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Exploratory Arrangement of City Park Facilities Through Visitor Behavior Mapping (Case Study: Adipura Park in Muara Enim City)

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Abstract

Rapid urban development has increased the public's need for urban parks as public spaces. However, the lack of a systematic evaluation mechanism based on user behavior has often resulted in facility layouts being out of sync with spatial characteristics and visitors' activity patterns. This causes park utilization rates to inadequately reflect spatial potential, requiring an empirical approach to understand the relationship between spatial characteristics and user behavior. This study analyzes the distribution of visitor activities and their relationship with spatial characteristics to formulate facility layout recommendations using behavior mapping at Adipura Park in Muara Enim, South Sumatra. A descriptive qualitative approach supported by quantitative data was applied through direct observation over seven days in three time periods. The park was divided into zones based on function and spatial characteristics. Results indicate variations in activity intensity and type across zones. Zones 2 and 3 show the highest utilization levels, while Zone 1 is moderate and mainly circulatory. Zones 4 and 5 tend to be passive due to limited facilities, comfort, and visibility. These findings underscore the importance of aligning facility layouts with user behavior as a basis for urban park planning. The findings provide empirical guidance for designing more responsive, efficient, and user-oriented public park spaces.

Keywords: *Behavior, Behavior Mapping, City Park Facilities, Public Spaces, Visitor Management*

Eksploratif Penataan Fasilitas Taman Kota Melalui Pemetaan Perilaku Pengunjung (Studi Kasus: Taman Adipura di Kota Muara Enim)

Abstrak

Perkembangan kota yang pesat meningkatkan kebutuhan masyarakat terhadap taman kota sebagai ruang publik. Namun, belum adanya mekanisme evaluasi sistematis dan berbasis perilaku pengguna menyebabkan penataan fasilitas seringkali tidak selaras dengan karakteristik ruang dan pola aktivitas pengunjung. Hal ini mengakibatkan tingkat pemanfaatan taman belum mencerminkan potensi ruang secara optimal, sehingga diperlukan pendekatan empiris untuk memahami hubungan antara karakteristik spasial dan perilaku pengguna. Penelitian ini bertujuan mengisi keterbatasan tersebut dengan menganalisis distribusi aktivitas pengunjung serta keterkaitannya dengan karakteristik spasial untuk merumuskan rekomendasi penataan fasilitas melalui metode behavior mapping pada Taman Adipura di Muara Enim, Sumatera Selatan. Pendekatan yang digunakan adalah deskriptif kualitatif didukung data kuantitatif, melalui observasi langsung selama tujuh hari pada tiga periode waktu. Area taman dibagi ke dalam beberapa zona berdasarkan fungsi dan karakteristik ruang. Hasil penelitian menunjukkan adanya perbedaan intensitas dan jenis aktivitas antar zona. Zona 2 dan zona 3 memiliki tingkat pemanfaatan tertinggi, sedangkan Zona 1 bersifat sedang dan lebih sirkulatif. Zona 4 dan zona 5 cenderung pasif akibat keterbatasan fasilitas, kenyamanan, dan visibilitas. Temuan ini menegaskan pentingnya kesesuaian antara penataan fasilitas dan perilaku pengguna sebagai dasar penataan taman kota.

***Kata-kunci**: Fasilitas Taman Kota, Penataan Pengunjung, Perilaku, Pemetaan Perilaku, Ruang Publik*

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Introduction

Urban parks are part of green open spaces (GOS) that serve ecological, social, and aesthetic functions within the urban environment. Urban parks are central to advancing urban sustainability and improving quality of life [1]. Parks are examples of public spaces that feature a variety of supporting facilities [2]. Well-designed parks can improve environmental quality and strengthen social cohesion among city residents [3]. Law No. 26 of 2007 on Spatial Planning stipulates that every city is required to provide at least 30% of its total area as green open space, with 20% of that consisting of public green open spaces such as urban parks. This provision indicates that the existence of urban parks is not merely a quantitative requirement but also demands high quality planning and management capable of addressing the needs and activity patterns of urban communities.

Public spaces serve as venues for human interaction [4]. The primary function of open spaces is to provide a setting for the community to socialize, interact, and communicate with one another [5], [6]. Other functions include serving as venues for sports, recreation, performances, exhibitions, and official ceremonies [7], as well as providing opportunities for relaxation and education for residents [8]. Factors driving community use of public spaces are influenced by the local environmental conditions [9]. Ideally, public spaces are shaped based on the actual needs of visitors, not merely on visual design or aesthetic considerations. Human behavior in public spaces is influenced by factors such as physical comfort, safety, spatial function, and social relationships [10]. Jan Gehl classifies activities in public spaces into three categories: obligatory activities (e.g., walking to work), optional activities (playing, relaxing), and social activities (interacting with others) [10]. The design of public spaces must integrate physical design approaches, spatial management, and sensitivity to the needs of diverse community groups [11]. The busier the park, the higher the frequency of interactions among users [12]. Therefore, an empirical approach is needed that can systematically record and map actual visitor activity patterns, so that the relationship between spatial characteristics and user behavior can be objectively understood as a basis for evaluating and designing more responsive public spaces.

Behavior mapping is a systematic observation method used to record and analyze human activity in specific spaces, particularly public spaces. This method was developed in practice by William H. Whyte in his research on the use of urban spaces in New York [13]. Behavior mapping can serve as a crucial preliminary step before urban space revitalization planning, thereby aiding in the efficient management and design of parks tailored to usage patterns [14], [15]. In practice, behavior mapping involves directly observing activities at the site and recording data on a prepared spatial map to determine how visitors use the designed space. The behavior mapping process is non-intrusive, conducted from a distance, and often carried out in public spaces [16]. This allows for spatial analysis of activity hotspots, vacant areas, and mismatches between facility elements and their actual functions. With these capabilities, behavior mapping serves as a relevant tool for examining the distribution of visitor activities and identifying patterns of space use at the study site as a basis for further analysis

Research on Adipura Park using a behavior mapping approach is important because studies on urban park design have traditionally focused on physical and aesthetic aspects, while data driven analysis of user behavior remains limited, particularly regarding Adipura Park in Muara Enim. This theoretical gap indicates that the integration of spatial characteristics and actual visitor activity patterns in the evaluation of public spaces is not yet optimal. Therefore, a behavior mapping approach is necessary to generate a more accurate empirical understanding of the relationship between spatial configuration and user behavior as a basis for strengthening evidence-based studies on urban park planning.

As a public open space at the district level, Adipura Park in Muara Enim Regency, South Sumatra, exemplifies the character of a city park on a mid-sized urban scale, with usage dynamics distinct from those of large cities. Although behavior mapping has been employed in studies of public spaces, its application to city parks in non-metropolitan areas remains relatively limited. This highlights the need for research that examines the relevance of this method within different spatial and social contexts. This study aims to explore the application of behavior mapping to identify the distribution of visitor activities and their relationship with spatial characteristics. Adipura Park was selected as the case study because it is the main urban park of Muara Enim with diverse functions and usage intensities, making it relevant for enriching behavior-based public space evaluation studies in medium-sized cities.

Methods

This study employs a post-positivist paradigm that emphasizes the systematic and objective collection of empirical data, while acknowledging that social reality is contextual and cannot be understood in absolute terms [17], [18]. This paradigm aligns well with the application of behavior mapping because the study not only counts the number of visitors or types of activities but also seeks to understand how and why visitors utilize the park area at specific times and locations. This approach allows for the integration of measurable observational data, such as the distribution and intensity of activities, with interpretations of behavioral patterns within spatial and social contexts. Consequently, the study not only quantitatively describes the use of space but also explains the relationship between spatial characteristics and the dynamics of visitor activities, thereby addressing the limitations of behavior-based urban park evaluation studies in the context of medium-sized cities.

Data Collection Methods

This study employs a behavior mapping method using a descriptive qualitative approach supported by quantitative data to analyze patterns of space utilization and visitor interactions with facilities at Adipura Park, Muara Enim Regency. The descriptive qualitative approach in behavior mapping is understood as an effort to systematically describe patterns of visitor activity based on field observations, while interpreting the meaning of such behavior within specific spatial and social contexts. Quantitative data were obtained by recording the number of visitors, types of activities, duration, and distribution of activity points on a base map of the park, which was then presented in the form of frequency tables, percentages, and activity–zone matrices to identify trends in space usage. Qualitative data was obtained through direct observation of interaction patterns, movement patterns, location choices, and environmental conditions that influence activity, including field notes on visit times and spatial conditions. The integration of these two types of data was conducted through a comparative analysis between usage intensity (quantitative) and behavioral descriptions (qualitative), thereby yielding a more comprehensive understanding of the relationship between spatial characteristics and visitor activities. The selection of Adipura Park as the sole case study was based on its position as the primary urban park at the district level, featuring multifunctional uses and diverse usage intensities, making it representative for exploring the application of behavior mapping in the context of a mid-sized city and enabling in-depth, context-specific analysis aligned with local characteristics.

Field observations were conducted for one consecutive week during three representative time periods: mornings from 7:00 to 8:00 a.m., afternoons from 12:00 to 1:00 p.m., evening from 5:30 PM to 6:00 PM on weekdays and weekends. The researchers recorded visitor distribution, activity intensity, duration of space usage, and crowd concentration points as quantitative data to support behavior mapping. The subjects of observation included all park users present during the observation without direct intervention, grouped by age category (children, adolescents, adults, and the elderly), gender, and type of activity performed (sports, recreation, socializing, or passive activities). Data were recorded systematically on a base map of the park to identify trends in space usage according to time, user groups, and activity types.

Through field observations, researchers recorded visitor distribution, activity intensity, duration of use, and crowd concentration points as quantitative data to support behavior mapping. This data was combined with qualitative descriptions of activity characteristics, spatial conditions, and visitor behavior patterns in each park zone. Subsequently, the mapping results were analyzed to assess the suitability of facilities with actual usage patterns, identify ineffective or underutilized areas, and formulate recommendations for a more optimal facility layout. This combined approach is illustrated in Figure 1.

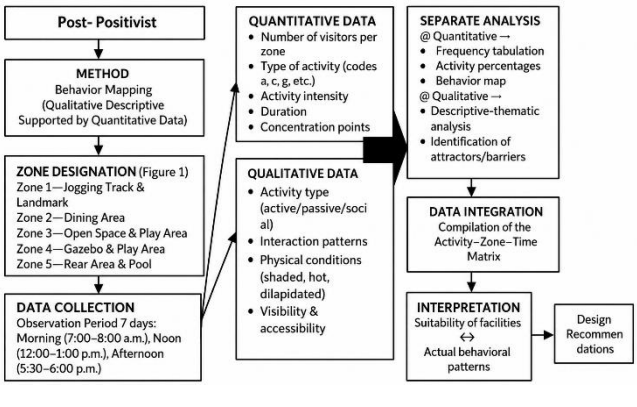

Figure 1. Research Methodology Diagram

Field observations were conducted over a consecutive one-week period. This timeframe was chosen to capture variations in user activity during departure hours, break times, and return or afternoon hours, thereby allowing for a comprehensive observation of spatial usage patterns. A one-week observation period was considered sufficient because this study is exploratory and descriptive in nature,

aiming to identify general patterns of behavior, intensity of space use, and activity trends at the study site; thus, it is not oriented toward long-term statistical generalizations, but rather toward an initial mapping of phenomena and a contextual understanding of spatial characteristics. The one-week period also allows researchers to capture variations in activity between weekdays and weekends, so that differences in spatial usage patterns can be directly compared. Repeated observations at the same time over seven days reveal relatively consistent patterns, making the data sufficiently representative for the initial analysis phase and the formulation of design recommendations or spatial interventions.

The survey area was divided into several zones, as shown in Figure 2. The selection of zones in this study was based on the spatial characteristics and functions of each area within Adipura Park. Zone 1 is located far from the main entrance but remains visible; it features a jogging track and the "I Love Muara Enim" visual element, which serves as the main attraction for visitors. Zone 2 is situated along the highway and is dominated by a food court area, encouraging visitors to stop by and linger. Zone 3 is located directly in front of the entrance and adjacent to the "Tugu Adipura" monument, and features a large open space that is frequently used for renting children's play equipment and hosting community events. Zone 4 is located near the parking area and prayer room, featuring seating, a gazebo, and children's play equipment, serving as a transitional space and gathering area. Meanwhile, Zone 5 is situated at the back of the park, relatively hidden from the front area, and equipped with seating and a small pond, making it a quieter and less monitored area.

Data Analysis Methods

Data analysis in this study was conducted using a behavior mapping approach focused on identifying visitor activity patterns in each zone of Muara Enim's Adipura Park, as illustrated in the diagram in Figure 2. Data from field observations conducted across three time periods (morning, afternoon, and evening) over seven days revealed visitor presence, types of activities, intensity of space usage, and variations in visit duration. Visitor activities were processed through a coding process based on public space behavior standards; for example, code "a" for leisurely walking, code "c" for jogging, or "g" for viewing the scenery. These coding results were then organized into frequency tables based on zone and time period to identify activity intensity in each zone.

The coded data are then remapped onto the park's base map to form a visual pattern showing the distribution of activity points, or behavior mapping. This visualization enables spatial analysis of high activity areas (hotspots), transition zones, and areas with low usage levels. Through this mapping, the relationship between visitor behavior and the park's physical characteristics can be identified, including the presence of facilities that attract visitors or, conversely, those that are not being utilized optimally. This quantitative data is combined with qualitative notes detailing the context of space usage, the physical condition of zones, and factors that support or hinder activities. The first method of integration involves analyzing quantitative data, such as activity frequency, visitor numbers, and spatial usage intensity to determine dominant patterns across each zone and observation period. Second, qualitative data, such as notes on the physical condition of zones (shade, cleanliness, availability of benches), the atmosphere of the space, thermal comfort, and factors supporting or hindering activities, are classified into specific themes. Third, both sets of data are cross-referenced in a zone

Figure 2. Map of the Characteristics of Each Observation Zone

and time-based matrix, ensuring that each quantitative finding is accompanied by contextual explanations that strengthen the interpretation. The results of this integration are then reverified using a behavior mapping chart to assess the alignment between activity intensity and the physical characteristics of the space, thereby enabling a comprehensive understanding of visitor behavior patterns.

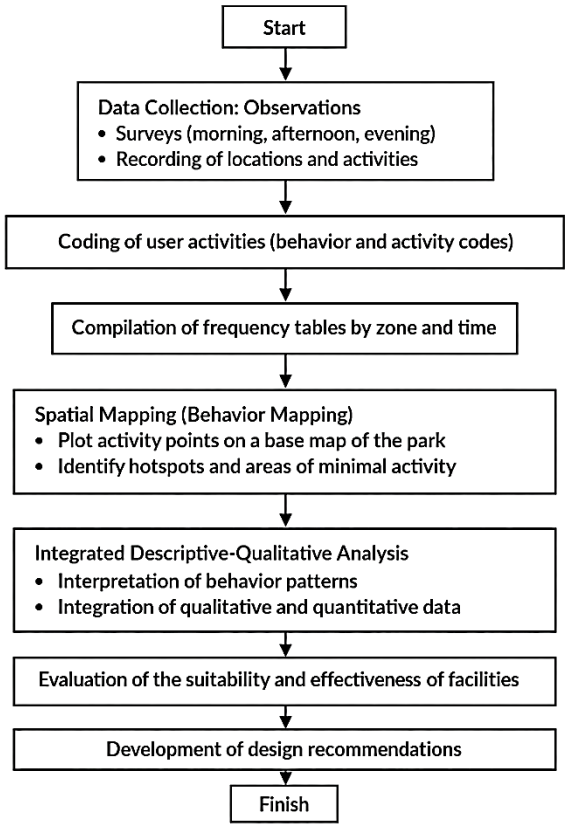

Figure 3. Research Flowchart

Results and Discussion

Visitor Traffic Patterns by Time. Observations over a seven-day period show that visitor traffic at Adipura Park varies significantly across the three observation time periods. During the morning period (7:00–8:00 a.m.), there was a peak in visitor numbers, particularly on weekends, dominated by visitors engaged in cleaning activities and food vendors in Zone 2, as well as jogging, calisthenics, and light exercise in Zone 3, as shown in Figure 4.

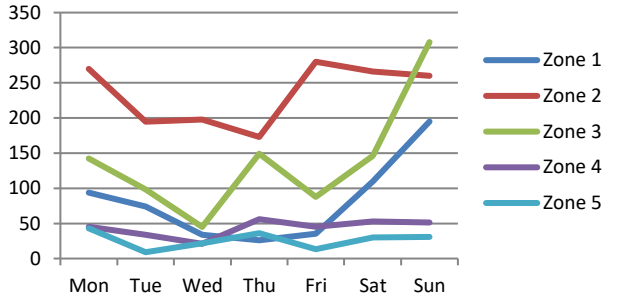

Figure 4. Morning Visitor Patterns

Based on the results of observations during the midday period (12:00–1:00 PM) shown in Figure 5, visitor traffic decreased significantly. Most of the activity was dominated by visitors resting or relaxing in shaded areas in Zones 1 and 3, and relaxing while eating and drinking in Zone 2

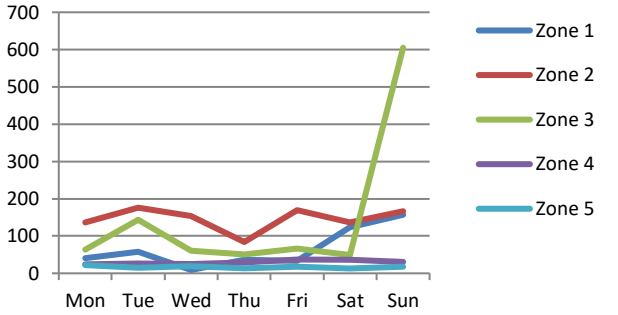

Figure 5. Afternoon Visitor Patterns

Meanwhile, the results of the afternoon observation period (5:30–6:00 p.m.) in Figure 6 show a slight increase in visitor numbers compared to the midday period, particularly in Zone 3, which is dominated by areas for children's game rentals, play, leisurely walks, socializing, and family activities. Zone 2, on the other hand, is dominated by food vendors.

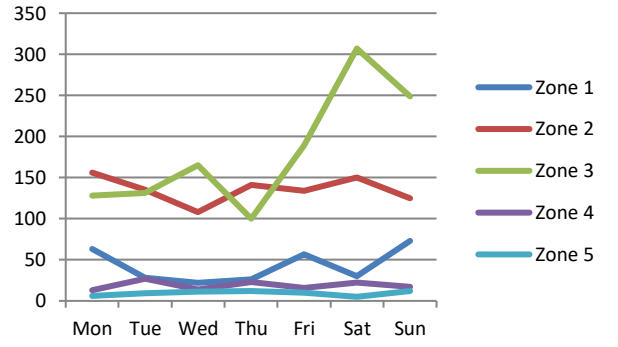

Figure 6. Evening Visitor Patterns

Data from visitor visits by time of day shows that usage patterns at Adipura Park are heavily influenced by the recreational activities preferred by the public, such as leisurely walks, jogging, and morning exercises, as well as dining, sitting, and casual conversation.

Distribution of Visitor Activity by Zone

Behavior mapping analysis shows that each zone has distinct activity characteristics. The images were selected based on the most frequent activities at different times and in each zone. Zone 1 features a jogging track and the “I Love Muara Enim” sign. In the morning, there is high activity in sports, chatting, and relaxing while sitting on the grass, ground, or poolside, as shown in Figure 7.

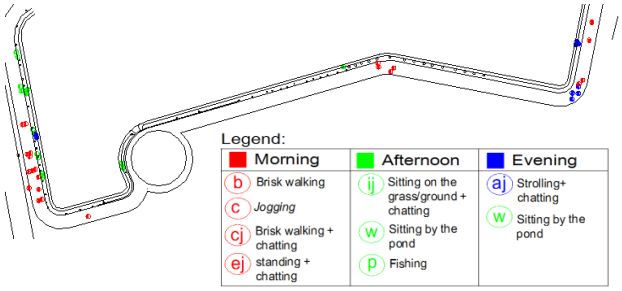

Figure 7. Visitor Activity in Zone 1

Zone 2, shown in Figure 8, is located near the food court and is the zone with the longest visit duration, as visitors tend to sit and relax or enjoy their meals while chatting.

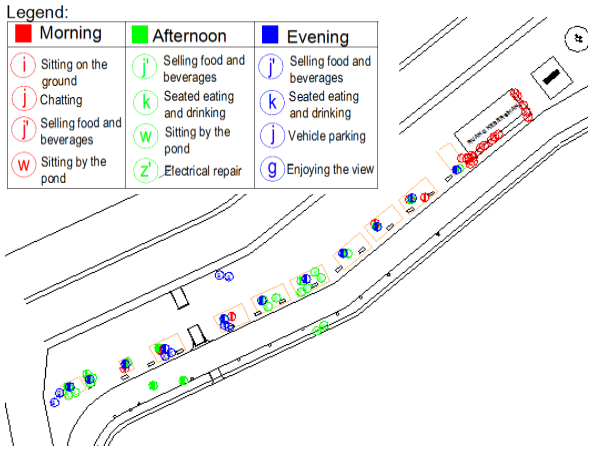

Figure 8. Visitor Activity in Zone 2

Zone 3, shown in Figure 9, is located near the entrance and the Adipura Monument and serves as a transition area. However, in the morning, visits tend to last a bit longer due to exercise activities in the courtyard, and in the afternoon, when the toy rental booths are open and bustling, visitors tend to play and engage in activities for longer periods.

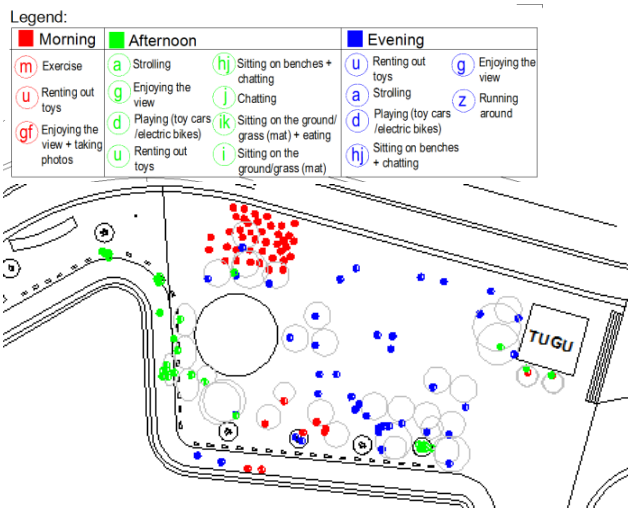

Figure 9. Visitor Activity in Zone 3

Zone 4 in Figure 10 shows a relatively low distribution of visitor activity throughout the day. Activity is concentrated only at certain points, such as gazebos, seating areas, and play areas. The play equipment and seating facilities in Zone 4 are largely in a state of disrepair, which reduces the comfort and appeal of the area.

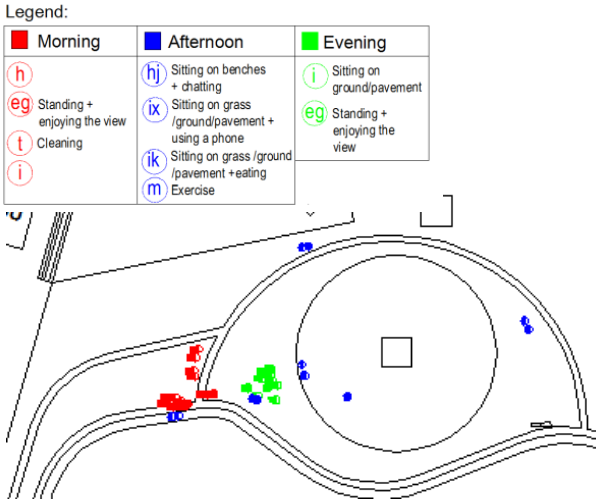

Figure 10. Visitor Activity in Zone 4

Furthermore, Zone 5 in Figure 11 is the zone with the lowest activity. This area attracts few visitors because it is located at the back of the park and is obscured by many large trees, making it less visible and lacking in features that would draw visitors to the area.

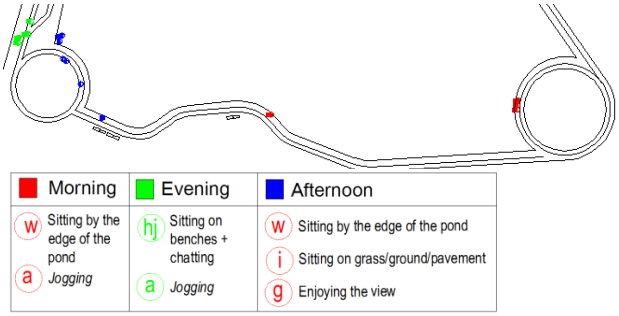

Figure 11. Visitor Activity in Zone 5

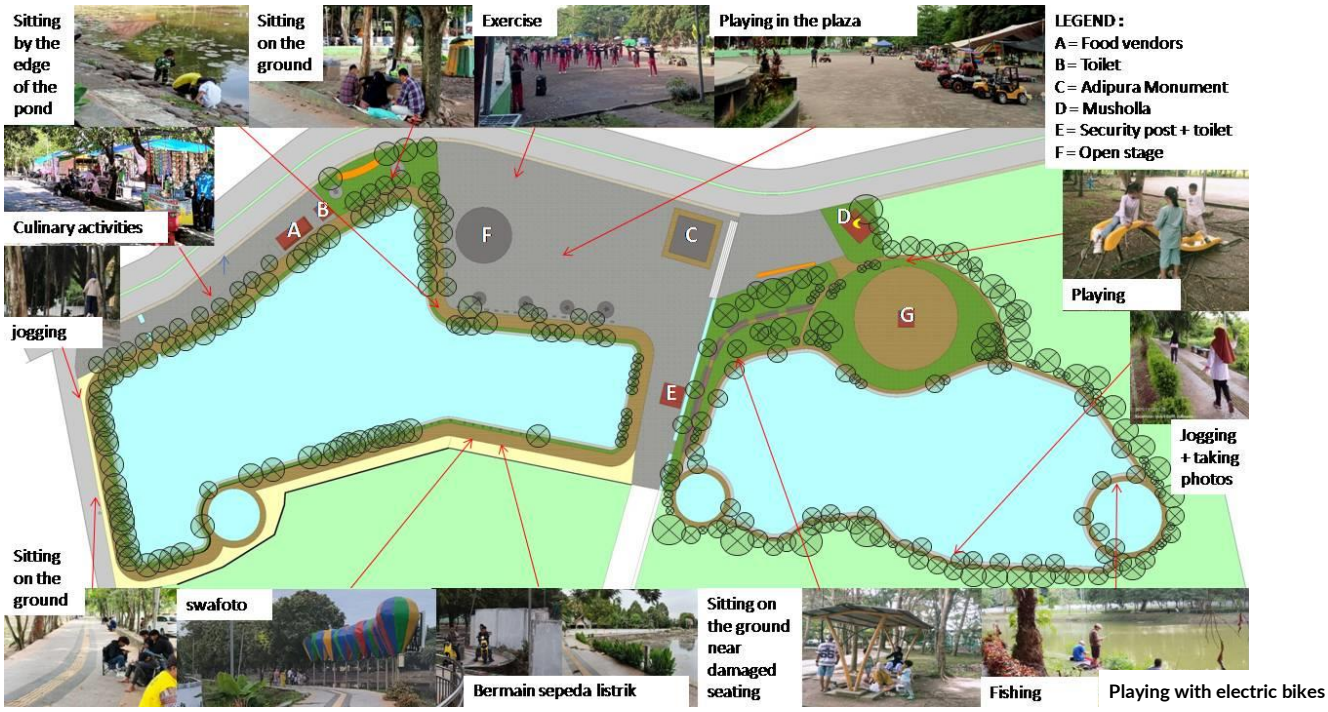

Figure 12. Visitor Activity by Zone

Table 1. Distribution of Visitor Activities

No	Zone	The Daily Rhythm of Society	Environmental Comfort	Availability of Facilities	Attractions in the Area	Activity Level
1	Zone 1 (Jogging track & icon "I Love Muara Enim")	Busy in the morning (exercise); moderate activity in the afternoon	It is quite comfortable, but some areas are not very shaded	Food stalls and seating area	Park landmark icon	Moderate high (morning)
2	Zone 2 (Food court)	Busy from noon to evening, long visit duration	Comfortable for sitting and gathering	Food stalls & seating area	Mealtime activities and social interaction	High (Primary hotspot)
3	Zone 3 (Near the entrance & the Adipura monument)	Busy in the morning (exercise) and in the afternoon (toy rental)	Comfortable for sitting and gathering	Playground, game rentals	Muara Enim Adipura monument and Main access	High (Hotspot)
4	Zone 4 (Gazebo & Children's playground)	Limited but steady number of visitors throughout the day	Less comfortable (facilities are in disrepair)	Prayer room, gazebo, and playground equipment (partially damaged)	Limited, poorly maintained	Low
5	Zone 5 (Back area of the park)	Quiet all day long	Difficult to access visually; hidden by trees and bushes	Limited facilities	Lacks visual appeal	Very low (Passive zone)

Based on the previous discussion regarding the distribution of visitor activity by zone in Figure 12 and Table 1, it can be concluded that the utilization of Adipura Park's public spaces is highly dependent on the daily routines of the community, the comfort of the environment, the availability of adequate facilities, and the attractions present in each zone. The main hotspots with high activity are in Zone 2, with its culinary facilities, and Zone 3, which is adjacent to the Adipura monument and the game rental facilities in the courtyard. The moderate activity zone is in Zone 1 because part of the area is not shaded by trees, so it tends to function solely as a circulation area. Zones 4 and 5 are passive areas with low visitor activity due to limited facilities, a shortage of attractive elements, and their locations, which do not clearly indicate their intended use

Results of Visitor Behavior Analysis

Research findings indicate that visitor activity distribution at Adipura Park in Muara Enim is not evenly spread but rather concentrated in zones that offer supporting facilities, a comfortable environment, and stronger activity appeal. Zones 2 and 3 are the areas with the highest activity intensity because they provide spaces for social interaction, such as food courts, seating areas, and play areas, that allow visitors to gather, eat, and engage in activities together. This pattern aligns with findings in "Behavior

Mapping and Its Application in Smart Social Spaces" [19], which confirm that behavior mapping can reveal the relationship between human activity and spatial configuration, thereby identifying zones with high usage intensity as well as underutilized areas.

The results of the observations also indicate that human behavior in public spaces is influenced by various environmental factors, such as physical comfort, spatial function, safety, and opportunities for social interaction. Areas with more comfortable physical conditions such as spaces free of weeds, featuring shady trees, and sheltered from direct sunlight tend to be more popular among visitors. Additionally, zones with clearly defined spatial functions also exhibit higher usage rates, such as jogging tracks, food courts, game rentals, and open-air activity spaces that provide facilities suited to visitors' needs. These findings align with the study "Public Park Behavior in Da Nang: An Investigation into How Open Space Is Used" [20], which states that environmental comfort, the presence of facilities, and accessibility are key factors influencing the intensity of public open space usage (see Table 2).

From the perspective of public space theory, the findings of this study also support the ideas presented in the book "The Social Life of Small Urban Spaces" [13], which explains that people tend to choose spaces that are comfortable for sitting, easily accessible, and feature engaging social activities. Whyte also emphasizes the principle that "people attract people," meaning that the presence of initial activity in a space will draw more visitors to come and

Table 2. Research Mapping

No	Source	Research Focus	Methods	Contributions	Relevance
1	"Behavior Mapping and Its Application in Smart Social Spaces" [19]	Behavior mapping and its application in social settings	Behavior mapping and observation	Emphasizing that behavior mapping is a comprehensive evaluation method for analyzing patterns of urban park use through the integration of spatial, temporal, and social dimensions as the basis for evidence-based public space planning.	Behavior mapping is an effective exploratory approach for analyzing visitor usage patterns and activity distribution, enabling the identification of active zones, low-activity zones, and activity variations over time-serving as the basis for designing park facilities that are responsive to visitor needs
2	"Affordance-based design evaluation: Bridging architectural intention and adaptive user behavior" [23]	Development of an Affordance-Based Architectural Design Evaluation Framework	Theoretical or conceptual research (affordance, agency, niche, verification–validation)	Offers a new approach to evaluating architectural design by examining how spaces are actually used by users, ensuring that the design aligns with its intended function and adapts to the real-world behaviors and needs of visitors.	Both emphasize the importance of understanding the relationship between spatial configuration and the actual behavior of park visitors as the basis for evaluating and designing public spaces that are more adaptive and responsive.
3	"Public Park Behavior in Da Nang: An investigation into how open space is used" [20]	Understanding visitor behavior patterns and the physical factors that influence the use of urban parks through the behavior mapping method	Behavior mapping, observation, and questionnaires	To identify the physical factors of open spaces that influence visitor activity and satisfaction as a basis for evaluating and improving the design of urban parks.	Provides a theoretical foundation for understanding the relationship between visitor behavior and the physical elements of a park through the use of behavior setting and behavior mapping approaches.
4	"Patterns of human behavior in public urban green spaces: On the influence of users' profiles, surrounding environment, and space design" [21]	Analysis of User Behavior Patterns in Public Urban Green Spaces (PUGS) and Spatial Elements in Urban Parks	Behavior mapping, observation, ANOVA, chi-square test, and Pearson's correlation to identify relationships between user behaviors	Understanding the relationship between user behavior, characteristics, and sociodemographic factors, as well as the design elements of green open spaces, as a foundation for planning and designing urban parks that are more responsive to users' needs.	This demonstrates that behavior mapping can be used to identify the relationship between visitors' behavioral patterns and the design elements of green open spaces, which serves as the basis for exploring ways to arrange urban park facilities so that they better align with users' needs and activities.
5	"Analyzing GPS Data for Psychological Research: A Tutorial" [22]	Developing practical guidelines for GPS data analysis to understand patterns of human mobility and movement in space	GPS spatial analysis with data preprocessing, DBSCAN clustering, and mobility feature calculation	Providing a methodological guide for the analysis of human mobility patterns based on spatial data	Providing a spatial analysis approach that can support the understanding of visitor activity patterns in behavior mapping studies of public spaces

interact. This phenomenon is evident in Zone 2, which features culinary activities, making it a hub of activity and resulting in longer visit durations compared to other zones.

In addition, the comfort of the environment plays a significant role in shaping social activities in public spaces. This aligns with the concept outlined in the book “Life Between Buildings” [10], which explains that the quality of public spaces is greatly influenced by the physical conditions of the environment, such as the comfort of seating, protection from heat, and the presence of shade. Gehl states that social activities in public spaces will flourish when the conditions of the space allow for optional activities, such as sitting leisurely, chatting, or observing the surroundings. This is evident in the increased interaction among visitors in Zone 2, such as sitting together, chatting, and eating together as well as family activities in Zones 3 and 4, where parents accompany their children while they play in the playground or gazebo.

On the other hand, factors such as safety and visibility also influence visitors’ preferences regarding space usage. This is evident in the low level of activity in Zone 5, which is located at the back of the park and is less visible from the main area, causing it to be rarely visited despite having a fairly large open space. This finding aligns with the results of the study “Patterns of Human Behavior in Public Urban Green Spaces” [21], which indicates that patterns of urban green space usage are influenced by a combination of user characteristics, the quality of the surrounding environment, and the design of the available space. Areas with good visibility, complete facilities, and elements that attract activity tend to have higher usage rates compared to areas that are less visible and lack facilities.

In addition, the spatial analysis approach used in this study shares similar principles with the analysis of human mobility described in “Analyzing GPS Data for Psychological Research: A Tutorial” [22]. That study demonstrates that an understanding of human movement patterns can be obtained through the spatial mapping of activity distributions. Although this study employs direct observation via behavior mapping, this method remains capable of systematically identifying visitor activity patterns and providing insights into how public spaces are utilized by the community.

Thus, the behavioral patterns identified in this study not only support previous theories and research findings but also indicate that the use of public space in Adipura Park is shaped by a combination of physical, functional, and social factors that interact to influence people’s preferences and activities in utilizing public space

Design Recommendations

Based on the results of visitor behavior analysis using the behavior mapping method, it is evident that the layout of facilities at Adipura Park needs to be adjusted to align with visitors’ spatial usage patterns and preferences. Figures 13 and 14 indicate that dedicated dishwashing facilities are needed for vendors or visitors dining in Zone 2. Providing these facilities is essential to prevent dishwashing activities, which have traditionally taken place along the jogging track, thereby ensuring the cleanliness and functionality of the sports path are maintained. Additionally, the food kiosks currently lack a neat appearance, necessitating improvements to their facade design.

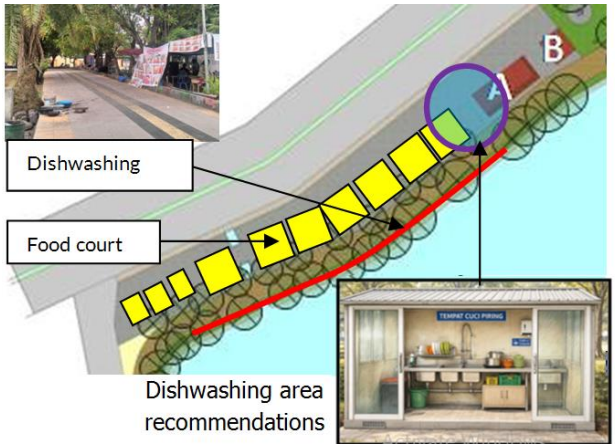

Figure 13. Dedicated Dishwashing Area for Vendors

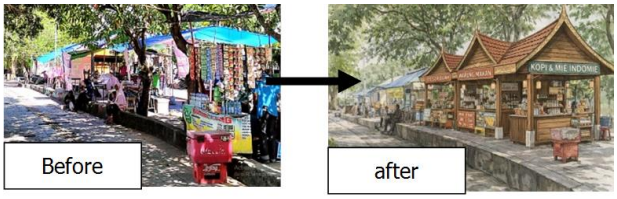

Figure 14. Recommended Food Court Layout

In Zone 3, damaged seating needs to be repaired, and wider seating should be added, as the current facilities can only accommodate 2–3 people, making them uncomfortable for visitors who come with their families. Additionally, the use of gazebos is relatively low due to the heat, so visitors prefer seating in shaded areas under trees. The seating areas requiring repairs are indicated in Figure 15.

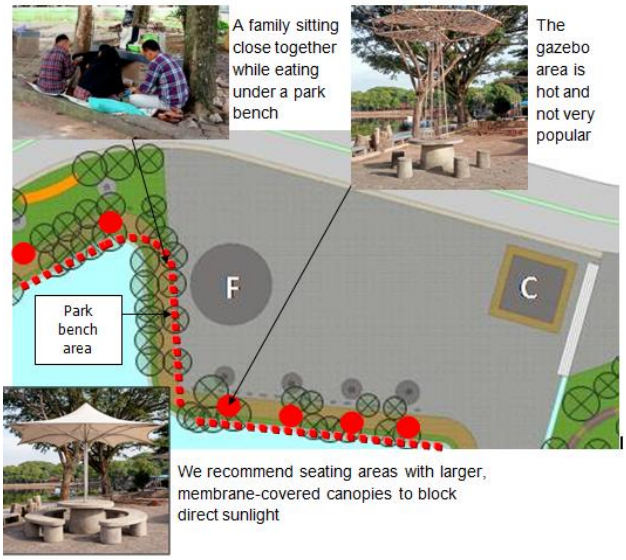

Figure 15. Areas in Zone 3 That Need Improvement

In Zone 1, which is a zone of moderate activity, additional shade structures and seating are needed in the quiet areas shown in Figure 16 so that visitors can comfortably use the area for recreation and take photos at the "I Love Muara Enim" sign.

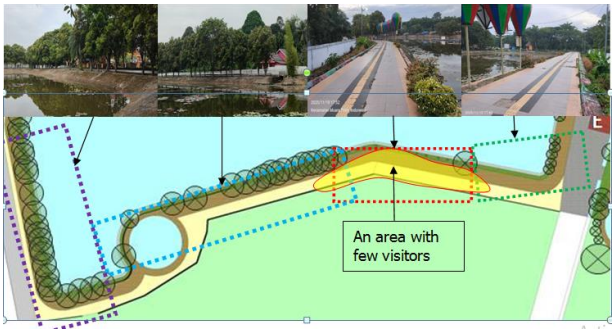

Figure 16. Areas in Zone 1 That Require Improvement

Meanwhile, passive zones such as Zone 4 and Zone 5 require more strategic interventions, such as repairs and additions to seating facilities and play equipment, improvements in visual quality, enhanced lighting and physical comfort through the removal of weeds, as well as the provision of activity attracting elements to revitalize these areas. Overall, these findings indicate that facility planning must be oriented toward the actual needs of visitors and the spatial conditions of each zone so that public spaces can function more optimally, inclusively, and sustainably.

The Researchers' Interpretation

This study is intended to explore the layout of urban park facilities by analyzing visitors' actual behavior through behavior mapping. The observed patterns of visitor activity, including the types of activities, locations, times, and levels of crowding, reveal how park facilities are utilized by the public. Areas that are frequently used indicate that the facilities meet visitors' needs, while areas that are rarely used suggest limitations in functionality, comfort, or the appeal of the space.

Based on this interpretation, the researchers conclude that the layout of park facilities should be based on visitor behavior patterns, not merely on aesthetic considerations. By mapping visitor behavior, it is possible to identify zones that need to be maintained, improved, or redesigned. Therefore, the findings of this study serve as the basis for formulating recommendations for the layout of urban park facilities that are more effective, comfortable, and aligned with the needs of the community.

Conclusion

This study shows that the pattern of space utilization at Adipura Park in Muara Enim is not evenly distributed but is concentrated in zones that feature supporting facilities, a comfortable environment, and activities capable of fostering social interaction among visitors. Behavior mapping results show that Zones 2 and 3 are the areas with the highest activity intensity due to the presence of food and beverage facilities, play areas, and open spaces that facilitate social interaction and recreational activities. Meanwhile, Zone 1 exhibits moderate activity and tends to function as a circulation and sports area, while Zones 4 and 5 are classified as passive zones due to limited facilities, low spatial visibility, and environmental conditions that do not support visitor comfort.

These findings confirm that the effectiveness of public spaces is greatly influenced by the alignment between spatial characteristics, facility quality, and user activity patterns. Through a behavior mapping approach, this study was able to identify the spatial and temporal distribution of visitor activities, thereby providing an empirical basis for evaluating the utilization rate of each park zone. Therefore, the design of urban park facilities should be guided by a user behavior-based approach, taking into account activity needs, environmental comfort, and attractive elements capable of enhancing the intensity of social interaction in public spaces.

AI Use Declaration

The author states that artificial intelligence (AI), such as ChatGPT, was used to a limited extent in the preparation of this manuscript, specifically to assist with language translation and grammatical refinement. All ideas, analyses, data interpretations, and

conclusions are the result of the authors' own thinking and remain the authors' sole responsibility.

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