

# Toward Sociable City Park: The Relationship between Sociopetality of Seating Facilities Design and Communities' Social Activity in Khon Kaen, Thailand

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**Abstract**—Green space in urban areas, including city parks, is one of the essential components and inseparable elements of the urban structure. Not only have environmental benefits, but city parks are also beneficial for the community in social improvement, as they become places for human interaction and integration. Khon Kaen City, one of the city centers in Thailand, continues to grow from what was originally only a small rural area. Thus the existence of city parks is fundamental. Since sitting is an activity that can open opportunities for social interaction and create the vitality of urban space, the importance of creating seating that can maximize the social interaction (sociopetal) of the community in the city park is needed. However, the seating facilities in Khon Kaen city parks are dominated by linear seating characteristics that can minimize social interaction (sociofugal). This study aims to investigate the relationship between the sociopetality of seating facilities design and communities' social activity. Data on seating facilities design characteristics and communities' social activity collected through behavioral mapping in three city parks in Khon Kaen were analyzed using chi-square and odd ratio. The results showed a significant relationship between the sociopetality of seating facilities design and communities' social activity. Sociopetal seats tend to be used 2.4 times more often for social activity than individual activity. This finding can be a reference for architects, planners, and designers to increase social activity in city parks.

**Key word:** Sociopetal space, Sociofugal space, Bench arrangements, Social activity

## I. INTRODUCTION

Green space in urban areas, including city parks, is one of the essential components and inseparable elements of the urban structure [1]. Its existence has not only environmental benefits [2], but also social benefits that improve the quality of life of urban communities [3], [4], as a place for human interaction and integration as well as outdoor fitness and health improvement [5]. The leading role of parks as public spaces is to promote social interaction through enhancing social activities [6]. Therefore, it is crucial to maximizing the use and

benefits derived from parks by designing them as places of positive experience [7].

Sitting is a stationary activity that opens opportunities for social interaction and creates vitality in urban spaces [8][9]. Spaces in the city that offer many opportunities for sitting are well-functioning city areas [6]. Therefore, to improve social functions in city parks, seating facilities must support social activities. Humphrey Osmond proposed the concept of socioptality where stable interpersonal relationships are fostered through designs that encourage small group formation and face-to-face contact [10]. Furthermore, he categorizes spatial settings related to user interaction into two categories. Sociopetal space enlarges user interaction, while the contrary minimizes social interaction, namely sociofugal space [11], [12], [13]. An outdoor place with a sociopetal space provides an ideal opportunity for people to gather around and chat, thus can become a prominent meeting place and greatly enriching urban life [13].

In contrast to the urgency of sociopetal space in seating facilities in a city park, its application to the seating facilities design is not given much attention. The park seating design often encountered is an elongated linear shape, a sociopetal design [14]. This characteristic supports the limited interaction among people and the distance between the first and the last person is quite far [15]. Several previous studies have reported this. Sociofugal seating facilities tend to be used for solitary activities [16]. Sociofugal seating that dominates in public green open spaces cannot accommodate visitors who come in groups [17], [18].

Khon Kaen is a secondary city and a principal city in northeastern Thailand [19]. This city was originally a small settlement but has continued to develop into a dynamic urban center [20], [21]. Nowadays, Khon Kaen is an institutional city center for administration, education, and health care [22]. The existence of a city park that supports community social activities is vital. Several studies have also focused on the development of city parks, starting from those who review it from the elderly behavior [23] and for recreational needs [24]. However, no more specific study has examined the seating facilities design and its relationship with community social activities. Moreover, a pilot study showed that linear (sociofugal) shapes dominate the seating design in Khon Kaen city parks.

Accordingly, it is essential in architecture and planning to evaluate the seating facilities in city parks as a reference for assessing, managing, planning, and developing these areas. A public space-public life study is needed as a tool to increase understanding of the importance of providing quality public space [25]. Therefore, the sociopetality aspect of the seating facilities in Khon Kaen city parks and its relationship with the community social activity will be observed.

## II. METHODOLOGY

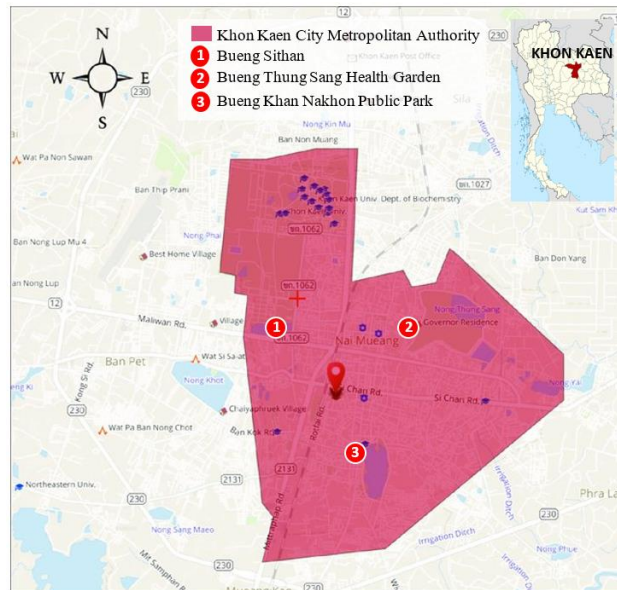
### A. Study Area

This study will specifically focus on the Khon Kaen city parks with several criteria determined

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at the beginning to support the research, namely (1) It is located in Khon Kaen City metropolitan authority, (2) It is located in the city center (downtown park) with a service scope, especially to urban communities [26], (3) Have a water area, considering that more stationary activities will occur so that visitors can linger in the area [27], (3) Parks used by the community for various activities.

The city parks that meet the research criteria that will be the focus of this research, namely (1) Bueng Sithan, (2) Bueng Thung Sang Health Garden, and (3) Bueng Khaen Nakhon Public Park. Moreover, location of each city parks shown in Figure 1.



**Figure 1 Location of the three city parks**

### *B. Data Collection*

Data collection on the community activities was carried out using the Behavioral Mapping method. The behavior mapping method is a survey technique developed in the 1970s by Ittelson. Furthermore, Sommer and sommer [28] explain behavioral mapping is described in a sketch or diagram of an area where humans carry out various activities. This method aims to describe behavior on a map, identify the type and frequency of the behavior, and show the relationship between these behaviors and specific design features, including the use of public spaces. More specifically, the behavioral mapping technique used is Placed-centered mapping. Place-centered methods are more suitable if the goal is to access a specific location [28].

Behavioral mapping was conducted on two working days (Monday and Friday) and two weekend days (Saturday and Monday). Behavioral mapping was conducted on 19-21 November 2022 in Bueng Sithan, 26-29 November 2022 at Bueng Thung Sang Health Garden, and 3-6 December 2022 in Bueng Khaen Nakhon Public Park. The research time specified is 16:00 – 20:00, which is considered a relatively busy time in the parks.

The chi-square test is an overall test for detecting relationships between two categorical variables. If the test is significant, it is important to look at the data to learn the nature of the relationship. There are five stages of carrying out the chi-square test [29]: (1) Formulate the hypotheses, (2) Specify the expected values for each cell of the table, (3) To see if the data give convincing evidence against the null hypothesis, compare the observed counts from the sample with the expected counts, assuming  $H_0$  is true. (4) Compute the test statistic, (5) Decide if chi-square is statistically significant.

From this statistical test, it can be concluded that there is a significant relationship between the two variables in this study. It is likely significant if the opportunity factor is less than 5% or p-value  $<0.05$ . The variable being tested is said to have a significant relationship if the p-value is less than 0.05 with a 95% confidence level.

After the chi-square analysis, the odds ratio (OR) was used for further analysis. This analysis was carried out to assess the association strength between the determinants and the outcome of this study. Odds are the ratio of the probability of an event occurring in one group to the probability of the event not occurring. OR is the chance that an event in one group will occur, divided by the case that the other group will not be exposed. Concluding with the odds ratio is if  $OR = 1$ : There is no difference between the groups;  $OR >1$ : Suggests that the odds of exposure are positively associated with the adverse outcome compared to the odds of not being exposed;  $OR <1$  Suggests that the odds of exposure are negatively associated with the negative results compared to the odds of not being exposed [30]. This study's chi-square and odd ratio tests used the JMP 14 analysis application.

### III. RESULT

#### A. Seating facilities in terms of the sociopetality aspect



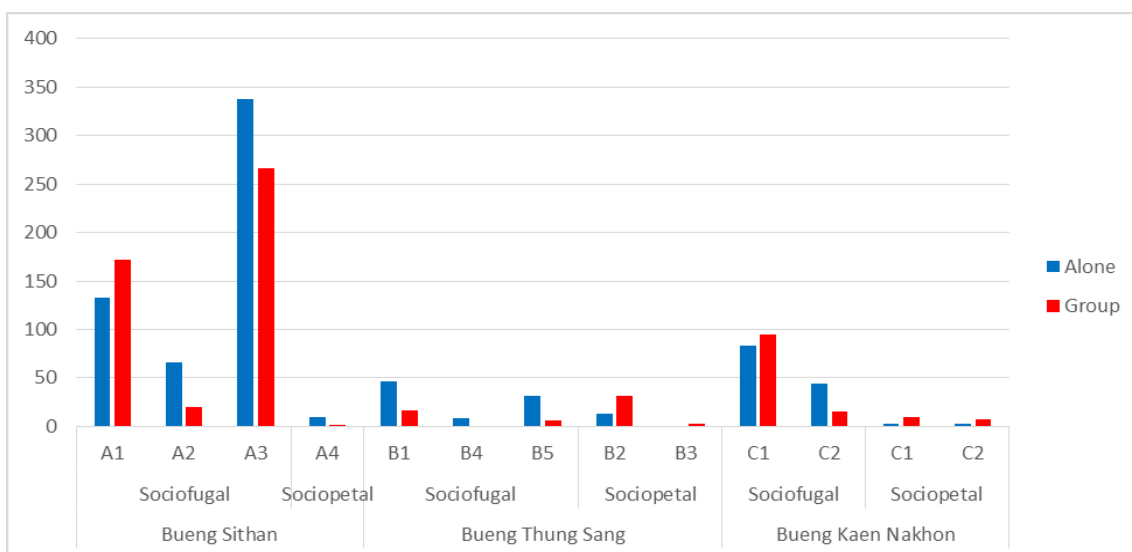
**Figure 2 Seating facilities in Khon Kaen city parks**

**Table 1 Characteristics of seating facilities in Khon Kaen city parks**

Seating Facilities	Characteristic	Sociopetality
A1	The seat shape is linear and arranged side by side	Sociofugal
A2	The seat shape is linear and arranged side by side	Sociofugal
A3	Seating facilities are arranged in a step with an elongated linear shape	Sociofugal
A4	The shape of the seating is a semi-circle and arranged centered	Sociopetal
B1	Linear seating that only accommodate two people are arranged as one chair	Sociofugal
B2	Seating facilities are arranged in a curved step	Sociopetal
B3	The seating shape is linear and arranged centered	Sociopetal
B4	Linear chairs that only accommodate two people are arranged as one chair	Sociofugal
B5	Seating for one person are arranged as facing outward	Sociofugal
C1	Linear seating extends, but some angles form an angle of less than 180 degrees so as to form an arrangement facing inward	Sociofugal and sociopetal
C2	Seating for one person are arranged side by side lengthwise, but some angles form an angle of less than 180 degrees so that they form an arrangement facing inward	Sociofugal and sociopetal

Figure 2 shows the seating facilities in three city parks in Khon Kaen, while Table 1 describes the specific characteristics of each seat in terms of sociopetal and sociofugal aspects. First, there are four types of seating facilities in Bueng Sithan (A1-A4). A1, A2, A3 are categorized as sociofugal because of their characteristics which can minimize social interaction, while A4 is sociopetal because they can maximize social interaction. Secondly, there are five seating facilities in Bueng Thung Sang Health Garden (B1-B5). B1, B4, and B5 have sociopetal characteristics, while B2 and B3 are sociopetal. In addition, there are two types of seating facilities in Bueng Kaen Nakhon Public Park (C1 and C2). C1 and C2 are elongated linear seats that describe the sociofugal design, but at certain angles, some angles have degrees below 180 to form sociopetal characteristics. Therefore, these two seating facilities create a sociopetal and sociofugal space. In conclusion, the seating facilities in Khon Kaen city parks are dominated by sociofugal seats.

**B. Community activities**



**Figure 3 Community activity in each seating facilities**

Figure 3 shows the community activity while sitting at each seating facility in Khon Kaen City Parks. Seating A3 is the seating with the highest frequency for both alone and group activities. They were followed by A1 and C1, where all three are sociofugal seats. However, in seating A1 and C1, when viewed from the graph, the frequency of group activity is higher than one person. This finding indicates that even though they are sociofugal, seats are still used for group activities.

**C. Relationship between the sociopetality aspect and community social activity**

Firstly, a chi-square analysis was carried out to determine whether there was a relationship between sociopetality and sitting patterns at Khon Kaen City Park seating facilities. Moreover, if there is a significant relationship, further analysis will be carried out, namely the odds ratio (OR), to determine the strength of the relationship between these variables.

**Table 2 Counted and expected value of the sitting pattern in Khon Kaen city parks**

Activity	Sociofugal		Sociopetal		Amount
	Counted	Expected	Counted	Expected	
Alone	752	735,632	28	44,368	785
Social	591	607,368	53	36,632	639
Total	1343		81		1424

**Table 3 Chi-square of sitting pattern in Khon Kaen city parks**

Chi-square	14,157
df	1
p-value	0,0002

The data collection results were processed using the chi-square statistical method to obtain a relationship between the sociopetality of seating facilities design and the activity pattern. The analysis in Table 2 shows the comparison between the counted value and the expected value from the behavioral mapping in city parks in Khon Kaen City. The expected value result indicates no tables with values below 5, so the analysis can continue by looking at the p-value. The analysis results in Table 3 stipulated that  $H_0$  = No relationship exists between the sociopetality and activity in seating facilities. In contrast,  $H_1$  = A relationship exists between the sociopetality and activity in seating facilities. The decision rule was if  $p < 0.05$ , then  $H_0$  was rejected; if  $p > 0.05$ , then  $H_0$  was accepted. The chi-square test results showed that  $p = 0.0002$  ( $p < 0.05$ ), meaning  $H_0$  was rejected. The conclusion was drawn that in the city parks in Khon Kaen city, the sociopetality of seating design has a strong relationship with community activity.

**Table 4 Odd ratio of sitting pattern in Khon Kaen city parks**

Odd ratio	Confidence interval	
	Lower 95%	Upper 95%
2,408509	1,504709	3,855172

Table 4 shows the value of the odd ratio, which can be interpreted that sociopetal seats tend to be used by people who come for social activities as much as 2.4 times greater than those who come for alone or solitary activity in city parks.

#### IV. DISCUSSION

Seating facilities in three Khon Kaen city parks identified sociofugal seating as dominating. The highest frequency seating most frequently used by the people of Khon Kaen is A3 in Bueng Sithan, followed by A1, which is also in Bueng Sithan, then C1 in Bueng Kaen Nakhon Public Park. These three seats have in common that the seats are placed on the edge of the lake. This study indicates that the community of Khon Kaen likes to sit in a seating facility close to the water. It is in [31] that attractive seating is a good place for one of them by having water as a special attraction.

Regarding sociopetality, the three seats are sociofugal seating that can minimize social interaction. A3 is stepped seating in an elongated linear form, A1 is linear seating arranged side by side, and C1 is wall seating arranged in an elongated linear form. These three seats force

users to form a linear style sitting pattern, as in [15], [14], [12] that linear side-by-side sitting makes the user's gaze point in the same direction so that social interaction becomes minimal. However, this kind of seating is still comfortable if used by only two people.

Because those seating facilities minimize social interaction, seats A3, A1, and C1 are predominantly used for individual or solitary activities. However, group activities also have a high frequency especially in A1 and C1. This finding is in line as in [15], revealed that some people sitting in a group choose a linear sitting pattern because allowed them to admire the view of park more easily. In addition to these three chairs, the group activity was also identified to be relatively high at seating facility B2 in Bueng Thung Sang Health Garden. This seating facility is stepped seating but forms a curve which makes it comfortable for groups because users can sit in a partial circle style so that the direction of view can meet comfortably. The seating is also located near the lake. This finding indicates that people in Khon Kaen like sitting around the water area even though the seating is sociofugal. The above phenomenon results in a not-too-high odd ratio result on the relationship between sociopetality and sitting pattern in Khon Kaen city parks, namely sociopetal seats tend to be used 2.4 times more often by people who come in groups than those who come alone. Even so, sociopetal seating can still contribute to increasing social activity in Khon Kaen city parks. As the number of sociopetal seating increases, so will the number of group activities in the city park seating area. This finding can be further reviewed by considering the sociopetality factor and the placement of seats around the lake area.

The findings obtained in Khon Kaen parks regarding community activity in seating facilities can be a reference for architects, planners, and designers in considering seating in urban parks to create urban parks that contribute to the vitality of urban spaces. In addition, these findings can help maintain the sustainability of parks in urban spaces, and the community can feel the social benefits of the urban park itself.

## CONCLUSION

This study examines the sociopetality of seating facilities design in Khon Kaen city parks and its relationship with community activities regarding social activity. The results show that there is a significant relationship between the two variables. Seating facilities in city parks which are dominated by sociofugal space which can minimize social interaction and lead to high solitary activities. However, people tend to use sociopetal seats for group activities rather than solitary activities. Therefore, this finding can be a reference for practicing architects, landscape architects, product designers, and urban planners in creating social activities in city parks to maximize the social function of the park as an urban green space.

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