EASY ACCESS TO PUBLIC TRANSPORTATION FOR SUSTAINABLE SITE DEVELOPMENT, A CASE STUDY OF UNISULLA KALIGAWE SEMARANG

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Abstract: Global warming issue generates some sustainable-oriented actions aiming at protecting and improving environment quality. Air pollution caused by vehicles is one of the causes of global warming. Sustainability can be started in academic phase, such as campus environment, landscape, and buildings. This paper aims at explaining the sustainable development in Sultan Agung Islamic University (UNISSULA) and especially in its sustainable site development. Method used for this paper is qualitative case study that is suitable to answers questions about how and why. Case study requires a collection of site’s data as much as possible before being analyzed based on relevant theories. The result of this paper suggested the applications of sustainable site development in a campus ground especially with an easy access public transportation for Islamic campus and with Islamic values within.

Keyword: Campus Ground, Site Development, Sustainable Architecture

INTRODUCTION
Sustainable is such an important keyword in many sciences field nowadays. It is happening due to the increasing global warming issues. In the architectural world, architecture, as a science in engineering, also participates in sustainable act and called sustainable architecture. It even generates some isms such as ecological architecture, eco-friendly architecture, green architecture, etc (Sardjono & Nugroho, 2014). Regarding to global warming issue, sustainable architecture concept is absolutely applied, and one of its application is on campus ground (Filho, et al., 2015). Campus ground can contribute a huge impact in sustainability (Amr, et al., 2016). By applying sustainability concept in campus environment, it is expected to build a sustainability awareness character to the students (Coulson, et al., 2011). Islamic-based campus has more emphasis on sustainability concept, because sustainability is part of Islamic value (Indrawati, 2015). Indrawati (Indrawati, 2015) explained that Islamic architecture has three indicators: functional (hasan), good (thoyib), and aesthetic (jamil), then sustainable contained in good (thoyib). Which means Islamic fully support to sustainability and applicable to whole life aspects, including the academic world. There are many research papers studied about sustainable architecture in housing, buildings, and campus grounds all over Indonesia. Examples of sustainability in housing are the case of PERUMNAS (citizen settlement) and Badui tribe traditional buildings (Sudarwanto, et al., 2014) (Sardjono & Nugroho, 2014). But none of them explored sustainability linked to Islamic values. While sustainability study in building was the case of Bank Indonesia Surakarta, and it was not linked to Islamic
values (Sucipto et al., 2014). Whereas about sustainability study has been conducted in several universities such as Diponegoro University, Bandung Islamic University, Andalas university (Hapsari et al., 2014) (Salampessy & Pranggono, 2015) (Amrina & Imansuri, 2014) (Phramesti & Yuliastuti, 2013) and none of them linked to Islamic values. While research about Islamic values in buildings have been conducted for several times but none of them explaining about campus and sustainability. Thus, the aim of this paper is to complete them by providing explanation about sustainability case study of Islamic campus and considering Islamic values. This paper is an advance explanation and more specific in an easy access to public transportation from previous paper (Hasan, et al., 2016) (Hasan, et al., 2015). Sultan Agung Islamic University (UNISSULA) is the location of this research.

LITERATURE REVIEW

Sustainable architecture is being part of natural architecture, sustainable architecture uses natural materials, without cause ecological damage (Kultur, 2012). ASHRAE, an organization works as sustainable design promotion, explains that a design that green / sustainable is a design which minimalizes the negative impact of human to the surrounding environment, materials, resources, and nature process (ASHRAE, 2006). Sustainable design is considered as part of sustainable architecture (Sardjono & Nugroho, 2014). Sustainable design has 5 points to be considered, they are: sustainable site development, water conservation and efficiency, energy efficiency and renewable energy, material conservation and resources, indoor environment quality (ASHRAE, 2006) (Yudelson, 2007).

Furthermore, the main point of this paper, which is easy access to public transportation is to include in sustainable site development. Its aim is to create an eco-friendly site by using less private motor vehicle (Yudelson, 2007). Site must be placed within walking distance to any bus stop, which is no more than 300 meters according to Green Building Council Indonesia (GBCI) (GBCI, 2011). It requires adequate pedestrian ways that accomodates all users with various conditions. After presenting the existing data in site and analyzing based on related theories, Islamic values related also needs to be considered. Islamic values such as verses in Holy Koran and hadith are used to support the reason why UNISSULA as Islamic based campus was chosen. Furthermore, the analysis equipped with Islamic values is the novelty of this present paper.

RESEARCH METHOD

Qualitative methodology was used in this study since it is considered more appropriate to understanding the significance from social problems and involving participants to generates specific data (Creswell, 2013). Definition above strenghtening the use of qualitative which considers that sustainable architecture is a people involving issue. Further, qualitative method uses case study strategy which allows the researcher to investigates a program, event, activity, process, or a groups (Creswell, 2013). Case study is being recommended to answers questions about how and why (Yin, 2014). Case study is being choosen for its advantage to presents explanation more detail (Alwasilah, 2014) then generates a longitudinal illustration (Prastowo, 2011). First step in case study is collecting datas from site as much as possible. But the datas taken must be related to the theme, easy access to public transportation in UNISSULA. Before collecting datas, requires to understanding about sustainable architecture as the very first variable.

RESULT AND DISCUSSION

Sultan Agung Islamic University (UNISSULA) takes place on Kaligawe street which is a national high way connecting provinces. Its strategic location makes the academicians easy to access the campus by public transportation. Moreover 2 bus stops (bus and Trans semarang) are located around the area. But there are no integration between campus area to these bus stops. Pedestrian ways connecting to these bus stops less convenient. No wonder, the amount of academicians using private vehicles are numerous. Almost all parking spaces are full of cars and and motor cycles. Actually the university encourages the academicians to use public transportation instead private vehicle. One of the academicians' reasons was the distance between bus stops to the building. Some buildings are located not in a walking distance. Figure 1 explained some buildings from various distances.

<table>
<thead>
<tr>
<th>No</th>
<th>Sign</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pink ellipse</td>
<td>Trans Semarang Bus stop</td>
</tr>
<tr>
<td>2</td>
<td>Blue Ellipse</td>
<td>Bus Stop</td>
</tr>
</tbody>
</table>
Those are some buildings represents all buildings in campus of UNISSULA explained in table 1. HM Sulchan (red ellipse) building represents officialdom building, collective lecture building (yellow ellipse) and Al Biruni building (turquoise ellipse) represent lecture buildings, and Masjid Abu Bakar Assegaf (green ellipse) represents public facilities. Those buildings have different distances to bus stops and trans semarang stop, it explained in following table 2.

<table>
<thead>
<tr>
<th>No</th>
<th>Building</th>
<th>From/to Bus Stop (meters)</th>
<th>From/to Trans Semarang Stop</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>HM Sulchan Building</td>
<td>100</td>
<td>230</td>
</tr>
<tr>
<td>2</td>
<td>Collective lecture building</td>
<td>150</td>
<td>280</td>
</tr>
<tr>
<td>3</td>
<td>Masjid Abu Bakar Assegaf</td>
<td>250</td>
<td>365</td>
</tr>
<tr>
<td>4</td>
<td>Al Biruni Building</td>
<td>375</td>
<td>330</td>
</tr>
</tbody>
</table>

From explanation in table 2, it can be conclude that buildings in UNISSULA has different distances according from bus stops. Some buildings are not in a walk distances. GBCI (GBCI, 2011) explains that maximum distance for walk-distance is 300 meters. Based on that theory, it has UNISSULA to own low-emission vehicles to accomodate the academicians reach the buildings from/to bus stops without any hassle. The low-emissions vehicle can be in the form of shuttle or bicycle. Beside that, the academicians also should have be stimulated to using public transportation and walk from/to bus stops due to some buildings are in walk distances. Due to UNISSULA has not fully integrated public transportation in the campus ground, the academicians usually going to campus by private vehicles such as motor cycle and car. The problem caused is sprawled parking area inside campus.

Based on cases above, it requires UNISSULA to own low-emission vehicles and well maintained pedestrian access to stimulated the academicians reducing their private vehicle usage. Due to the absence of low-emission vehicle in UNISSULA, adjustment with the existing roads in UNISSULA is necessary. The adjustment allows a bicycle way on existing road. It takes some adjustment on roads and explained in some points in UNISSULA sitemap below.
In redesign path number 1, it requires a roof protected pedestrian way, bicycle path with separator, and remove all parking line. The roof protected pedestrian way is located on right side due to the building is located on right side. Removing parking line requires a parking building, on southwest area of UNISSULA. The parking lot allows the inside area of UNISSULA free from vehicle. The location suggestion for parking lot can be seen on figure 6.

Then on point number 2 in figure 2 is a next phase of ringroad in UNISSULA. Path number 2 has approximately 5.8 meters width. This path is rarely passed by pedestrians since they are prefer passing by the center area of UNISSULA which closer in distance and shaded. The condition at its existing road has no paralel parking. The section of its path can be explained in figure 6. Then in figure 7 below is the redesign of path number 2 adapted from government regulation (PUPR, 2014). The bicycle way is made with low separator with 1.5 meters wide.

Point number 3 in figure 2 is a next phase of ringroad in UNISSULA beside of Masjid Abu Bakar Assegaf. Path number 3 has approximately 5.2 meters width. This path is regularly passed by pedestrians since provides pedestrian way and a way towards masjid. The condition at its existing has a parallel motorcycle parking on right side. The section of its path can be explained in figure 10. Then in figure 11 below is the redesign of path number 4 adapted from governement regulation (PUPR, 2014). The bicycle way is made with low separator with 1.5 meters wide.

Point number 5 in figure 2 is a next phase of ringroad in UNISSULA between Technology Industry Faculty building and PUMANISA (canteen building). Path number 5 has approximately 5.3 meters width. This path is regularly passed by pedestrians since provides pedestrian way and access to the BRT (bus) stop. The condition at its existing road has a parallel parking on right side. The section of its path can be explained in figure 12. Then in figure 13 below is the redesign of path number 5 adapted from government regulation [24]. The bicycle way is made with low separator with 1.5 meters wide.
Islamic Values

Providing a convenient street for pedestrians and bicycle users by any means facilitating others for doing something. At once it helps to maintain the air from pollution in the campus ground since the parking area is being integrated in front of the campus area. Awareness of giving ease to other Muslims contained in Hadith history by Al-Bukhari and Muslim, “A Muslim is the brother of another Muslim, he is not ill-treat him, and does not lower him. Whoever fulfills the needs of his brother, Allah will fulfill his wish. Whoever removes the narrowness from one world narrowness of a Muslim, Allah will remove from him one of narrowness in the Day of Judgment. When a Muslim covers the ugliness of a Muslim, Allah will cover his ugliness on the Day of Judgment”. And it also contained in another Hadith, that is “Whoever helps his brother demand, so Allah will help his demand too.” (Hadith history by Al-Bukhari and Muslim)

Then concerning Allah order to not make any damages in the earth has been written in Koran (Al-A’raf : 56), “Do no mischief on the earth, after it hath been set in order, but call on Him with fear and longing (in your hearts): for the Mercy of Allah is (always) near to those who do good.” From those hadiths and verse, it can be concluded that Islamic values the sustainability in the form of providing comfort and good quality of life for human being, and that can be in terms of improving air quality, providing access and comfort to pedestrian and care for the needs for other in longer term.

CONCLUSION

In term of campus location, UNISSULA has already supported by public transportations such as intercity and inner city bus. Pedestrian ways between campus buildings and bus stops should be integrated and renovated to accommodate the pedestrians need. Beside that UNISSULA needs to renovate its ringroad system and parking area to encourage the academicians using public transportation and low-emission vehicle (bike/shuttle) rather than drive their own cars or motorcycles. Renovating such systems will give the benefits to UNISSULA both in short and long term, that maintain the air quality, raise the awareness to live sustainably, and the most important is to implement Islamic values in accordance Koran and Hadith.

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