Improving Urban Environmental Quality and Human Well-Being towards Healthy Urbanism: Case Study in Soetomo General Hospital, Surabaya, Indonesia

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Abstract. Nowadays, there is overwhelming evidence that regular physical activity has important and wide-ranging health benefits. The health risk and mortality factors were indirectly influenced by physical inactivity, the sedentary lifestyles developed by the car-oriented urban approach. That evidence supports the conclusion that physical inactivity becomes one of the most important public health problems of the 21st century, and may even be the most important. In order to encourage healthy urbanism, focusing on cultural and environmental aspects become necessary to Indonesian people. Soetomo General Hospital is a provincial health centre to provide a sense of security, comfort and convenience which are equal for all kinds of people, especially to walk. Therefore, environmental quality is a very important component to be considered. This paper utilizes character appraisal to find Soetomo General Hospital area’s physical condition. The result concludes design criteria for the built environment of the area. These design criteria are used as the main concept for elaborating the concept design of the place to improve its quality of environment towards healthy urbanism.

Keywords: Environmental Quality; Human Well-being; Public Space; Healthy Urbanism.

1. Introduction
Understanding of empirical facts through the analysis of three road segments in RSUD dr. Soetomo can conclude that land use in all three road segments is quite diverse having supported Soetomo General Hospital as the center of activity. In the general sphere, each road has its own characteristics and needs with different handling. It means as a case, the part of the city's area of the hospital area becomes something unique to illustrate the linkage between urban face changes influenced by the meaning of an environment according to Shultz's statement of the wider meaning of placement in an environment not only related to occupancy, but also to reach shelter or neighborhood [1].

This research still refers to the arrangement that prioritizes the needs of each road corridor. The arrangement in question is to rearrange the area, especially the corridor of the road experiencing a decrease in its condition and even the transfer of function. This is conducted by paying attention to the
Sustainability Principle which requires to wisely choosing a more cost-effective alternative to natural resources, using urban area development patterns with new functions that provide better appeal. Attention here includes the thoughts on the conditions of achievement of the Sustainable Development Process.

In general, the first phase is more focused on physical conditions. The form of road connectivity, free from obstacles, the quality of the area for walking and the need for a map can provide important building location information. However, there is also a very important non-physical factor to improve the need for a place to gather and sit comfortably; as well as the need for supervision and stern action on the behavior of motorists who are potentially harmful and take pedestrian rights. Therefore, there needs to be a review of the needs of the road users as well as the priorities of design development and design direction in the future.

1.1. Literature Review

Environmental physical design can affect the level of public health. In relations between humans and the surrounding environment, the challenges in healthy city design deal with developing good communication between the medical community and land use [2]. Then, physical activity, obesity, and other diseases, are closely related to the lack of land use management, such as low density development, single use development, and road networks that are not well-connected [3]. Regarding parameters related to community activities and their health, land use is an important factor in forming a healthy space in a city that can have a direct impact on the community [4].

Land use as a reason related to public health, is also mentioned by several earlier studies where land use becomes a reason related to public health as well as inherited community characteristics, lifestyle and social economic variables [5] [6]. It all reflects a broad view of health as a positive experience of well-being and not just absence of disease [7]. However, despite the symbiotic relationship between land use planning and health, this connection has in practice been forgotten to date [8]. Regarding land use matters, the two interrelated sets of theories underlie this diagram: about urban ecosystems and about health determinants [9]. Each model layer has an impact on health and well-being, and changes in land use affect each layer. An artificial environment layer is a field where land use planning has a direct impact. Changes in the built environment structure change the natural, the social and economic environment [8].

![Figure 1. The built environment as part of healthy urbanism](image)
Source: Barton and Grant, 2006

Physical boundaries and territorial boundaries and access in the area influence each other higher density environments allow better access and increased use of local facilities, although access to services for people living in areas far from the city center is also related to get transportation services [10].
Type of land use. The mixed impact of land use on health has to do with increasing levels of physical activity with health benefits that have resulted in including reduced obesity rates, identifying types of environments or environmental aspects that will ease a more active lifestyle [11] [12] [13].

Environmental profile. This highlights a number of physical characteristics that have a positive impact on health and well-being, including: an attractive and well-maintained environment; bright and well-built sidewalks for pedestrians; road patterns that offer opportunities for informal contact among residents [14].

The above description provides a solid summary of the relationship between the concept of Healthy Urbanism and land use. The community in this concept plays an important role in providing active participation and gaining experience with communication between activities that actively support health and land use. The use of land that supports the concept of Healthy Urbanism must be able to provide an active response hindering people for choosing the second option other than walking in a movement towards the destination such as using public transportation or choosing not to move at all.

2. Material and Methods
The research method in this study employs character appraisal [15] to find Soetomo General Hospital area’s physical condition. The method is used to obtain information about the functional form and to record activities to list the particular characteristics that occur in this area. The result will conclude design criteria for the built environment of the area. These design criteria used as the main concept to elaborate the concept design of the place to improve its quality of environment towards healthy urbanism.

The condition and quality of the corridors around the hospital will be the basis of this research. The corridors are Dharmawangsa Street, Prof. Dr. Moestopo Street and Airlangga Street. The following is a map that explains the location of the study site.

3. Result and Discussion

3.1. Physical Boundaries
The physical boundary becomes one aspect of environmental quality that affects comfort in an area. The appraisal character of the three corridors shows the condition and situation of each physical boundaries problem.

On Dharmawangsa Street, the building borderline for the east side segment perimeter area is 12 m, while for the west side commercial land is 10 m. There are some misuses of the pedestrian lane as a place for passing motorbikes, bicycles and PKL carts selling rather than using highway shoulder segments. On the edge of the highway, there was no clear marker of the location of parking vehicles resulting in cars and motorbikes parked in any place neglecting the time and crowds of the road.

Prof. Dr. Mustopo street is included in the classification of secondary arterial roads which have a width of 25 meters. Each side has 3 lanes of vehicles which are usually used for parking the vehicle. The borderline of the north and south side of the building in this corridor is 8 meters, each with priority for pedestrians.
Airlangga street is included in the classification of secondary collector roads that have a meter road width. Each side has 3 lanes of vehicles which are usually used for parking the vehicle. The border lines of the north and south sides of the corridor are 5 meters, each with pedestrian priority.

3.2. Type of Land Use

The main land-use in Dharmawangsa Street is oriented towards the health industry because there are several hospitals or health facilities, education and community housing in the development area. Health facility building that supports Dr. Soetomo on this road is on the east side of the road. This area also contains other public facilities such as Tennis Court, Hockey Field, and Softball Field. On the west side, most are filled with shops that sell daily equipment, food, and medicine.

Land use in the corridor of Prof. Dr. Moestopo street is dominated by health and education facilities. The functions of the buildings found are health facilities in the form of dental and oral hospitals, education in the form of Airlangga University campus A, and commercial functions in the form of small stalls which are business enterprises owned by residents.

Land use in the Airlangga Road corridor is mainly for public facilities and some buildings for services and commercial trade. On the north side, several health facility buildings are located such as Graha Amerta and RSUD Dr. Soetomo, as well as offices such as the BKKBN Center in East Java Province. Some small and medium-sized commercial buildings also appear to fill the corridor both on the north and south, including restaurants, photocopies, jewelry stores, and posyandu. In existing conditions, there is land use for informal traders using portable places to sell.

3.3. Environmental Profile

| Dharmawangsa Street Corridor | Prof. Dr. Moestopo Street Corridor |
|-----------------------------|-----------------------------------|
| **East Side**               |                                    |
| ![East Side Diagram](image) | ![Prof. Dr. Moestopo Diagram](image) |
| **West Side**               |                                    |
| ![West Side Diagram](image) | ![Prof. Dr. Moestopo Diagram](image) |

The east side of the Dharmawangsa road is filled with high-rise hospital health facilities. Some of them have a height of 4 floors or more, thus giving the character of a corridor with high buildings on this road. While the west side looks more grounded with pedestrian lane users because it manages their front to be easily accessible without a fence. The character of Dharmawangsa street neighborhood is formed by the profile of the environment of buildings in the style of modern architecture. The building's façade is displayed in the form of vertical and horizontal lines formed by concrete structures and other ornaments.
The corridor of Prof. Dr. Mustopo gives the impression of a monotonous facade, especially on the south side where the dividing gate stretches from one side to another on the road. The number of offices in this area makes this area seem more closed and private for pedestrians. Environmental characteristics in Prof. Dr. Moestopo street is formed by the profile of the buildings in the style of colonial architecture or the *indische empire style* using a shield or *limasan type roof* and the use of columns in buildings without any cover ornament.

### Airlangga Street Corridor

The environmental characteristics of Airlangga Street are formed by diverse environmental profiles. There are buildings that use the colonial architectural style or the Indische empire style. There are also buildings that are stylish in modern architecture, especially in new buildings, as well as buildings that have Mediterranean architectural style, especially in residential buildings.

### 4. Conclusion

Soetomo General Hospital in an urban context and environmentally-conscious region should basically consider the following several things. The first consideration is setting the skyline of buildings around the hospital area to create a balance of the neighborhood environment. The use of zoning in the wider corridor as a commercial area for informal traders must be encouraged. Then, utilization of spaces on pedestrian lanes as well as corridors as passive public spaces is also required. Design of pedestrian pathways is equipped with barrier and passive public spaces as a barrier between pedestrian circulation area and motorized circulation. All corridors need to add pedestrian maps presenting location of buildings around the area.

The mentioned items above are integrated into a schematic design proposal with the aim to actualize Dr. Soetomo General Hospital’s sustainability and the characteristics of each corridor within the area.

#### Table 2. Schematic Design

| Concept Visualization |
|------------------------|
| **Before** |
| **After** |
| Align the facade of the building by equalizing the position of the banner in the vertical part of the partition. |
The 4rd International Conference in Planning in the 2019 Era of Uncertainty
IOP Conf. Series: Earth and Environmental Science 328 (2019) 012063
doi:10.1088/1755-1315/328/1/012063

| Concept Visualization |
|------------------------|
| **Before** | **After** |
| The addition of *oversteer* in front of the shopping area and stalls that provide harmony between facades of buildings. |
| Airlangga Street |

| **Before** | **After** |
| Addition of street furniture such as zebra cross line, pelican cross, pedestrian maps, and tactile paving |
| Airlangga Street |

| **Before** | **After** |
| Seats and trash bins are placed repetitively on the edge of the pedestrian lane as a separator of the pedestrian lane with transportation routes. |
| Dharmawangsa Street |

| **Before** | **After** |
| Plants with low shrub plants to optimize vegetation and improve the aesthetic quality of the corridor. |
| Dharmawangsa Street |

| **Before** | **After** |
| Structuring the zoning of commercial areas of informal traders with the concept of open space to give an open impression. |
| Dharmawangsa Street |
Acknowledgement
This publication is part of research, conducted in 2017-2018, entitled Designing Soetomo General Hospital in the context of Urban Environmental Development. This research is funded by “Ministry of Research, Technology and Higher Education Republic of Indonesia”.

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