning helped strengthen the territoriality of the house. And maintenance was routinely done and an easy-maintained building material was chosen. Based on these results, it shows that architect do have awareness in in designing secure and safe built environment to enhance users’ quality of life and support social sustainability.

Lastly, this study is still an initial research. The results of this research still need to be tested and confirmed in subsequent studies. The findings of this study can be a reference for academics and practitioners in sustainable building design, especially in the social aspects.

7. References

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