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A CASE STUDY OF CPTED PRINCIPLES IN RELATION TO BULLYING BEHAVIOUR IN SECONDARY SCHOOL

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Abstract - This paper presents a case study examining the potential influences of building design on bullying behavior and experiences, in comparison of Malaysia secondary school students. Theories of environmental psychology suggest that environmental context influences social attitudes and behaviour. The research focuses on the relationship between the physical environment of urban schools and the students' negative behavior of two secondary schools in Selangor, Malaysia. Through discussion of the findings from previous studies, the gaps in criminology knowledge on bully-design link will be highlighted. The features of physical environment such as broken fixtures, display of student artwork and signboard and physical decay can affect the occurrence and behaviour of criminals. An observation was conducted at two secondary schools in Selangor with a random sample of 200 students from Form 1, Form 2 and Form 3 involving the observation of 17 school blocks. Three principles of Crime CPTED were analyzed in the school environment. The results indicated that there is a significant difference in territoriality and school maintenance which results in the forming of the negative environment in the schools. It was found that this, in turn, affects the frequency of bullying occurring among the students in school. The design and planning of the school's external environment should give more consideration on creating conducive learning environment that could foster positive social behavior especially for urban schools. School environment is important to the child's development.

Keywords - School, Bullying, CPTED, Physical Environment

1   INTRODUCTION

Bullying is a growing social issue that affects millions of students globally. For almost 30 years, bullying among students has been known as a serious problem in school (Roland & Galloway, 2002). Bullying in schools reflects a part of the bigger problem of violence in society (Atlas & Pepler, 1998). Previous longitudinal studies have found a strong and consistent relationship between bullying and later criminality (Andershed, Kerr, & Stattin, 2001; Min, F. Catalano, P. Haggerty, & D. Abbott, 2011; Dan Olweus, 2011; Renda, Vassallo, & Edwards, 2011; Sourander et al., 2011). Bullying behaviour among students is a global phenomenon and it does not only occur in Malaysia's schools but also occurs in other countries such as Australia, Japan, England and United States. From past research, at least 5 percent of the students in both primary and secondary schools were bullied weekly or more often in North America, Australia, Japan, Scandinavian countries and several countries in Europe (Roland & Galloway, 2002). The United States Department of Justice and The National Association of School Psychologists (NASP) estimated that 160,000 children missed school each day due to the fear of the bullies (Newman-Carlson & Horne, 2004). In the year 2013, approximately 3 percent of students aged between 12 and 18 years old reported afraid of being attacked or harmed at school or on the way to and from school (Robers, Zhang, & Morgan, 2015). Bullying is linked to many negative outcomes including student achievement, physical, mental health and later life. Adolescents who are bullied suffer from terrible psychological effect and these effects can be linked to suicidal thinking.

Malaysia also is experincing this phenomenon, and it has been a concern, especially for parents. Malaysia is a country with multi-ethnic, multicultural, and multilingual society. Usually, bullying has not been viewed as a criminal act and has either been ignored or treated as a

disciplinary matter in schools. In the meantime, there is no implementation of strong national policy that is fighting for school bullying, and the issues are left to individual schools. However, Malaysia government is in all effort to combat bullying in school. The victims apparently received helped and supported by school counseling. The perpetrator will be dealt with criminal law and if it is serious can be expelled from school. The crime in school should be noted as a serious problem as it could lead to crime in the future (Andershed, Kerr, & Stattin, 2001; Min, et al. 2011; Olweus, 2011; Renda, Vassallo, & Edwards, 2011; Sourander, et al., 2011). The built environment is believed to be one of the factors influencing crime and the level of fear of crime in society (FOC) (Sakip, Johari, & Salleh, 2012). However, there is not much of research in school crime context on how environmental approach may help in reducing school crime and increasing safety in school.

One purpose of this study is to examine the association between various aspects of the physical environment in and around schools and bullying among students. More specifically, the study aims to examine the influence of the school's physical environment—measured in terms of both attractive and neglected material characteristics (e.g., attractive classrooms, display of artwork, graffiti on the walls, broken fixtures).

2   LITERATURE REVIEW

Criminal cases of bullying in Malaysia in the year 2014 had gained great attention by the Ministry of Education (MOE), the Social Welfare Department (SWD) and Royal Malaysian Police (RMP) when videos of bullying crimes were uploaded on to the Internet and, thus, making it viral among Malaysians. In order to reduce school violence and to create a safe school culture and environment, a blueprint for a Safe School Programme in Malaysian, also known as Safe School Concept and Manual: Implementation Guide to Create a Safe School, Community and Family for Children had been developed on 2002 by the Ministry of Education, Malaysia. Bullying can be defined as negative actions that repeatedly occur over a period of time directed against another student who has difficulty in defending himself or herself (D Olweus, n.d.; Wan Ismail et al., 2010). Negative actions referred to behaviour that was intended to inflict harm, injury, pain, or discomfort upon another individual (Atlas & Pepler, 1998). Meanwhile, Atlas and Pepler (1998) defined bullying as a form of social interaction in which there was an implied imbalance of power or strength in the interaction. The power of imbalance in bullying may not be limited to physical size and may be presented in the tone of voice, physical stance of a bully or the number of children take part as bullies and the support of peers who were involved (Atlas & Pepler, 1998). Hence, bullying can take place when there is an imbalance of power between another people with negative action and has difficulty to defend on their own.

2.1   The Relationship between Environmental Design and Bullying Behaviour

The basis of environmental design is interaction among other factors of physical, social, environmental, individual and community (Sakip et al., 2012). According to Poyner (1983), human movement and behaviour are critically affected by the design and layout of the physical environment. Architectural design and layout of buildings, street networks and so on can influence significantly how people interact, use, and move in their environments (Reynald, 2014). Crime is believed to be related to the physical environment (Liebermann & Kruger, 2004). The opportunities that exist in an environment encourage a criminal to act on a targeted victim (Liebermann & Kruger, 2004). In deciding whether or not to commit an act of crime, environmental element is one of the factors considered by criminals (Anastasia & John, 2007). Criminal behaviours are driven by their environments, whether physical or social aspect (Sakip & Abdullah, 2008). Studies by Shamsuddin, Bahauddin, and Aziz (2012) indicated a relationship between the outdoor physical environment of the school and the students' social behaviours . However, the limitation of this research is not to evaluate the negative social behaviour related to schools environment. A study of school violence in Gangseo district, Seoul was conducted to determine the criminal spots on the way home from school for middle-school students (Lee, Ryu, & Ha, 2012). Through a cognitive map analysis, Lee, Ryu, and Ha (2012) argue that the students feel fear mostly for reasons related to human factors rather

than to space factors; among the human factors, 'peers' represented the most frequent reason. The most common locations for student victimization are at the playground (Fite et al., 2013; Dan Olweus, 1993; Stephenson & Smith, 1989), classroom (Atlas & Pepler, 1998; Rapp-paglicci, Dulmus, Sowers, & Theriot, 2004), and hallways (Astor, Meyer, & Behre, 1999; Stephenson & Smith, 1989; Vidourek, King, & Merianos, 2016). Certain 'hot spots' that indicated to be unowned spaces are where the sights of more crime event create greater fear among students (Astor et al., 1999). The presence sense of ownership of these locations has the potential to drastically decrease the prevalence of victimis-ationin schools (Astor et al., 1999). Through these studies, victimisation occurs most likely when the adults are limited in their abilities to monitor. The school structure may play an important part in giving a chance for individual children to involve in bullying behaviours (Atlas & Pepler, 1998). Craig et al. (2000) reported that victimisation is most likely to occur in less structured environments. Studies showed that lower rates of school victimisation were associated with the school safety interventions that are focused on improving the physical environment of the school (Johnson, 2009). Johnson (2009) concluded that physical environment appears to offer intervention opportunities to reduce school victimisation.

2.2 Crime Prevention Through Environmental Design

There is a growing body of research that supports the assertion that crime prevention through environmental design is effective in reducing both crime and fear of crime in the community (Cozen, Saville, & Hillier, 2005). CPTED is focus on the relationships between people and environment. The behavior and movement of human was significantly affected by the architectural design and layout of the physical environment (Poyner, 1983). The crime patterns due to human behavior and daily routine were determined by environmental design factors (Felson, 2006). A review of 122 evaluations of crimes prevention project by Poyner (1993) indicated that over half of the area of environmental design (24 out of 45) demonstrated the reduction of crimes. The evaluation were focused on lighting, fencing, design changes to improve surveillances opportunities, the cleanup of neighborhoods, street changes, wider market gangways, electronic access control and modification. CPTED is an increasingly fashionable approach and is being implemented in a global scale (Cozen et al., 2005). Research by Rasidah, Johari, Najib, & Salleh (2012) showed high CPTED practices are able to reduce fear of crime. It is found that improved territoriality, indicated school ownership, and improved surveillance are essential factors for a better perception of safety in school (Wilcox, Augustine, & Clayton, 2006).

2.2.1 Territorial Reinforcement

Territoriality is a design concept directed at reinforcing proprietary concern and a "sense of ownership" in legitimate users of space thereby reducing opportunities for offenders by discouraging illegitimate users (Cozen et al., 2005; Perkins, Meeks, & Taylor, 1992). These strategies are not independent of one another, and they act in concert to use physical attributes to separate public, public-private and private space, to define ownership by including symbolic barriers (signage, subtle changes in road texture) and real barriers (e.g. fences, pavement treatments, landscaping and artwork) and define acceptable patterns of usage. In addition to promote opportunities for surveillance (Cozen et al., 2005; P. Cozens & Love, 2015). Eliminating any unassigned spaces and ensuring all spaces have a clearly defined and designated purpose, are routinely cared-for and monitored is also a component of territoriality (Cozen et al., 2005). Due to increase of fear, it might lead an individual to engage in target hardening activities to reduce the chances of future victimization (Melde & Esbensen, 2009). A study of five high schools was conducted to examine the relationship between school physical environment and school crime (Astor et al., 1999). The findings revealed that certain 'hot spots' referred to as unowned spaces such as hallways, dining areas, and parking lot where the sights of more crime event and greater fear among students (Astor et al., 1999). Astor et al. (1999) claimed the presence sense of ownership of these locations has the potential to drastically decrease the prevalence of victimization in schools. However, Astor, Meyer, and Behre (1999) suggest that by placing adult or video camera in an undefined space it did not create a sense of ownership of space among adults and students.

2.2.1 Natural Surveillance

Natural surveillance is a design strategy that uses design structures to increase the visibility of a building that gives risk perception to the potential criminal in an area and making him feel being watched (PM Cozens, Saville, & Hillier, 2005). It keeps the intruders under observation and decrease the opportunity of a crime. The lighting and natural daylight also play an important role in a goodvisibility, which can influence the visible distance. A good surveillance and lighting at night is able to improve visibility of the area thus reducing fear of crime (Kitchen & Schneider, 2007; Perkins et al., 1992) and to create visual clarity to the surrounding area. Surveillance can be accomplished through natural and mechanical. Natural surveillance includes the local community actions, buildings' physical openings, and police patrol (PM Cozens et al., 2005; Perkins et al., 1992). Meanwhile, mechanical surveillance involves the use of tools such as street lighting and closed-circuit television (CCTV) (P. Cozens & Love, 2015). According to Lee and Ha (2015), visibility is an important factor that affects fear of crime in environment. Although most exterior spaces of elementary schools are high-visibility areas, the hottest spots were behind the buildings areas which were low in visibility (Lee & Ha, 2015). However, findings from Lee and Ha (2015) were contrary to the theory of CPTED that asserts the areas with good visibility as safe from criminal behavior. The result indicated that fear of crime can occur not only in places with poor visibility but also in those with very good visibility. It was found that human factors had a much greater influence.

2.2.1 Maintenance and Management

Maintenance is to promote a positive image and to routinely maintain the built environment to ensure that the physical environment continues to function effectively (PM Cozens et al., 2005). Maintenance of an area is link to the individual behavior. The level of an area is maintained one of the factors in the quality of the activities that take place in it (Durán-Narucki, 2008) and can be a major impact on whether it will become targeted by criminals. A study of 95 schools was conducted to examine the role of school attendances in the relationship between facilities in disrepair and student's achievement (Durán-Narucki, 2008). The condition of the school buildings were obtained through survey that were conducted through visual inspection. Durán-Narucki (2008) had indicated that student's achievement was higher in newer building and in buildings with higher condition rating which had well maintained schedule. A good maintenance strategy directly impacts the fear of crime due to awareness of responsibility and caring of the targeted crime. It allows for the continued use of a space for its intended purpose. By including CPTED concept from the design stage of a building, it can build a safe-crime environment rather than waiting for a crime problem to happen. By reviewing and go through existing problem area and applying the CPTED principles, those problems can be avoided.

3 METHODOLOGY

For this research, two government secondary schools in Bandar Baru Bangi and Ampang, Selangor were selected as the multiple-site case studies. Thus, the limitation of the study is only in this particular secondary school in Selangor. The result of the study cannot be made generalization of bullying problems in Malaysia. Selangor is the most developed state in the country where Kuala Lumpur the capital city of Malaysia used to be located before being gazetted as a federal territory. The schools that were selected are Sekolah Menengah Kebangsaan Jalan Empat, Bandar Baru Bangi (School 1) and Sekolah Menengah Kebangsaan Taman Tasik, Ampang (School 2). The schools were selected mainly because of their different design layout. The layout of School 1 is in the form of 'cluster and enclosed' where the building blocks are all facing towards the center where the assembly field is located, while the design for School 2 was developed in the form of uniform buildings (army barrack like) typical of the old school buildings which were developed and designed by the JKR. (Fig. 1 and Fig. 2) Somehow, despite the differences in school layout design, the schools selection was based on the highest number of perpetration in the age range from 7 to 18 years in crime cases that was reported by police over five years ago.

3.1 Research Instruments

The research has adopted quantitative techniques of gathering data. Students from Form One, Two and Three were involved in the questionnaire. The questionnaires include open-ended questions and questions using 5 Likert scale measurement which are 1=never, 2= once a month, 3=2 to 3 times a month, 4= once a week and 5=2 to 3 times a week. Respondent's agreement on the statement is used to measure the degree of bullying behaviour in school. The questionnaire was conducted with 81 students from School 1 and 119 students from school 2. This study used questionnaire to collect the data on the type of bullying behaviour.

Field observation was carried out at the chosen case studies to indicate environmental design factors of the school that contribute to the bully occurrences based on the absence and presence of CPTED elements. The visit includes assessing the school campus design layout, spatial quality of each space, the availability of amenities and the circulation. The result show how the characters of school spaces could strongly influence the students' behaviour.

4 DATA ANALYSIS

From the observation of the maps, there is differences in school building arrangement which had possibility leads to different interaction between the students during the recess time. Figure 1 and Figure 2 showed school maps of SMKJE and SMKTT. The arrangement of SMKTT building that is scattered made it difficult for adults to monitor compared with the arrangement of SMKJE building which is more organized and compact. Through daily interactions with the physical and social environment, individuals learn about their places in society, their value, appropriate and inappropriate behaviour (Durán-Narucki, 2008). As part of children development, they actively look for cues on how to behave, who they are, or what they can achieve in environment in which they spend time mostly (Durán-Narucki, 2008). Rivlin and Weinstein (1984) claimed the physical characteristics of a setting can influence the behaviour of its users.

Demographics data such as school name, gender, form and race were obtained from the respondents. Table 1 shows the demographic data of the study. The sample of the study consisted of two secondary schools with 81 (40.5%) respondents from Sekolah Menengah Kebangsaan Jalan Empat (SMKJE) and 119 (59.5%) respondents from Sekolah Menengah Kebangsaan Taman Tasik (SMKTT). The gender analysis showed that the study consist of 91 (45.5%) male students and 109 (54.5%) female students. Analysis from the respondents showed that 41 (20.5%) respondents from Form One students, 46 (23%) respondents from Form Two students and 113 (56.5%) respondents from Form Three students.
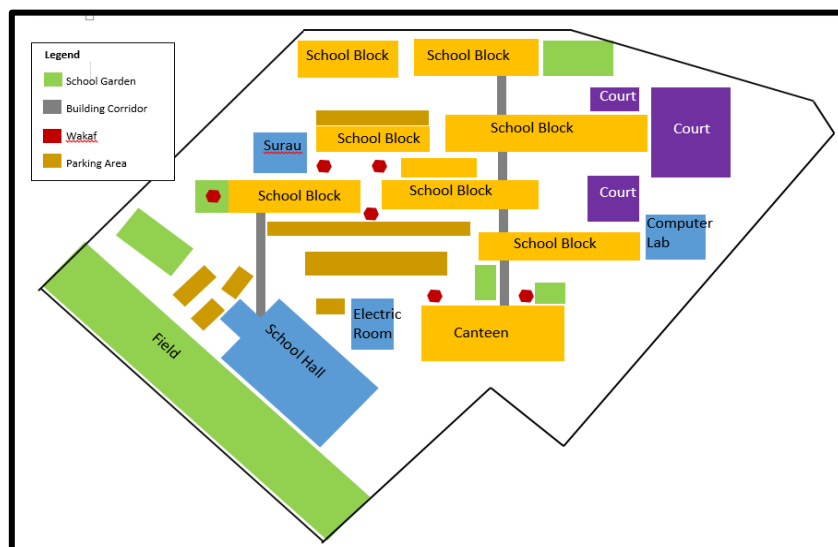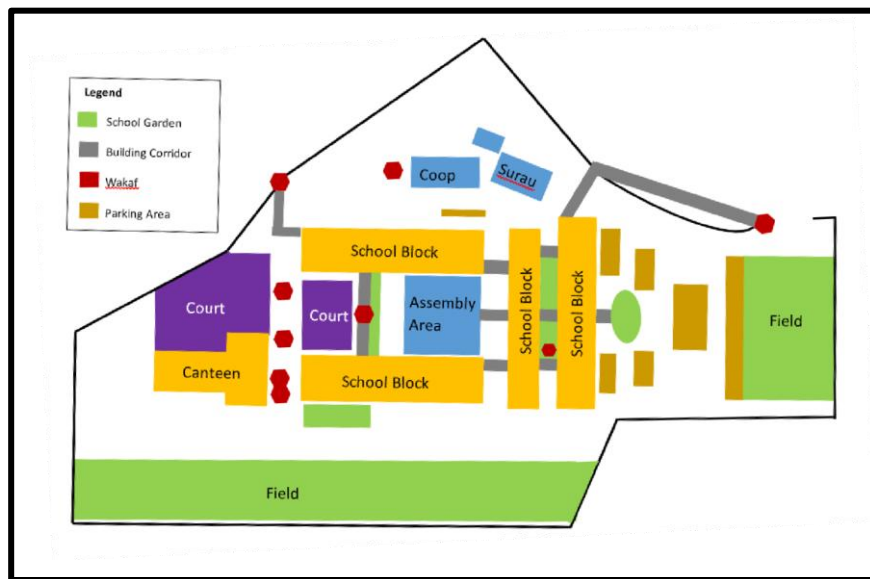

Figure 1 SMKTT school map

Figure 2 SMKJE school map

Table 1 Demographic Distribution

	Criteria	Total No (n=200)	Percentage (%)
School	Sekolah Menengah Kebangsaan Jalan Empat (SMKJE)	81	40.5
	Sekolah Menengah Kebangsaan Taman Tasik (SMKTT)	119	59.5
Gender	Male	91	45.5
	Female	109	54.5
Form	Form 1	41	20.5
	Form 2	46	23.0
	Form 3	113	56.5

4.1   Bullying Behaviour

The statistical analyses by ANOVA and Tukey's multiple comparison tests were carried out for the two different schools on the three types of bullying behaviour. Treatment effects were considered significant at $P < 0.05$ (Snedecor and Cochran, 1967). An analysis of variance in Table 2 showed that the effect of different school environment on physical bullying ($F_{(1, 198)} = 3.91$, $p = 0.05$) and relational bullying was significant ($F_{(1, 196)} = 6.21$, $p = 0.01$). The different bullying behaviour in physical bullying and relational bullying may be due to a different environment that exists in each school. Improper landscaping and building design may give the opportunity to the student to bully others. Differently, with verbal bullying, it can be done quietly and covertly where the children are able to avoid detection and punishment (Atlas & Pepler, 1998). Despite reaching statistical significance, the actual difference in mean score between the groups was quite small. The effect size, calculated using eta squared as below, was 0.02 for physical bullying and 0.03 for relational bullying.

Table 2 Bullying behaviour in two different

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Physical Bullying	Between Groups	12.17	1	12.17	3.91	0.05
	Within Groups	616.79	198	3.12		
	Total	628.96	199			
Relational Bullying	Between Groups	79.27	1	79.27	6.21	0.01
	Within Groups	2500.88	196	12.76		
	Total	2580.15	197			

$$\text{Eta squared (Physical Bullying)} = \frac{12.17}{616.79} = 0.02$$

$$\text{Eta squared (Relational Bullying)} = \frac{79.27}{2500.88} = 0.03$$

4.2 Territoriality

A total of 17 blocks in four schools were observed to indicate the element of territoriality that exists in each school. Table 3 shows result from the observation which indicated that there were 7 blocks in SMKJE with a total of 273 territoriality element and 10 blocks in SMKTT with 120 elements. Calculation of territoriality element per block resulted in 39 elements per block in SMKJE and 12 elements per block in SMKTT. Based on the observation of territoriality element in two schools, SMKJE had more sense of school ownership in giving of student good school environment compare with SMKTT. This was shown by the number of territoriality element per block in the school.

Table 3 Territoriality element per block in two schools

School	Total Block	Territoriality Element		Total	Territoriality element per block
		Signage	Ownership		
SMKJE	7	38	235	273	39
SMKTT	10	23	97	120	12
Total	17	61	332	393	

4.3 Surveillance & Maintenance

Analysis by ANOVA and Tukey's multiple comparison tests were carried out for the two different schools once again. The objectives of this analysis are to know whether it is different in surveillance and maintenance in two different schools. An analysis of variance in Table 4 showed that the effect of different school environment on surveillance was statistically not significant ($F_{(1, 13)} = 0.002$, $p = 0.97$).

Table 4 One-way ANOVA Tests between two different schools with surveillance principle

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	0.03	1	0.03	0.002	0.97
Within Groups	203.30	13	15.639		
Total	203.33	14			

But, Table 5 shows that there was significantly difference in school maintenance in both schools ($F_{(1,11)} = 8.19$ $p = 0.01$). Territoriality principle is closely related to maintenance principle

in presence sense of ownership in school. A significant difference showed in physical and relational bullying when the students were socializing among the others. Thus, this study showed that there is a possibility of association between various aspects of the physical environment in and around schools and bullying among students.

Table 5 One-way ANOVA Tests between two different schools with maintenance principle

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	32.89	1	32.89	8.19	0.01
Within Groups	44.19	11	4.02		
Total	77.08	12			

5   DISCUSSION AND CONCLUSIONS

The purpose of this paper was to determine if there is association between various aspects of the physical environment in and around schools and bullying among students. Table 2 showed the analysis of bullying behaviour in two secondary schools. There are significantly differences in physical and relational bullying in SMKJE and SMKTT. The physical environment in school is believed to be related to developing students' behaviour in school (Durán-Narucki, 2008; Liebermann & Kruger, 2004). This finding suggests that various aspects of the physical environment in and around schools could influence students' interaction and relation with each other. The finding similar with Mohamad Salleh and Zainal (2014) and Rigby (2008) showed the indirect bullying was the most widely performed compared with direct bullying. Relational bullying is a group process that is difficult to see in adults.

Apart from that, the bullying is believed to be related to the physical environment (Liebermann & Kruger, 2004) as it plays an important aspect in the developing behaviours (Durán-Narucki, 2008). The opportunity that exists in an environment encourages a perpetrator to act on a targeted victim (Liebermann & Kruger, 2004). In deciding whether or not to commit an act of crime, the environmental element is one of the factors considered by criminals (Anastasia & John, 2007).

Tables 3-5 show the findings of physical features in two secondary schools based on three CPTED elements. Based on the finding on territoriality element in Table 3, the result indicated that it was significantly different in element per block between SMKJE and SMKTT. The element such as water sculpture, bench, notice board, and garden furniture play an important role in creating sense of ownership in student. Astor et al. (1999) claimed the presence sense of ownership of these locations has the potential to drastically decrease the prevalence of victimization in schools. A good conducive landscaped is believed to directly or indirectly assists in providing space for leisure and interacting with landscape components (Ali, Rostam, & Awang, 2015). This paper may have proven that the level of certain components of landscapes at the school in the region is significant that can create a sense of ownership by setting up gazebo, pergola, bench, garden tables, signboards and flower pots. Schools that include permanent student artwork in the interior spaces of school buildings also will foster student ownership (Killeen, Evans, & Danko, 2003). This can be proven by the mean (μ) value of relational bullying in SMKTT is higher ($\mu = 1.52$) than in SMKJE ($\mu = 1.32$).

However, even though the school layout and design were different in each school, but the monitoring in each building can be done. This finding was shown in Table 4 which indicated that there was no significant difference in the surveillance element. The visibility of the activity placemen, open space and classroom can be seen from the buildings block. The chances of bullies to bully in the hidden corner are less. Although most of the exterior spaces of the schools are a high-visibility area, there were few respondents reported that the hottest spots were behind the buildings area. This finding tends to support previous studies which indicated that there was low visibility behind the school building (Lee & Ha, 2015).

Meanwhile, Table 5 shows significant differences in maintaning element in SMKCP, SMKJE and SMKTT. The result on maintenance level in SMKJE showed that the level was 61%

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to 80%. Meanwhile, the level of maintenance in SMKTT was 41% to 60%. According to Skogan and Maxfield (1981), (as cited in Melde & Esbensen (2009), the environment that lacks maintenance, poorly kept buildings and unsupervised which referred to as "sign of crime" and people tend to fear this environment which may develop a reputation for high levels of criminal behaviour. Lacks of maintenance in SMKTT may develop bullying behaviour which substantiates with previous study by Lorenc, et al. (2013) and Wilcox, et al., (2006). Dirt, decay, graffiti, litter and other sign of neglect of the environment are seen as drivers of fear (Lorenc et al., 2013; Wilcox et al., 2006). These findings tend to support previous studies on physical environment and student misconduct by Wilcox, et al. (2006). The application of colours and usage materials also may influence students' behaviour (Shamsuddin et al., 2012) as the students enjoy being at the bench as they provide not just seating areas but also plants and water elements. It is found that more green area and seating area are better for a school environment.

As a whole, there is a possibility of association between various aspects of the physical environment in and around schools and bullying among students. By manipulation of the design and layout, physical features are believed do influence the chances of a crime to occur by affecting violent behaviour. Environmental design theories are emphasizing on physical environment as a tool to control and block any opportunities to offend. Students have a fundamental right to learn in a safe, supportive environment and to be treated with respect.

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