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Application of The Green Building Concept in Children's Libraries

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ABSTRACT

There is a low rate of literacy in Indonesian society. The poor interest in reading among Indonesians makes this worse. One of the key facilities for enhancing the caliber of human resources is the library. A venue for the dissemination of knowledge is the library. Global developments are significantly influenced by fast-evolving knowledge and technology. As much as 70% of Indonesian pupils, according to a 2018 assessment by the Program for International Pupils Assessment (PISA), have poor reading skills and are unable to identify the main idea of a brief paragraph. With these circumstances, Indonesian libraries are unable to sustain the country's population's desire in reading. To develop reading skills from an early age, this paper will undertake green building research in kid-friendly apartment complexes and libraries and investigate design approaches that utilize these concepts to boost user comfort and productivity. The process involves examining library resources found in both online and print scientific journals. This research develops a green building design concept with several applications, such as integrating green open space on the building site into a central green open space in an exemplary garden, integrating each floor of the building into green open space, maximizing daylight for building lighting during the day, using solar panels to store energy from sunlight, and using filtered rinse water to water plants.

Keywords: children's library, green building, literacy

1 Introduction

Results from the 2018 PISA study show that 70% of Indonesian pupils have reading proficiency levels that are below level 2 on the PISA scale. Where it is said that 70% of Indonesian pupils are unable to even locate the main concept or crucial details in a brief text [1]. The findings of a study conducted by the Central Statistics Agency (BPS) in 2018 revealed that Indonesians' interest in reading was similarly low, with just 14.92% of those over 10 reporting reading newspapers or magazines, a decrease from the 15-year average. This amounted to 23.70% [2]. The Laporan Akuntabilitas Kinerja Instansi Pemerintah (LAKIP) reports that as of 2016, there were only 154,000 libraries in Indonesia, or 20% of the country's demands were being met. The sub-districts are likewise affected by the lack of library availability. Only around 6%, or 600 libraries, of Indonesia's total 7,094 sub-district libraries' demands are met. The scarcity of good books to read further contributes to the dearth of libraries. To combat Indonesia's current literacy deficit, it is crucial to establish the habit of reading books to children as early as feasible. Designing a welcoming and beautiful library is one of the efforts. It is believed that an appealing design would make people want to visit the library for longer, which in turn will spur even greater interest in reading.

The title of this design is Apartment and Library Design Child Friendly in Medan City with a Green Building Approach. According to the Oxford Dictionary, a library is a structure where collections of books,

newspapers, and other materials are maintained for people to read, study, or borrow. Films and recorded music are also occasionally housed there [3]. A structure that houses a collection of books, newspapers, magazines, and occasionally movies and music recordings for people to read, study, or borrow. The Big Indonesian Dictionary (KBBI) describes a library as a location, structure, or area set apart for the upkeep and use of book collections, among other things; it also describes it as a collection of books, periodicals, and other library materials stored for reading, learning, and conversing [4]. A library is an organization that professionally manages a collection of written works, printed works, and/or recorded works using a standard system to meet the needs of users in the areas of education, research, preservation, information, and recreation, according to Law of the Republic of Indonesia Number 43 of 2007 concerning Libraries[5].

A library is a room, area of a building, or building itself that is used to hold books and other publications. Books and other publications are often organized using a certain layout [6]. It can be concluded that what is meant by a library is a building that accommodates various sources of information to be read and can be used as a source of knowledge by the users themselves. A library can also be referred to as a place for storing and collecting various sources of written works or library materials. Sutarno (2006:120-130) in his book entitled Libraries and Society states that a good library location is easily accessible to the public, strategic, clean, healthy, quiet, flood-free, and has vehicle access. Apartment properties have special characteristics in choosing their location [7]. The choice of apartment location considers the travel time from the location of the apartment to the center of activity in an urban area which takes no more than 15 (fifteen) minutes [8]. Based on the above study, it can be concluded that the criteria for choosing a good location in designing Child-Friendly Apartments and Libraries in MeandCity are strategic areas, short travel time to reach the center of activity, healthy, flood-free environment, and transportation facilities available.

In his book "Green Architecture: An Introduction to Understanding Green Architecture in Indonesia," Tri Harso Karyono claims that green architecture uses the least amount of energy, water, and materials and has the least amount of negative effects on the environment [9]. This definition emphasizes the minimal impact of architecture on the environment. Another definition states that a green building is a new building that is planned and implemented or a building that has been built and is operated by taking into account environmental factors. Especially in the building industry sector in Indonesia [10].

According to the Green Building Council Indonesia/GBCI in 2011, a green building adheres to the principles of sustainable development from the planning, development, and operation stages so that it demonstrates aspects preserving the air quality in the space, guarding against overuse of natural resources, and keeping human health in mind when doing maintenance. It can be concluded that Green Architecture is an architectural concept that minimizes damage or adverse effects on nature by using natural resources optimally and reducing the use of resources that can produce residues (waste) [11].

There are six principles of green architecture, according to Brenda and Robert Vale's book "Green Architecture Design for Sustainable Future," published in 1991 [12]. Conserving Energy (Saving Energy), Energy saving is a principle to reduce energy use in buildings by optimizing the use of natural energy from around the building, such as choosing to use natural light during the day instead of lamps. Working with Climate, adapting to the climate is paying attention to nature, weather, and the environment and using it in building design. For example, using plant elements in buildings to create a certain climatic atmosphere. Respect for the site is observing conditions around the site and considering them in a building design to produce an environmentally friendly building. Respect for the user, and caring for users is paying attention to building users and adjusting building designs according to user needs and desires. Minimizing new materials is development using pre-existing materials that are not harmful to nature, which aims to optimize new and renewable natural resources so that they are maintained and can be utilized for the future. Holism is the principle of designing buildings by using all the principles that exist in green architecture and adapting them to the conditions contained in the site.

National Taipei University Library

In (Figure 1) In the Sanxia area of New Taipei City, National Taipei University integrates the local culture of Sanxia Old Street with the history of porcelain art in the Yingge District in northern Taiwan. On May 25, the When on Earth website listed National Taipei University as one of the top ten coolest green buildings in the world.

Figure 1. Taipei Univesity Library
Source: LIAO Architect & Associates [13].

Libraries have long been seen as symbols of academic institutions. Historically, the majority of libraries have been constructed with a rigorous environment in mind and just one point of entry for security worries (Figure 2). It succeeds in its mission of offering a peaceful area and book storage. The power of eco-friendly elements like rooftop solar panels and rainwater collection and storage systems is the foundation for the buildings employed. environmental effect is minimized by sustainable design.

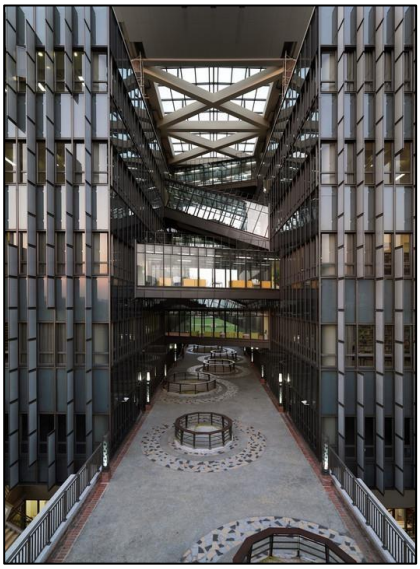

Figure 2. Single Entrance For Security
Source: LIAO Architect & Associates [13].

Through the creation of interactions between various spatial entities, including people, literature, media, architecture, and environment, National Taipei University hopes to increase people's understanding. the reading experience is enjoyable. People come here not just for one particular reason, but also to engage with others and the surroundings. By extending the idea of reading to a larger concept of life experience, libraries are given a new perspective.

National Library of Singapore

The structure includes two blocks divided by an atrium (Figure 3). Visitors are welcomed by the atrium that forms the plaza, which is either completely illuminated or partially enclosed with sky gaps that distribute light to different sections of the building while aiding in ventilation. The atrium's bridge serves as a connection between the two blocks. The library is housed in the bigger project block, which is atop a naturally ventilated public square with skylights. All the loud activities, including the exhibition, theater, and multi-media room, are housed in the smaller, curving block.

Figure 3. National Library of Singapore
Source: Ian Mutuli [14].

Due to the need to differentiate in terms of space design, architects created two portions that depict a peaceful sector of the library next to a busy public gathering area. The objective is to build appealing library facilities that will draw people to other public and creative activities in addition to reading. The building is slanted away from the East-West axis to protect itself from the afternoon sun. The southwest side of the building is permanently shielded from the sun by solid barriers. To reduce overheating and glare, sun shading blades are fastened to the building front. Another facade has sunshade glass panels that bring in more natural light. The demand for artificial indoor lighting is reduced by light shelves that reflect sunshine further into the building to help brighten the interior spaces. The atrium, which the architects of T. R. Hamzah & Yeang referred to as the inside "street," served as the project's main focal point. Victoria Street and North Bridge Road are two busy roadways that it connects at street level (Figure 4). This area, known as the Public Events Plaza, serves as a gathering place and a route to the main foyer. The square is bustling thanks to the stores, cafés, and libraries there.

Figure 4. Plaza for Communal Space
Source: Ian Mutuli [14].

The inside of the building's 14 planted gardens, which are home to 120 different species of tropical plants, assist control the daily temperature. The two open-to-the-public gardens are spread across two of the building's floors. On the fifth floor, in the courtyard, there are outdoor audio-visual amenities. The second garden, The Retreat, includes a stone foot reflexology trail and is on the tenth floor. Other parks may be open for special events even if they are regularly closed.

2 Method

Data gathering was done to define the project's functions and objectives. The following considerations in picking a place include RDTR, accessibility, existing features, and surrounding environment. Data gathering, analysis, and drawing are the steps taken in the design issue-solving methodology. Perform a site survey by making firsthand observations of the area, collecting data on the location, the surroundings, the wind, the sun, the direction of the sun, the flow of traffic, the state of the neighborhood, and the impact of the location on the nearby buildings. People desire to live close to public spaces, according to the findings of a poll that was done on 90 respondents in February 2022.

3 Results and Discussion

3.1 Project Description

Design of Child-Friendly Apartments and Libraries in Medan City is a project. Child-friendly housing and educational facilities are supported by facilities built utilizing a green building approach. The objective is to make homes that are kid-friendly and to raise children's reading levels in the country Stadium Street, Teladan Baru, Medan City District, Medan City, North Sumatra, 20216 where this project is situated. (Figure 5) depicts the state of the project location as a settlement-filled region with a total size of around 1.73 HA and level relative land contours. Due to the presence of educational facilities close by, the location has excellent potential for creating homes and libraries.

Figure 5. Project Location

Source: Google Earth [15].

3.2 Building Mass Concept

In (Figure 6) shows the stages of building mass composition that respond to the site by opening towards a green open park with a purpose that gives a welcoming impression to visitors, each building is given green open space to give mass and appearance such as terracing not monotonous. This of course provides lighting and air circulation for all rooms in each unit. Heat buildup is reduced by the use of Greenwall, which serves as additional skin. The building's front is made attractive by too much sunlight entering it. Having varied levels of greenery creates the appearance of terraces on structures.

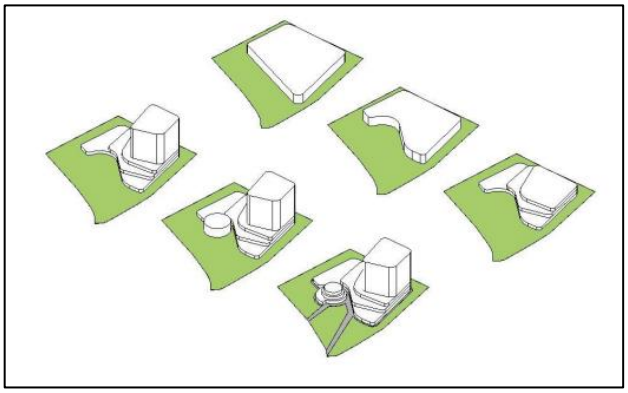

Figure 6. Mass composition

3.3 Outdoor Concept

The complete master plan site's pedestrian-safe, vehicle-free region is depicted in (Figure 7). On-site amenities for pedestrians this takes the shape of an Exemplary Park, the focal point of a green open space that connects the master plan's existing structures and serves as a community gathering place.

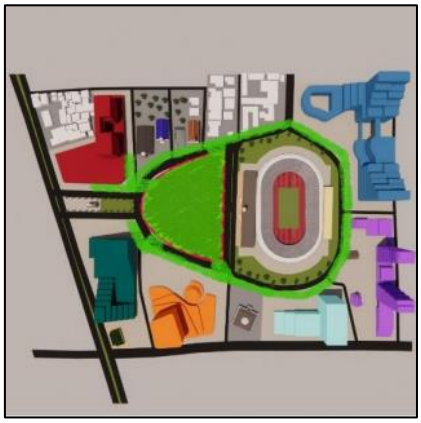

Figure 7. Pedestrians on the Site

Motorized vehicles such as automobiles, buses, and motorcycles are transported to the underpass line that is connected with the basement of each structure, as shown in (Figure 8). There are openings every 50 meters along the underpass line where sunlight may be used to illuminate the basement.

Additionally, there are stairs from the basement to the site for pedestrians with disabilities. Detailled 3D underpass design elements are shown in (Figure 9).

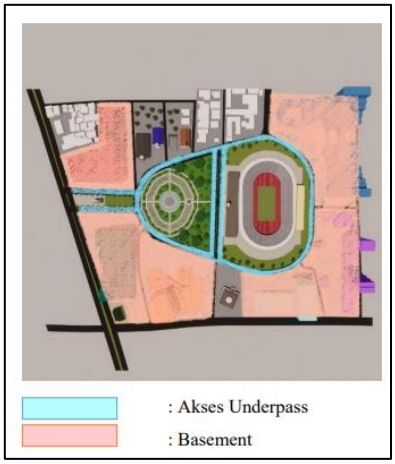

Figure 8. Underpass Circulation

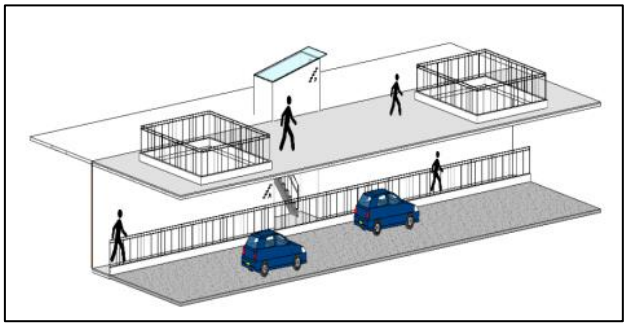

Figure 9. 3D Detailed Underpasses

3.4 Vegetation

In (Figure 10) shows the arrangement of vegetation will use various types of plants such as shade, guide and aesthetic plants. Vegetation type as shade are vegetation with characteristics of dense leaves such as pine, fir and banyan. Trees with characteristics as shade are placed in the west and east sides of the site as the first protection against the sun's heat. Vegetation that serves as aesthetics in the form of low trees, plants moldable, plant with flowers as color. For example, bonsai bougainvillea flowers, bowl flowers, poinsettias, and so on. (Figure 11) depicts the environment of the jogging and cycling paths; there is flora and a bicycle parking facility that distinguishes the two paths. To encourage community fitness activities and provide site visitors with a rest space in the form of a shaded area in this common area sitting outside behind a tree.

Figure 10. Children's Playground and Relax Park

Figure 11. Jogging Track

3.5 Indoor Concept

Three major components may be found on the first floor of the apartment: childcare, early childhood education, and a library. Apartment complex amenities include a supermarket where tenants can have their daily needs met, as well as a number of cafés and shops. Providing play spaces, dining rooms, study areas, and a children's rest area are all features of a daycare that serves as a facility for child care. There are four classrooms in paud, and they are separated by class type and grade level. For sports class, there is a designated green open space, ensuring that the kids maintain their masculinity while engaging in outside activities. There is an open reading area and an indoor reading room on the first level of the children's library (Figure 12).

Figure 12. Interior

4 Conclusion

Design of Child-Friendly Apartments and Libraries in Medan City with the Green Building Approach is an apartment that prioritizes residents and friendliness to children with facilities like daycare, Early Childhood Education (PAUD), and child libraries. It is situated on Jl. Stadium, New Example, Medan Kota District, Medan City, North Sumatra. By fostering a lifelong love of reading under the guidance of their parents, children who have access to resources in the form of a children's library are intended to boost the literacy of the country's youth.

Designing a kid-friendly apartment and library around the idea of green architecture and taking design cues from terraces results in a room that is seamlessly connected to green open space, which improves airflow throughout the entire building. Glass is used to let as much natural light as possible into each space of the structure. Help reduce energy usage with the aid of solar panels installed on the roof floor.

5 Acknowledgment

This study looks at the green architecture used in the Design of Child-Friendly Apartments and Libraries, which are expected to be a forum for residents and visitors to increase the literacy of the nation's children. Department of Architecture, Faculty of Engineering, University of North Sumatra, and all parties who assisted in the study.

6 Conflict of Interest

The authors whose names are listed below certify that the manuscript do not have conflict of interest.

Marsella Vannesa

This statement is signed by all the authors to indicate agreement that the above information is true and correct (a photocopy of this form may be used if there are more than 10 authors):

Author's name (typed)	Author's signature
MarsellaVannesa	

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