The Comparison of Soundscape between Urban Residential and Gated-Residential in Indonesia

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Abstract. Soundscape approach is one of an assessment tools for identifying acoustic environment and has an important part in shaping cities’ sustainability. In residential, the good quality of the acoustics was expected to meet the residents expectation, in order to have a comfortable place to inhabit. But the existing condition often is contradictive with these expectations. In Indonesia there are some types of residnetials with different characteristics, two of them are urban residential and gated-residential. The aim of this study was to compare soundscape between the two types of residential in Indonesia by identifying the sound sources. The most favourite and less-favourite sound sources also will be analysed. The research method used a qualitative method through an online questionnaire to identify the sound sources that perceived by respondents who lived in urban and gated-residentials in several cities in Indonesia. The result of this study shown the importance of context in shaping soundscape, especially in residential. Different context with different acoustic environment resulting different sound sources which perceived by human in order to assess their comfort dimension in their residents.

Keywords: soundscape, sustainability, urban residential, gated-residential, sound source

1. Introduction
Acoustic environment has an important part in shaping sustainable and healthy urban communities and cities. To assess those acoustic environment, soundscape approach can be used. Soundscape concept has been applied on diverse disciplines and has developed from the field of music to architecture. Soundscape approach has different purpose with noise control. Rather than to reduce noise levels, soundscape tend to concentrates on what sounds are desired in a place [1]. It doesn’t treats sounds as a “waste” but as a “resource’ to shape acoustic environments.

The soundscape terminology was popularized in 1977 by a music composer, Murray Schafer. He described soundscape as “[a]n environment of sound (or sonic environment) with emphasis on the way it is perceived and understood by the individual, or by society“ [2, 4].

Soundscape is defined by ISO as “acoustic environment as perceived or experienced and/or understood by people, in context” [2]. This concept is based on humans’ perception of
the acoustic environment. Soundscape includes relationships between context, sound sources, acoustic environment, auditory sensation, interpretation of auditory sensation, responses, and outcomes [2].

![Figure 1. Conceptual Framework of Soundscape [2]](image)

In the context of residential environment, it is expected to be a comfortable place for families to inhabit, one relates to the quality of the acoustics. But the existing condition often is contradictory with these expectations.

In Indonesia, rapid urbanization and population growth influence the transformation of residential. There are some types of residential in Indonesia, two of them are urban residential and gated-residential. Both of the settlements have different characteristics, so it is assumed that the soundscape that was formed would be different. Urban residential, or also known as kampung, is the main urban settlement typology which exhibit rural characteristics and a traditional way of life. It often come to feature irregular laneway patterns, narrow alleys, fine grain infrastructure and basic public facilities [3]. Gated residential, or also known as gated communities, or cluster housing, are term given to gated residential developments with limited access and boundaries surrounding the area [4]. It occurred due to some reasons, one of them is security. According to Hapsariniaty et al. [4], gated residential have several characteristics: built on a relatively small plot of land, small numbers of units, limited size of dwelling and facilities provided, and tends to support form of a small nuclear family.

Several researches have studied soundscape in a various contexts or environments, but only several studies discussed about soundscape in residential areas [1]. Therefore, the aim of this study was to compare soundscape between urban residential and gated-residential in Indonesia. Sound sources, or the origin of the sounds (e.g., road traffic, chirping birds, voices, footsteps, etc.) between the two types of residential will be identified and analysed in order to receive the soundscape model in urban residential and gated-residential. The most favourite and less-favourite sound sources also will be analysed in order to see the human preferences towards soundscape in residential areas.
2. Research Method

This research is a qualitative research, where the result was discussed descriptively. This method is used to see the most identified sound sources in urban residential and gated-residential in Indonesia, and compared them to see the general condition of soundscape in both types of residential in Indonesia.

The data collection used online questionnaire, as one of an in-situ environment assessment [5]. The online questionnaire contains a mix of open and closed ended questions, but for this study, only the result of the open ended questions will be used. The respondents were asked to identify all of the sound sources they can hear in their residential environment, and mention their most and least favourite sound sources.

There were a total of 381 respondents who came from various cities in Indonesia. From all of the respondents, 241 respondents lived in urban residential, and 140 respondents lived in gated-residential. All respondents are over 17 years old, with the largest demographic between 25 - 60 years.

Data analysis were conducted through few stages. The sound sources mentioned by the respondents were identified by the keywords and categorized according to the closeness of meaning. The sound sources identified was “natural sound” (e.g. sound of rain, water, wind, etc.), “animal sound” (e.g. chirping birds, dog, cat, etc.), “motorized transport” (e.g. car, motorcycle, heavy vehicles, horn, etc.), “electromechanical sound” (e.g. electrical equipment, construction, domestic, etc.), “human sound” (e.g. children’s voices, neighbours speaking voices, music, human activities, etc.) and “signals” (e.g. adzanl prayer calling, announcements from mosque, etc.).

After identifying the sound sources, the data analysed using distribution analysis. This analysis aims to identify the most dominant sound sources identified both in urban residential and gated-residential in Indonesia.

3. Result and Discussion

This part of the study will try to discuss the comparison of soundscape between urban residential and gated-residential in Indonesia through identifying sound sources. The most favourite and less-favourite sound sources also will be analysed in order to see the preferences towards soundscape in both residential areas.

3.1. The Comparison of Sound sources in Urban Residential and Gated-Residential

Based on Figure 2, it can be seen that between urban residential and gated residential have different result in the dominant sound sources. In urban residential, the most identified sound sources were “motorized transport” (30,15%), followed by “animal sound” (23,70%), and “human sound” (20,76%). In gated-residential, respondents mostly identified “animal sound” (25,40%), “motorized transport” (24,72%), and “human sound” (22,90%).

In Urban residential, majority are characterized by its narrow alleys and its location close to main roads [3]. The habitants can easily heard the sound of transportations passing each houses. In addition, it sometimes located near offices, shops, public facilities or commercial facilities, so it is located in busy locations where high intensity and frequency of vehicles passing through. The unlimited access and no boundaries also makes it accessible for motorized transportations. Therefore, the sound of “motorized transport” had become the most identified sound source there. “motorized transport” sound that mostly mentioned was the sound of car or motorcycle engine, horn, and muffler.
As for gated-residential, the limited access and boundaries surrounding the areas makes it difficult for public, other than the residents, to get inside the area. So “motorized transport” has not become the dominant sound source there. In fact, based on the questionnaire result, “animal sound”, become the most dominant sound source. Bird chipping has become the most identified animal sound in the cluster residentials. Probably, it is because in gated-residential, they provide more open spaces and public facilities, in the form of parks, swimming pools, etc. To support these, the developer planted various vegetation like trees and other plants. Then, these vegetations attract wild birds to come.

3.2. The Comparison of the Most Favorite Sound Sources in Urban Residential and Gated-Residential

The information for this analysis mostly consists of positive types of sounds. Based on Figure 3 between urban residential and gated-residential have the same result for the most favorite sound sources. The first most-favorite sound source was “animal sound” with percentage of 60,17% for urban residential and 53,85% for gated-residential; “natural sound”, 16,95% for urban residential and 23,78% for gated-residential; and “human sound” 10,17% for urban residential and 16,08% for gated-residential.
The two most favorite sound sources “animal sound” and “natural sound” both direct to the sound of the natural environment. This can be interpreted that in residential areas, both urban residential and gated-residential, need open spaces and vegetation. By providing open spaces like parks, swimming pool and playgrounds, and various vegetation like trees and plants, it can attract animals sounds like wild birds and cats to come, and also the sound of natural environment like leaves friction from trees, wind and water. Open spaces can also attract the residents to gather and do communal activities, thus, the “human sound” can also be formed naturally.

The result “animal sound” was very dominated in urban residential with highest percentage and huge gap among other categorization of soundscapes. This shows that this sound source is very much needed due stabilize the busy sounds from the “motorized transport”. Also the result for “signals” (adzan/ prayer calling, recitation from mosque, etc.) has higher percentage in urban residential and huge gap compared to result in gated-residential, shows that there are more mosque with an average closer distance so the residents can easily heard the “signals” sound source.

3.3. The Comparison of the Least Favorite Sound Sources in Urban Residential and Gated-Residential

The sounds mentioned in this analysis mostly are negative sounds or generally called as noise. From Figure 4 it can be concluded that both urban residential and gated-residential has the same least-favorite sound sources, which were “motorized transport” with percentage of 62.96% in urban residential and 39.42% in gated-residential; “human voice” by 15.23% in urban residential and 24.09% in gated-residential; and “animal sound”, 9.88% in urban residential and 16.06% in gated-residential.

![Figure 4. Comparison of the least favourite sound sources between urban residential and gated-residential](image)

The sound “motorized transport” that mostly mentioned in this part were the sound of car or motorcycle engine, horn, and muffler. This sound were chosen to be the most disliked sound in their residential. The sound “human voice” that most likely mentioned by the respondents were loud noises made by human (adults and children), like arguments sounds, singing, children
crying. While the “animal sound” that mostly mentioned were the sound of rats, dog barking and fighting cats.

The contrast percentage gap between “motorized transport” and other sound sources in urban residential shows how disturbing this sound is generally in this type of residential. This might resulted from the characteristic of urban residential, where majority has narrow alleys and close location to main roads [3]. So the residents can easily heard this sound from their houses. This result is also strengthen by the previous result from the sound sources identified, where “motorized transport” was the most dominant sound identified in urban residential. In gated-residential, all of the sound sources relatively has balance distribution. This might resulted due to the controlled access from the gated system and the planned infrastructures and facilities provided in the residential.

4. Conclusion

Based on the results mentioned above, between urban residential and gated residential have different result in the dominant sound sources. In urban residential, the most identified sound sources were “motorized transport”, “animal sound”, and “human sound”. In gated-residential, respondents mostly identified “animal sound”, “motorized transport”, and “human sound”.

Regarding the most-favourite sound source, both types of residential resulted “animal sound”, “natural sound”, and “human sound” as the sounds the respondents liked. This result shows the need to design open spaces with various vegetation to naturally attract animals, natural sounds and engaged human activities. For the least-favourite sound sources, “motorized transport”, “human voice” and “animal sound” was the sounds respondents find as noises that they dislike. The noises chosen was loud and disturbing noises that can be easily heard from their residents.

From overall results it can be concluded that context, has an important role in shaping soundscape. Different context has different acoustic environment, thus resulting different sound sources. These sound sources than perceived by human, which in turn will provide a comfort dimension to the residents inhabit it.

This research is initial research, future studies need to be conducted in order the complete the information on the soundscape of residentials in Indonesia. The results of this study can be references for government or private sectors in designing residential area from the perspective of acoustic environment comfort in order to achieve sustainable and healthy urban communities and cities.

5. References

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