



Designing USU Student Center Post Pandemic COVID-19 with Tropical Architecture Approach

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Abstract. *University of Sumatera Utara (USU) is the one of the largest and the best universities in Medan which has full of facilities and infrastructure. Nevertheless, currently University of Sumatera Utara does not have a Student Center. The provision of a student center at a university is essential for the development of outstanding students. Furthermore, in the post pandemic COVID-19, humans need a healthier space or place to be live in. Activities that take place indoors require good air quality to prevent viruses from easily entering and thriving inside the room. The application of tropical architecture in the design of the USU Student Center is a consideration in creating a place suitable for post pandemic COVID-19 conditions, and it also serves as a solution for the climate in Indonesia.*

Keywords: *Student Center, post pandemic COVID-19, tropical architecture*

1. INTRODUCTION

The University of Sumatera Utara is located in Padang Bulan, Medan City, North Sumatra. As one of the best campuses in the city of Medan, USU has complete academic and non-academic facilities and infrastructure as a medium for the community to carry out activities in it. However, currently there is no forum for the campus community to be able to get a place to channel their interests and talents, a place to interact with other students, a place for intra-campus organizations that are contained in one unit. And there is no centralized public space, which can be reached by all students of the University of North Sumatra. In addition, after the Covid-19 pandemic, humans need a healthier room or place to be in it so that the risk of contracting a disease becomes smaller in the future.

The existence of the Covid-19 pandemic, of course, will have an impact on developments in the world of architecture. Architecture has never stood alone, but is influenced by external factors so that the pandemic has a great influence on architecture, the existence of this pandemic provides another understanding that the problem of architecture is a problem of interaction between humans[1]. Activities that occur a lot in the space require a good quality of space health. The need for good natural air circulation and sufficient natural lighting to avoid the easy entry of viruses and live indoors.

In 2023, there are 42,687 students at the University of North Sumatra. With a large number of students, of course, they need facilities and infrastructure that can accommodate the

activities they carry out. Students need a space to carry out informal activities outside of lecture hours such as studying, doing assignments, discussing, or conducting organizational meetings with sufficient and appropriate facilities to support the student's activities [2].

Based on the problems described above, therefore a place is needed that can facilitate and support the activities held. To be able to facilitate student activities, it is by creating a student activity center building (Student Center) within the University of Sumatera Utara. The Student Center functions as a public space that can accommodate campus community activities within the University of Sumatera Utara. The application of tropical architecture is expected to provide comfort in the building because of the response to the tropical climate in Indonesia. As well as the creation of healthy public spaces by paying attention to the provision of openings and cross ventilation as an effort to reduce the growth of the virus indoors.

2. METHOD

The methodology used in the Design of USU Student Center Post COVID-19 with Tropical Architecture Approach employs a descriptive method. This method involves presenting, outlining, and explaining both primary and secondary data based on existing factual information (actual data). Subsequently, analysis is conducted to generate a concept that will be designed. The required data includes primary data (such as site survey for planning), secondary data (obtained through literature review, including theories), and comparative studies (gathering data related to the design object and theme).

3. RESULT AND DISCUSSION

Location

The location is within the Universitas Sumatera Utara, specifically on Jl. Alumni, Medan Baru District, Medan City, North Sumatra. According to the Rencana Detail Tata Ruang (RDTR) and the Zoning Regulations of Medan City 2015-2035, this site is designated as a public service facility and green open space area (RTH). The land area is about $\pm 2,2$ Ha. The site is strategically located around key USU buildings. Additionally, it is centrally positioned within the USU campus, ensuring easy accessibility from any direction.



Figure 1 Site LocationSource: Google Maps




Site Boundary :

- North : Alumni St., USU Auditorium, RSGM USU, FKG USU Mosque & FKG USU
- South : Faculty of Engineering USU, USU Library
- West : Almamater St. & Faculty of Engineering USU
- East : Perpustakaan St. & FASILKOM-TI

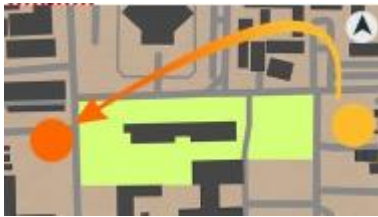
Design Analysis

The design analysis involves assessing accessibility, circulation, noise, sunpath, and wind direction. The analysis results are presented in Table 1.

Table 1 Design Analysis

No	Design Analysis	Response
1.	<p>Accessibility</p> 	<p>The main access from Alumni Street (red arrow), additional access from Perpustakaan Street and Almamater Street (blue arrows).</p>
2.	<p>Circulation</p> 	<p>Creating pedestrian paths for access to the USU Student Center building.</p>
3.	<p>Noise</p> 	<ul style="list-style-type: none"> • Buildings or rooms requiring tranquility are placed far from sources of noise. • Utilization of vegetation as noise filters.

4. Sunpath



- Building orientation facing north, thus reducing the intensity of direct sunlight entering the rooms.
- Use of double facades (secondary skin) on the east and west sides of the building.
- Increased openings on the north and south sides of the building.

5. Wind Direction



- Maximizing openings and ventilation in the building, especially from the north and south directions.
- Implementing cross ventilation to ensure optimal air exchange processes within the rooms.

Source : Author's Analysis

Program

Table 2 Space Program

NO	SPACE	AREA
1.	Main Space	6.997,055 m ²
2.	Management	371,046 m ²
3.	Support	1.701,297 m ²
4.	Service	494,26 m ²
5.	Parking	583,2 m ²
	TOTAL	10.146,858 m²

Source : Author's Analysis

Design Result

A. Massing

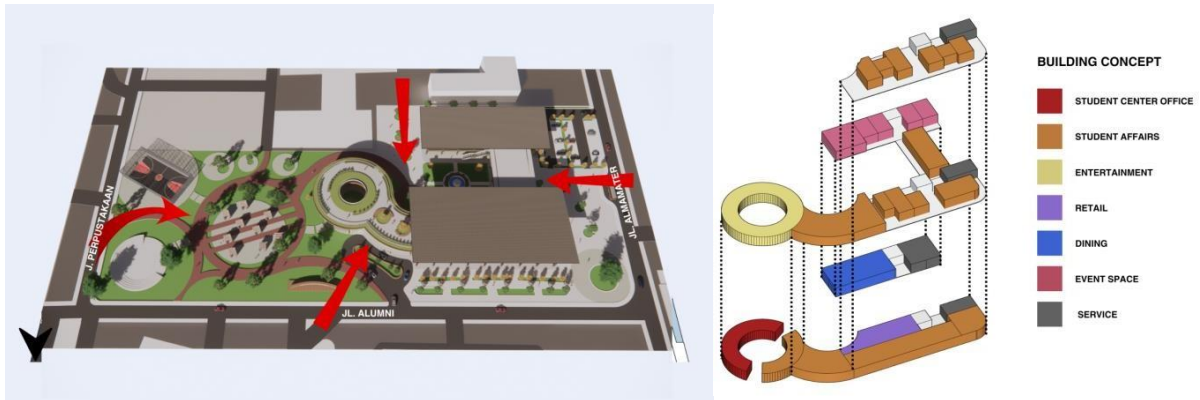


Figure 2 Massing and Building Concept

Source : Author's Analysis

Due to the location of the site in the center of the USU campus, the building mass form is configured to facilitate convenient access from various directions for users. The mass consists of three rectangular shapes arranged horizontally and vertically. Subtractive methods are applied to the corners of the rectangles. Circular masses are added to avoid a rigid appearance since the student center is fundamentally a flexible space. The building has three floors: the first floor houses the student center office, student affairs, retail, dining, and services. The second floor includes entertainment spaces, student affairs, and events. The third floor accommodates only student organization rooms.

B. Context

The concept of open space in this student center incorporates a variety of activities, which aims to encourage users to do more outdoor activities. This concept is related to the post-COVID-19 condition that is better when doing activities in outdoor spaces. In addition, the outdoor area is filled with trees to create a lush environment around the building.

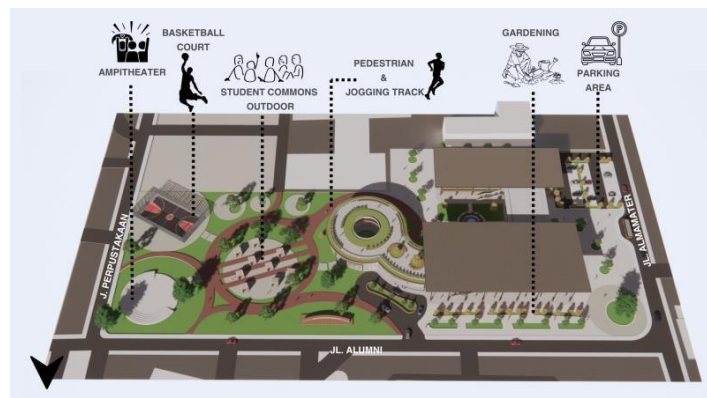



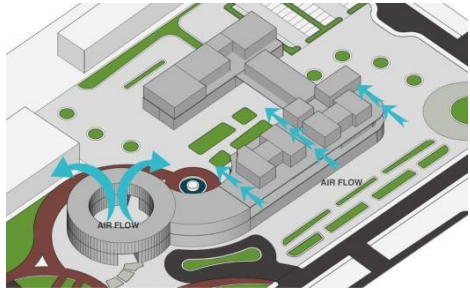

Figure 3 Outdoor Activities




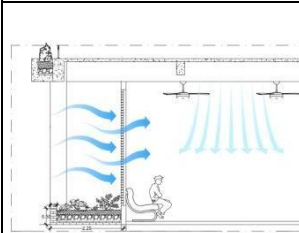
Source : Author's (2024)



Figure 4 Basketball Court & Student Commons Outdoor Source : Author's (2024)
Theme Implementation

Table 3 Theme Implementation

No	Design Picture	Description
1		Designing the longest sides of the building to face north and south helps the structure avoid direct sunlight radiation, thus minimizing heat buildup caused by direct sunlight. This approach ensures that direct sunlight only enters the shortest sides of the building, reducing the impact of heat radiation on the building.
2		The tropical theme is applied through an open facade design to maximize airflow. Additionally, circular void elements within the building promote cross ventilation, facilitated by window openings on the exterior facade and within the internal void spaces of the building.
3		On the north and west-facing facade of the building, a secondary skin made of aluminum is used to minimize direct sunlight entering the interior spaces.

4		<p>Long cantilevered roofs are utilized to provide shade from direct sunlight and protection from rain.</p>
5		<p>Air circulation is facilitated through window openings to encourage cross ventilation. Windows are strategically placed on the north and south sides to maximize airflow</p>
8		<p>To enhance indoor air circulation, the wall materials incorporate breathing walls, allowing for maximum airflow into the room. Additionally, ceiling fans are used to keep the air moving inside, minimizing the potential for viruses like COVID-19 to linger in the indoor environment.</p> 

Source : Author's (2024)

C. Site Plan

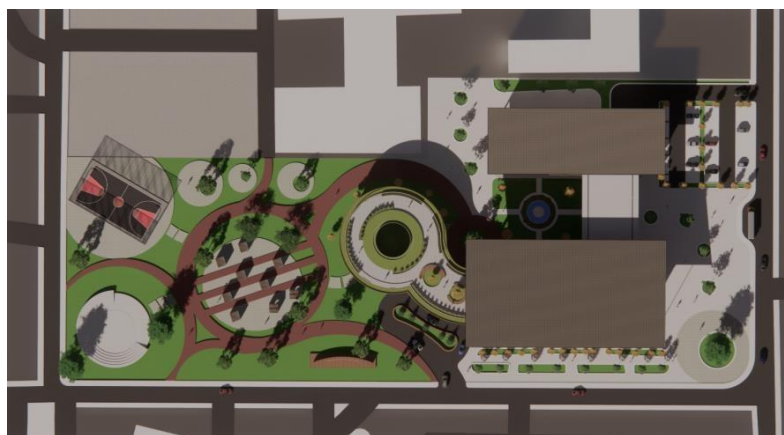
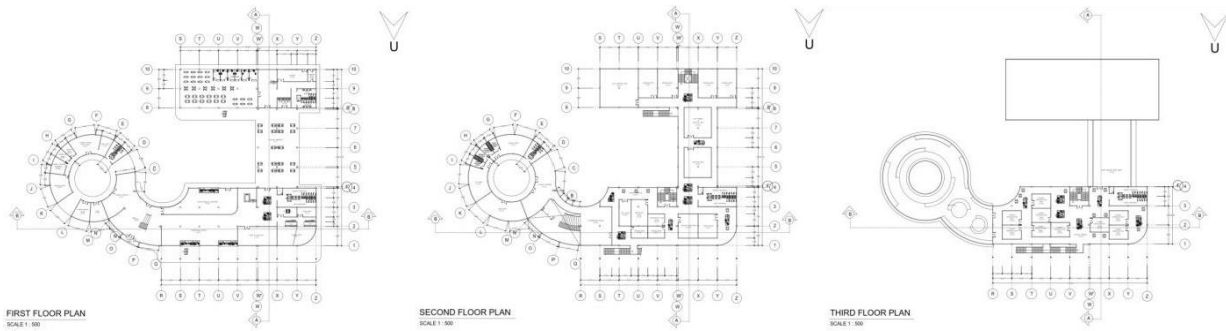


Figure 5 Site Plan Source : Author's (2024)

The front facade of the site faces Alumni Street, positioned directly along Gate 2 of USU, and also faces northward. Additionally, the longest sides of the building face north and south to minimize direct sunlight entering the rooms, creating a cooler indoor environment. Being located in a tropical climate country, the site is landscaped with trees to provide shade and create a lush environment around the building.

D. Floor Plan



E. Elevation



Figure 6 Floor Plan Source : Author's (2024)

In the building facade, brick material is utilized, adapted to fulfill one of the principles of tropical architecture, which is the use of local natural materials. For the secondary skin, white aluminum material is used to reflect sunlight.

F. Section

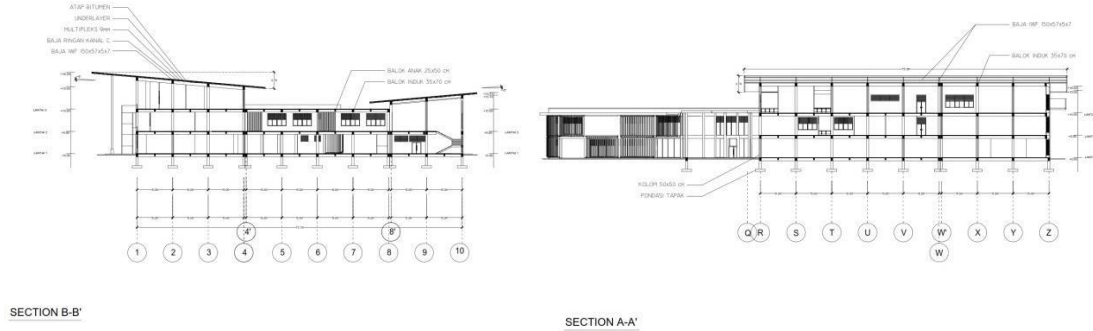


Figure 8 Section Source : Author's (2024)

In the section, it can be seen that the USU Student Center building uses a footplate foundation. The structural system employed in the building is a rigid frame structure. The roof is covered with a lean-to roof supported by IWF steel frames, and the roofing material used is bitumen roof.

4. CONCLUSION

Designing the USU Student Center as a space for learning, personal development, entertainment, and healthy social interaction for USU students. Furthermore, the application of tropical architecture is expected to create a post-pandemic building, as tropical architecture principles inherently include aspects of natural lighting and ventilation in designing a space suitable for post-COVID-19 conditions.

5. ACKNOWLEDGEMENT

I would like to express my sincere gratitude to all parties involved in the writing of this final project design report, especially to Dr. Andalucia S.T. M.Sc. as my supervising lecturer, has dedicated her time, thoughts, and energy to provide guidance, direction, and motivation to the author in completing this final project design report. This research is a study of the Design of the USU Student Center after the COVID-19 pandemic which is expected to realize the

provision of solutions for USU student activity center facilities that are in accordance with the current post-COVID-19 pandemic conditions.

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