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Application of Behavioral Architecture to the Land Layout Configuration of Pre-School and Daycare Center Facilities in Surabaya

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Abstract. Surabaya, *one of Indonesia's major cities, has a high demand for early childhood education facilities, including Pre-School and Daycare Centers. However, many of these facilities are not optimally designed, particularly in supporting social interaction, children's exploration, and the comfort and safety of the learning environment. In the design process, a qualitative descriptive research method was used, involving the collection of primary data through direct field observation, as well as secondary data obtained from online case studies, including references from papers, journals, and books. Based on the analysis, a behavioral architecture approach was applied to the "Adaptive" site planning concept in the design of Pre-School and Daycare Centers in Surabaya. This approach aims to create a learning environment that is more responsive to children's natural behavior in play and learning, thereby supporting their development optimally, safely, and comfortably, dynamically and interactively.*

Keywords: *Behavioral Architecture, Adaptive, Pre-School, Daycare*

1. Introduction

Surabaya is one of the big cities in East Java Province that continues to develop in various aspects, including infrastructure, education, and public facilities. As a center of economy and education, the need for children's educational facilities, such as pre-school and daycare, is increasing along with population growth. However, there are still many children's educational facilities that are inadequate in various aspects, such as security, comfort, and design that is in accordance with the needs of children's physical and psychosocial development, which are often not a top priority. This encourages the need for planning children's educational facilities that not only meet safety and comfort standards, but are also able to support children's cognitive, social, and motor development optimally.

By considering the characteristics of early childhood, who are active and easily influenced by the surrounding environment, the design of pre-school and daycare center layouts in Surabaya needs to be designed to stimulate children's social interaction, creativity, and psychological comfort. Therefore, the behavioral architecture approach in the concept of adaptive land layout is a solution to create a flexible learning environment, responsive to children's needs, and able to adapt to changes in their activity patterns and development. In addition, the integration of natural elements and strategically designed spatial zoning can enhance a more comfortable and enjoyable learning experience. With this approach, pre-schools and daycares in Surabaya are expected to not only function as places for care and learning, but also as environments that support children's holistic development optimally. Outdoor facilities are maximized to create a stimulating and interactive area so that children can freely explore, play, and develop their motor and social skills.

2. Theory Review

According to Jessica (2011) in (Sapti 2019), Behavioral Architecture can be interpreted as a built environment created by humans as a place to carry out their activities by considering all aspects of the responses or reactions of humans themselves, according to their mindset, characteristics, or perceptions as users. Meanwhile, according to Clovis Heimsath in his book "Behavior Architecture, Towards an accountable design process", interprets that behavior in architectural design is related to occupants and buildings and the relationship between the two

in the context of behavior and behavior-based architectural design techniques. Soegino (2007) that land use is a human activity that is directly related to the location and physical condition of the land. Sugandhy (2008) that land use is an ongoing process to utilize land optimally and efficiently for development. Jayadinata defines land use as a form of land utilization activity at a certain time.

School-age children, according to psychologists, are referred to as the exploration period or the age of asking questions. Because at this time, children like to explore the environment, and there is a drive for curiosity about what is around them, both feelings and the mechanisms of environmental life. In addition, children at the developmental age also tend to often ask about things around them (Sabri, 1993). According to George S. Morrison, the pre-school age of children is in the range of 3-5 years. According to Patmonodewo (2003), Daycare is one of the means of child care in groups, usually carried out during working hours. Daycare is an effort to care for children who are less able to receive complete parental care, but not to replace the task of parents in caring for children. Meanwhile, according to Susan Kontos (1987), Daycare is described as an environment where children are given care or care by adults while their guardians/parents are at work. She emphasized the importance of safe, stimulating, and attentive care in a daycare environment.

3. Methods

The method used in the study of Land Arrangement in Pre-School and Daycare Center Planning is descriptive qualitative by collecting primary data obtained through direct observation of objects in the field and secondary data obtained through online access to case studies from papers, journals, and books. This method provides an overview and solutions to problems in designing related to land arrangement by utilizing the Adaptive concept as its approach.

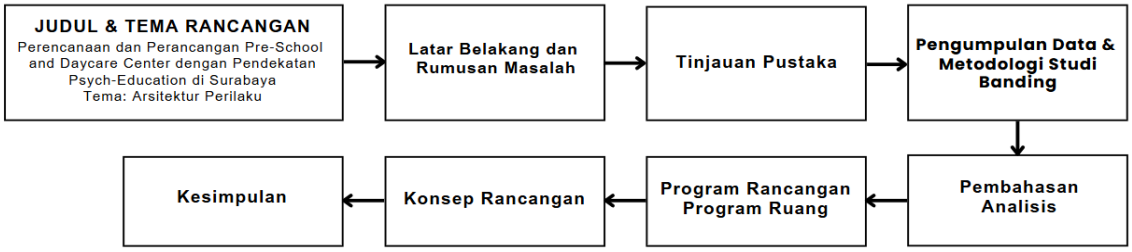

Figure 1. Methodology Diagram
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4. Results and Discussion

4.1 Location

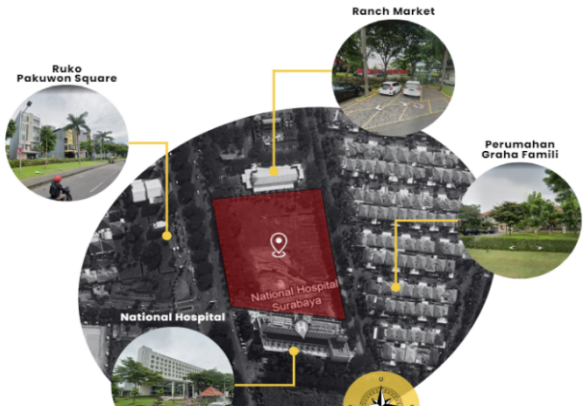

Figure 2. Design Location
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Table 1. Pre-School and Daycare Building Space Requirements

No.	*Space Requirements*	*Wide-Scale*	*No.*	*Space Requirements*	*Wide-Scale*
1.	Parkir (Mobil-Motor)	2828 m²	8.	Perpustakaan	128 m²
2.	Main Lobby	192 m²	9.	Ruang Pre-School	1120 m²
3.	Ruang Pengelola	640 m²	10.	Ruang Daycare	1056 m²
4.	Ruang Konseling	480 m²	11.	Playground, Lapangan & Taman	768 m²
5.	Cafetaria	288 m²	12.	Taman & Kolam Umum	488 m²
6.	Mini Theater	488 m²	13.	Ruang Service	128 m²

The design location is on Jl. Jl. Bukit Darmo Boulevard, Babatan, Wiyung District, Surabaya City, East Java, with a selected land area of 1.5 Ha. The condition of the land is in a fairly potential area with the northern boundary being Ranch Market, the southern boundary being National Hospital Surabaya, the western boundary being Ruko Pakuwon Square, and the eastern boundary being Perumahan Graha Famili. Based on the Surabaya City Regional Regulation concerning the Detailed Spatial Planning and Zoning Regulations of Surabaya City for 2018-2038, the site selected as the design site is in the UP II - Kertajaya area with a spatial pattern in the trade and service zone.

- Basic Building Coefficient (KDB): 60%
- Building Floor Coefficient (KLB): 1.5 points
- Building Boundary Line (GSB): 5 meters
- Fence Boundary Line (GSP): 3 meters

4.2 Space Program

The space program is one method to determine the type and function of space needed in building design so that each area can be utilized optimally and functionally. In its preparation, the space program must consider various aspects, such as the zoning system, type of activity, room standards, and user capacity, to create an effective and efficient spatial layout. The grouping of spaces and facilities in this design can be described in the following table:

a. Visitor Facilities: Mini Theater, Cafeteria, Main Lobby, Counseling Room
b. Management & User Facilities: Management Building, Main Building & Supporting Building

4.3 Application of Themes to Land Use

The application of the adaptive land layout concept in the Pre-School and Daycare buildings prioritizes social interaction and exploration, taking into account children's natural behavior in playing and learning. In addition, the adjustment of the site layout is strategically designed, where the main building (a), consisting of the education and childcare building, is placed at the back of the site. This placement aims to create a safer and quieter area for children, by avoiding the busier public zone. This strategy also functions as a response to user needs in creating a functional and comfortable environment while supporting children's learning and development activities optimally.

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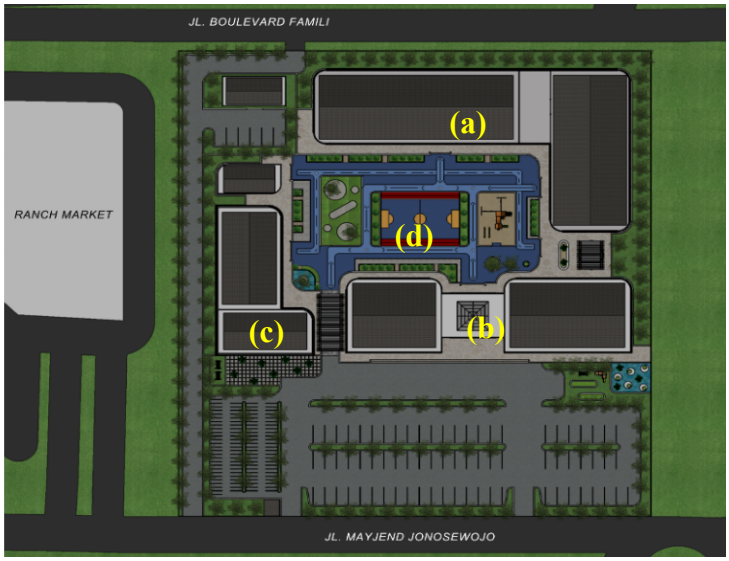

Figure 3. Siteplan
Sumber: Personal Document, 2025

The application of the Adaptive concept in the design of this land layout prioritizes open areas by placing outdoor activities, such as fields and playgrounds (d), in the middle or center of the land, making it easier for educators and parents to supervise children. This concept is expected to be able to create a space that supports children's physical activities, social interactions, and exploration optimally. The area is designed not only as a place to play but also as a flexible and stimulating learning environment. With this approach, the land layout not only functions practically but also contributes significantly to the psychological, cognitive, and behavioral development of children holistically.



Figure 4. Multifunction Field & Outdoor Playground
Sumber: Personal Document, 2025

The Reception and Management Building (b) is placed in the public-transition zone area to respond to the arrival activities of users before entering the main building, namely, pre-school and daycare. After parents drop off their children, teachers and caregivers will wait in the main lobby, then accompany the children to the pre-school and daycare areas through the building corridor, so that a neat, safe, and comfortable circulation flow is created for all users with a child-friendly pedestrian path design, which supports children's holistic development from the start of their arrival. The circulation that separates the public area and the children's area creates greater security and privacy for children. With this strategic placement, the Reception and Management Building also functions as an initial control point, ensuring the security and systematic recording of children's attendance.

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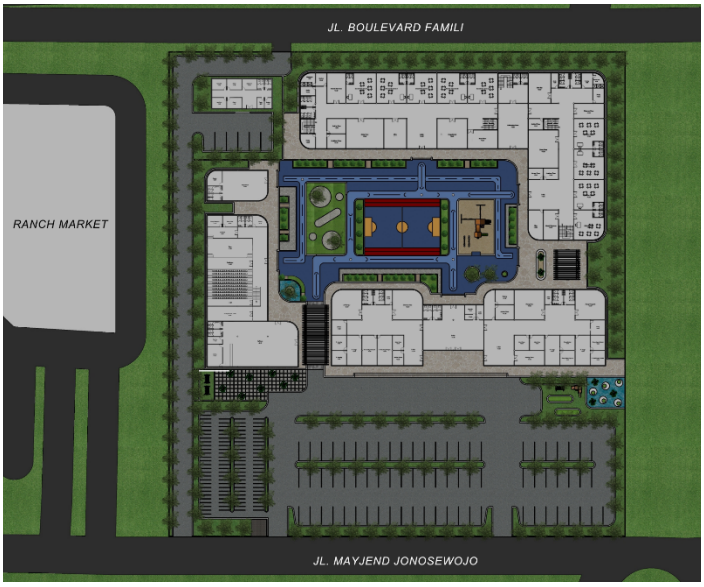

Figure 5. Layout
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In the pre-school and daycare areas, the spaces are designed with children's needs in mind to carry out activities optimally. There are flexible learning zones, allowing for various interactive and explorative learning methods. In addition, indoor and outdoor play areas are designed to encourage children's motor and social development, with safe and stimulating elements. Circulation within the site is also well-organized, where the corridors connecting the various spaces function as transition paths that allow children to move smoothly from one activity to another. The corridor is designed with sufficient width to create a pleasant and safe atmosphere for children. The overall layout supports the creation of a holistic environment, where children can grow and develop in a balanced way through a fun, safe, and stimulating learning experience. This integrated spatial design not only enhances daily routines but also nurtures creativity, confidence, and social interaction, forming a strong.



Figure 6. Cafeteria Building & Garden Area
Sumber: Personal Document, 2025

On the north side of the area, there is a Cafeteria and Mini Theater building (c), which is placed in the public zone. This building functions as a supporting facility that can be used by parents, visitors, and staff, as well as a means of organizing various educational and recreational activities. The Cafeteria provides a space for parents to relax and interact while waiting for their children, while also functioning as a dining area for staff and students. Meanwhile, the Mini Theater is a place to hold performances, educational film screenings, and various creative events that support

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children's social, emotional, and cognitive development. The presence of this facility is expected to create a more interactive, comfortable environment that is in line with the concept of experience-based learning, where collaboration between children, educators, and parents can be established harmoniously.



Figure 7. Building Corridor and Mini Theater Building
Sumber: Personal Document, 2025

In front of the Cafeteria, there is a garden that can be accessed publicly by all users of the area. In addition to functioning as an outdoor view for the Cafeteria, this garden is also a comfortable communal area, where users, especially parents, can relax while waiting for their children to finish their activities. Meanwhile, on the side of the building, there is a corridor that connects the public zone with the transition area to the inside of the area. This corridor can also be accessed publicly and is designed not only as a comfortable and directed circulation path but also as an informal interaction space that supports communication between parents, staff, and visitors. With an open and harmonious design that blends with the surrounding landscape elements, this corridor creates a warm atmosphere and supports connectivity between the outside and inside spaces, strengthening the concept of an inclusive and friendly space for all users.



Figure 8. Regional Perspective
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At the bird's eye angle, it can be seen from the front side of the land how the building mass is arranged, and also the circulation that is created. It is visible that the visual of the land is directly directed at the existence of outdoor activities in the form of a field area, a playground, and a park. For the overall appearance of the building mass, it has a dynamic arrangement with a well-considered orientation, facing Jl. Mayjend Jonosewojo and the center of the area, so that the building can interact with two directions of view, both from the view to the site and the view from the site. Ensuring maximum building expression and optimal environmental involvement in the overall design. The dynamic and free impression is quite visible from the arrangement of the building mass that is created, complemented by flowing circulation.

In Figure 8, the overall condition of the area can be seen from the left side and shows the placement of the Main Entrance and motorbike parking on the radial site adjacent to Jl. Mayjend Jonosewojo continues to the right side, which shows the Exit and car parking. The relationship between building masses is also expressed through circulation that connects one building mass to another, allowing efficient movement and optimal accessibility for users. The transition zone between outdoor and indoor spaces is also considered to create a more natural and harmonious experience, ensure good connectivity between spaces, and support the concept of "Adaptive" land use in the planning of this Pre-School and Daycare.

5. Conclusion

The application of the "Adaptive" concept in the design of the Pre-School and Daycare Center land layout in Surabaya seeks to create a flexible learning environment and support the holistic development of children by considering social interaction, exploration, and balance between indoor and outdoor spaces. Thus, the application of the "Adaptive" concept in the Pre-School and Daycare Center land layout in Surabaya is an innovative design approach, which not only adapts to the needs of children but also creates a more inclusive, dynamic, and enjoyable learning atmosphere with the role of well-integrated outdoor space.

To support this concept, the facilities are designed adaptively to support the function and comfort of users by presenting interactive classrooms, indoor and outdoor play areas, children's restrooms, shared dining rooms, educational gardens, and reception and management areas. All of these facilities are arranged based on the function and intensity of children's activities, with a separation between active, quiet, and transition zones to create a conducive and safe atmosphere. The room configuration is arranged radially and centrally with circulation paths that directly connect the indoor and outdoor spaces, allowing flexibility of use, ease of supervision, and comfort for all users.

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