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Sustainability and urban morphology

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Abstract. Urban morphology analysis allows us to understand an urban transformation. Through this analysis, the development of an area can be intervened in a planned manner. Morphology can be a valuable tool by linking technological aspects to urban sustainability strategies with various aspects of culture, social, civil through urban architectural design. This tool can be used in accordance with comprehensive and complex sustainability ideas that can only be achieved fully through the renewal of public awareness and the use of available resources. Architecture and language (linguistics) have a basic resemblance, where both are tools for conveying messages, radiating impressions and as objects to capture impressions and messages. Likewise, in understanding the form, both have the same similarity. The form of the two fields of science is studied in morphology. Morphology of the city learn the intricacies of urban space form and function changes the shape of urban space, both functions of grammatical and semantic functions. The smallest element of linguistics is morpheme, the smallest element of architecture urban is the space, so morpheme can be analogical into the space (morpheme = space). Morpheme consists of a free morpheme and bound morpheme, as well as space. Space as a three-dimensional shape composed of a solid space (content) and a void space (open). Typology can be analogical into the Urban Architectural then, the notion of "language" = "Urban Architecture".

Keywords: Urban Morphology, Urban Typology, Urban Architecture, Morphology Linguistics.

1. Introduction
There are many issues of problems in urban design, which are specifically related to the physical formation of the city that starts from the problem of urban physical development that is not controlled; the problem of unclear functional area connections due to uncontrolled development of land use patterns; building control issues include compaction, violation of building height requirements, breach of boundary line; the issue of the development of multifungsi buildings and super commercial blocks in the city center; the problem of the disappearance of green open spaces was replaced by the masses of dense buildings, contemporary city issues; aesthetic problems of the city, the disappearance of historic buildings replaced by factory outlets; the uncertainty of the character of the city as well as many more issues of problems facing the city. Broadly speaking, these physical problems are focused on the physical conflict spatial entity and are more due to the mutually stimulating socio and spatial changes. The clash between physical formation problems and the demands of good urban design qualities has led to the need to examine the city specifically from its morphological aspects. Some reasons why we need to talk about morphology. First because in line with the increasingly complex city life emerged the problem of physical formation of the city. And secondly because of the demands of the city's own
design goals that expect the creation of a good quality physical, functional and visual environment of the city[1].

This paper attempts to describe the concept of urban design through a linguistic morphology approach to understanding the city as a product of architecture through an understanding of linguistic definitions. Linguistics (architecture) and architecture have a basis of similarity, both of which are tools for conveying messages, radiating impressions and as objects to capture message-impressions. The purpose of this discussion is to know how to analogy the linguistic morphology into the morphology of urban design, and its usefulness is to better understand the city as a product of architecture through the understanding of linguistic definitions. Substantial discussion on this discussion is limited to the study of morphological linguistic and morphology of urban architecture, and to analyze linguistic morphology in the form of urban design concept.

2. Literature review

2.1 Definition of City

According to K. Adhimastra, the definition of "City" will depend on a person's point of view and the field of knowledge [9]. A Geologist will look at the land and the land beneath the city and how it relates to development. An economist will focus on urban trading issues that focus on the relationship of the city's activities and potentials financially. An anthropologist views the city in a cultural and historical setting. A politician emphasizes how to take care of the city and how the relationship between the government and the private sector. A sociologist focuses on the classification of urban settlements from all aspects of behavior / behavior. A health expert is more concerned with the health of the urban settlement environment. A legal expert focuses on the relationship of rules and decisions with city planning and implementation. An engineer focuses on the city's infrastructure system and its construction as well as the urban anatomical structure and its planning. And finally an architect has a common point of view with engineers, but emphasizes on aspects of the city physically with regard to the relationship between urban space and mass as well as its form and pattern.

According to Kostof that the city is a collection of buildings and people (cities are place made up of buildings and people) [10]. According to Sandi Siregar, the city is a habitable artifact [11]. The city as a man-made environment that exhibits a large and complex engineering work, comprises a collection of buildings (and other physical elements) as well as humans with certain configurations forming a physical-spatial entity. According to Edward Norwood Bacon that city is the articulation of space that gives a certain space experience to the participant. Therefore, the scope of attention of urban designers will be more complete if it includes buildings, settings and character of the city. According to Ali Madanipour that the city is a collection of buildings and artefacts and a site for social relationships. According to Aldo Rossi, City is architecture [12]. Architecture is not just a picture (visual physical form) of the city that can be seen only, but also as a construction. That is the construction of the city all the time.

2.2 Figure Ground Theory

In the process of urban design, the Figure Ground theory is closely related to the morphology of the city. This theory begins with a study of the relation of land-covered land as a dense mass (figure) with open (void-void) spaces. In particular, this theory focuses on the understanding of patterns, textures and poche (the typology of the mass of buildings and spaces).

The relationship system in figure / ground recognizes two groups of elements, namely solid (building mass) and void (space). Theoretically there are three basic elements that are solid and four basic elements that are void. The three solid elements (or blocks) are (1) single blocks; there is a building mass in a block constrained by a path or natural element (2) a block defining the side; configuration of building masses that divide a space and (3) field blocks; configuration consisting of a mass of widely distributed building blocks [13].
3. Methodology
Research methodology in this discussion is to use descriptive qualitative method. Qualitative descriptive research is a research that is included in the type of qualitative research. The purpose of this study is to reveal facts, circumstances, phenomena, variables and circumstances that occur when the study goes and serve what it is. Qualitative descriptive research interprets and relates data pertinent to the current situation. Usually this research activities include data collection, data analysis, interpretation of data, and ends with a conclusion that refers to the analysis of the data.

The first step of this research is to collect data from various literatures on morphological understanding in linguistic science; the data is then interpreted into morphological concept of urban design. Interpretation results are then concluded.

4. Results and Discussion
From the discussion of Linguistic Morphology above, the smallest element of a language is a morpheme. Inside the city architecture the smallest element of urban architecture is space [11] The same thing also expressed by Schindler in Space which states that space is a raw material of architecture. From these two meanings, the authors conclude that the morpheme can be dianalogikan as space (morpheme = space). Morphem consists of free morphemes and bound morphemes, as well as space. Space as a three-dimensional form consists of solid space (contents) and void space (open). The authors have it as it is in the following table:

| Linguistics                                      | Architecture                                      | Analogy Example |
|-------------------------------------------------|--------------------------------------------------|-----------------|
| Free morphem: a morpheme that can stand on its own as a word, and has meaning | Solid space: space that has mass → can stand on their own | 1. “sign”, when analogous to the form: “sign” |
| Morphem bound: a morpheme that can not stand alone, and has no meaning, is called jug as an affix. | Space void: empty space, space which is limited only by the spatial plane itself → can not stand alone | 2. “Signage”, when analogous to the form: “To” “Sign” |
|                                                 |                                                  | 3. “Designate”, when analogous to the form: “to” “sign” “ed” |
|                                                 |                                                  | 4. “Signature”, when analogous to the form: “Sign” “ature” |

In Bahasa Indonesia Sign, Signage, Designate and Signature as the example above can be referred to as the word. The word is the smallest unit of a sentence that can stand on its own and has meaning, formed from a combination of letters or morphemes. From this sense the word can be said to be a composite of the constituent elements of space, and or as the space itself which has meaning. Based on this understanding then, the analogy of the word into the form is illustrated in Figure 1.
Note Figure 1 above, the form of space C and D is one example that actually void space cannot stand alone. It takes solid space to make it a meaning. The void spaces can be prefixes, inserts (infix), suffixes (suffixes), and can also be confix (combined prefixes and suffixes) as space D. In the form of space E, although the solid space is different, but it has a unity of meaning.

As in the example number 4 (four) in Table 1 above, the word Signature can be called a word because it is a unified entity, but if it is reversed (exchanged its position) it will have no meaning anymore (Figure 2).

From Figure 2 above it is clear that if there is a change of position in the combined form of a space it will give a different meaning to the space, or it can be said has no meaning.

From the results of the above understandings, the authors take the conclusion about the analogy of Linguistic morphology into the morphology of urban architecture as in the table as follows:

| Morphology in Linguistics | Morphology in Urban Architecture |
|---------------------------|---------------------------------|
| Morphem                   | Urban Space                     |
| - free morphemes          | - Solidspace (solid mass)       |
| - bound morphemes         | - Voidspace (open space)        |

Word
- word is a complete and complete unity in a speech language
- words can be isolated that a word in a sentence can be separated from another and can be moved
- The elements of urban space formation, can consist of solid space (solid mass) and void space (open space), or other urban space-forming elements, and constitute a unity that forms meaning.
- These elements can be isolated.

From the table above can be concluded, if the Morphology of Linguistics according to Wikipedia in terms of morphology of urban architecture, then the morphology of the city is a study identify the
basic units of urban architecture as grammatical units. Morphology studies the intricacies of urban space and the effects of changes in the form of urban space on groups (building clusters and physical elements) and the meaning of urban space. Or in other words it can be said that morphology studies the intricacies of the form of urban space and the functions of changes in the form of urban space, both grammatical functions and semantic functions.

As for semantic understanding in urban architecture, writer refers from the opinion of Galuh Puspita) that semantic is composition (composition) of visual language through visualization of physical being captured by means of senses [14].

From the understanding of the morphological field discussed by linguistic morphology based on the opinion of Prawirasumantri, the analogy to the architecture of the city, among others, becomes:

a. Spaces contained in an urban architecture. According to Kevin Lynch in Image of the City, the creator of a city's imageability is (1) path: road, hall, pedestrian, highway and whole network of city movements; (2) edges: physical elements considered as boundary boundaries such as walls, buildings or beaches; (3) districts: parts of territories that have certain character or identity; (4) nodes, important points in the city, crosses; (5) landmarks: easily recognizable objects, into reference [15]. According to Hamid Shirvani in his book Urban Design Process, there are eight kinds of elements that form a city, namely (1) land use (land use); (2) building and mass building; (3) open space; (4) parking and circulation (parking and circulation); (5) signs (signages); (6) Pedestrian ways; (7) activity support; and (8) preservation [1].

Based on the understanding of the theory of Kevin Lynch and Hamid Shirvani then it can be taken decisions about the notion of solid space and void space based on urban architecture. Solid space is: (1) building masses, monuments; (2) land parcels of residential blocks; and (3) Edges in the form of buildings. While the void space is: (1) open space in the form of yard that is transition between public and private; (2) open space within or surrounded by mass of building is semi private to private; (3) the main network of roads and fields is public because it accommodates the city's public activities; (4) public parking area in the form of parked parking as a nodes that serves preservation of green areas; (5) open space systems in the form of linear and curvilinear in the form of flow sunga, lakes and all natural and wet.

b. The process of forming urban space. To understand and illustrate the formation of a complex city space, one of them is by observing urban tissues, or links formed by the elements of the city above. The Trancik figure-ground theory (1986) and the urban architectural theory of Edward Norwood Bacon (1974), could be the basis for deeper understanding of the urban tissues. The relative condition between buildings as solid space (solid mass) with void space (ground) can be seen from the relationship between space. The basis of this theory aims to explain the structure of space by determining the hierarchy of space, but it can also be used as a tool to illustrate the relationship between solid mass (solid space) with open space (void space). To find out whether the structure of the space is good or not, it is necessary to do proper analysis of the process of its formation.

Of course, the process of urban space formation with linguistic morphology approach is more appropriate if based on the figure-ground analysis. Figure is the term for built masses (usually in pictures shown in black or white) and ground is the term for all spaces outside the mass (usually indicated by white or black). From the use of this analysis is expected to terilhat urban texture patterns whether have a good meaning or not, in accordance with linguistics.

c. The function of the process of forming city space. An Architectural principle in which the form of a building must be obtained from the function that must be in full; schematic and technical aspects of architectural moderation (rationalism), whose broader theoretical stance also forms symbolic, philosophical, political, socio-economic questions. (Josias Tanyuga, 2010)

d. The meaning of the process of forming city space. The meaning of space is not only based on the aesthetic and visual sense alone. Meaning is based more on the deepest essence of what is in the minds of society because that is visual expression is a reflection of the basic value of the identity of the community (Tulistyantoro, 2005). Kevin Lynch (1981) argues that the meaning of the city is a compound of attributes (elements) and physical sense. Furthermore, according to Purwanto (2004) in Devin (2006), that understanding of the meaning of urban space is closely related to
three components, namely: (1) the identity of some objects / elements within a characteristic and characteristic city; (2) the structure of the order, which includes the pattern of relations between objects / elements with objects / other elements in urban space that can be understood and recognized by the observer; (3) meaning is an understanding of the meaning by the observer of the previous two components (identity and structure of the city). So it can be concluded that, to understand a meaning of city space whether meaningful or not, can be seen from the identity and structure of the city which is certainly studied based on linguistic understanding.

e. Upholstery of urban space. Morphology will obviously be related to the problem of typology.

5. Conclusion
The morphology of the city according to linguistic analogy is the study of identifying the basic units of urban architecture as grammatical units. Morphology studies the intricacies of urban space and the effects of changes in the form of urban space on groups (building clusters and physical elements) and the meaning of urban space. Or in other words it can be said that morphology studies the intricacies of the form of urban space and the functions of changes in the form of urban space, both grammatical functions and semantic functions.

The morphological fields of the city are discussed on the basis of linguistic analogies among others: Spaces contained in a municipal architecture; The process of urban space formation; The function of urban space formation process; The meaning of the process of the formation of urban space; and Tennis room space.

The typology of the city according to linguistic analogy is the study and classification of urban architecture according to its structural characteristics (grammatical) in order to explain the diversity of urban architectural structures. Grouping of urban architecture based on the hallmark of urban spatial planning. The typology studies attempt to establish broad groupings based on interrelated grammatical features.

The smallest element of linguistics is morpheme, in urban architecture the smallest element of urban architecture is space, so the morpheme can be dianologikan as space (morpheme = space). Morphem consists of free morphemes and bound morphemes, as well as space. Space as a three-dimensional form consists of solid space (contents) and void space (open).

From the notion of typology if typology is dianologikan into the Architecture of the City then, the notion of "Language" = "Urban Architecture"

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