Perceived Affective Improvement Strategies for Residential Area: The Case Study of Jakarta

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Abstract. Expectations for residential conditions are often not in line with existing real conditions. This causes stress on the residents of the residence which will have an impact on their health. This study aims to formulate a quality improvement strategy in residential areas from the soundscape approach. The soundscape is an approach that examines the relationship between humans, sound sources, and perceptions of the environment. This research methodology is quantitative by using an online questionnaire. The research results reveal dimensional differences between real and expected conditions. Based on this, a strategy is formulated that can be used to improve the quality of the residential environment. The recommendations of this research can be used by architects, urban designers, and policymakers at the sub-district and regional levels to improve the quality of the residential environment from a soundscape perspective.

Keywords: residential soundscape, acoustic environment, existing soundscape, expectation soundscape, improvement recommendation, Jakarta.

1. Introduction

The sound environment is an important factor to be considered in building sustainable and healthy urban communities and cities. The high-quality acoustic environment may positively affect the quality of life and health through the restorative healing environment [1, 2]. Those high-quality acoustic environments can be assessed and improved by the soundscape approach.

The concept of the soundscape was introduced by Michael Southworth in 1969. He argues that sonic identities should be considered and implied in urban design and city planning. Even though the soundscape initially discussed the field of music and the acoustic environment, but it needs to across disciplinary research, from psychology, environmental health, sociology, architect, and others [3, 4]. Nowadays, the soundscape has been defined by the International Organization for Standardization as an "Acoustic Environment that is accepted by people or communities in a context" [5].
There are three major components in soundscape research: the human (perception), the context, and the sound source. Therefore, those components must be identified – both for existing conditions and the expectation of the context. This research intends as a preliminary study on how to improve the qualities of the residential area through the soundscape approach.

2. Research Methodology

According to Aletta, soundscape research can be done in-situ environment, laboratory environment, and recalled in memory. Each acoustic environment needs its protocols in collecting data. The most realistic data is by assessing the in-situ environment through the Questionnaire [6, 7]. Due to the pandemic SARS-CoV2, the assessment was done by an online questionnaire to assess the perception in Jakarta Residential Area.

The respondent is 57 respondents (21 Male and 37 Female). Most of the respondents live in urban housing or urban villages (58%), 24% live in gated residential, 16% in apartments, and 2% live in flats. All the respondents are above 17 years old.

The questionnaire is divided into open questions and semantic differential scales. Open questions are used for seeking the sound source, while the semantic differential scales are used for measuring the perceived affective quality of the acoustic environment. The sound source then is grouped based on the sound source classification as listed in the International Organization for Standardization (cf. Figure 3) [7]. The semantic differential is collected for in-situ condition and expectation condition for the context. That semantic differential scale used
one to five scale, where the bigger number indicates the level of perceived affective representation.

3. Result and Discussion

3.1. Perceived Affective Quality Comparison between In-Situ Condition and Expectation

The result from the collected data shows that the perceived quality from in-situ measurement has a gap with the people's imagination of their residential area. The difference between a real condition and their imagination will cause stress for residents. In a long-term situation, this condition will affect the health – especially the mental health – of the resident. Therefore, it is necessary to find a strategy to achieve the desired conditions.
The graph radar in Figure 4 shows the difference between a real condition and the expectation of residential area in Jakarta. From the graph radar, the pleasant value in the in-situ condition has a value of 3.51 out of 5 scales, while the expectation value of the residents up to 4.49. Respondent regards the calmness dimension of sound only 3.37 while the expectation of the dimension point 4.21 from 5 scales. The same thing is shown in the vibrant group, where the expectation level (4.26) is far above the current in-situ condition (3.25). Meanwhile, from the eventful dimension, the sound that was heard was close to the expected value, where the value for in-situ sound is 3.65, and the expectation value reaches to 3.95. Another long gap is shown in the softness of the sound, where respondents valued the real condition in 3.07 and they expect more not too loud (4.23). In another perceived affective dimension, respondents expect a more relaxing sound environment than the in-situ condition, wherein the current condition, the value of relaxing is at the level of 3.39, quite far from the expected relaxing sound 4.32. The only perceived affective dimension that needs to reduce is the variant of the sound, where the current condition shows 3.35, while the expectation is only 3.15.

From the radar, the difference of perceived affective dimension between the real condition with the expectation level might show the relation between the dimension. The pleasant perceived affective quality will be increased if the calmness quality is increased too. The same with the vibrant value, eventful value, softness value, and relaxing value, where the increasing perceived affective qualities will affect the increasing pleasant perceived affective quality. In other words, those qualities will influence each other positively. Meanwhile, the variant quality needs to decrease to achieve the increasing other perceived quality affective. Therefore, the strategy needed to improve the quality of the acoustic environment in the Jakarta residential area is by increasing the perceived affective dimension of pleasant, calmness, vibrant, eventful, softness, and relaxing, and decreasing the variant of sound.

Reducing muttering or clashing of one sound with the other will increase the quietness level of the acoustic environment in the residential area, which in turn will also increase comfort quality and the others perceived affective values. It is necessary to think further on how to
present the voices that inspire enthusiasm in everyday life. The sound also needs to describe the events in the surrounding environment. Other research shows that this perceived affective quality is represented by the sound of human activity in the surrounding area. The most important strategy that must be considered is how to reduce the noise level in a residential area, which will increase the softness quality and affect other perceived affective dimensions. The type of sound source must be considered carefully to bring a relaxing feeling to the environment. Another strategy that can be taken is to reduce the variety of sounds in the residential environment. All of this strategy can be considered to improve the acoustic environment in Jakarta residential area.

3.2. The Improvement Strategies by Its Sound Source.

The acoustic environment is determined by the components in it - the sound that comes from the sound source. Therefore, it is necessary to know which sounds are heard, sources of sounds that are liked by the public, and sources of sounds that are not liked in residential areas. The sound source uses the classification formulated in the International Organization for Standardization [7].

Based on the word cloud above, many sound sources can be identified by the occupants. The word cloud is the word that appears a lot from the collected text data. The more respondents mention the sound source, the bigger the word will appear in the word cloud. The word cloud images show that the top five voices heard are vehicles, birds, cars, motorbikes, and people. There are some other voices such as the prayer calling from the mosque, ondel-ondel – local Betawi culture, dangdut music, and others. This sound source ultimately forms the acoustic environment in the residential area in Jakarta.

**Figure 5.** Word cloud of sound source in Jakarta residential area.
The sound source is then classified as in the International Organization of Standardization [7]. The residents point the animal sound for the most preferred sound with human sound, the signals, and natural sounds. There are no motorized transport and electromechanical sound classification as a preferred sound. Based on the collected data, the dislike sound classification is motorized transport, electromechanical sound, the human sound, and animal sound.

Figure 6. (Left) the preferable sound source classification. (Right) the dislike sound source classifications.

The figure above shows the difference between the sound source in real condition with the resident’s expectation of the sound source. One of the strategies to increase the perceived affective quality in the residential area is by modifying the sound source – reducing the dislike sound classification and enhancing the preferred sound classification. From the figure of comparison, the respondent needs to reduce the motorized transport sound classification – the muffler of the car and motorcycle, and the horn of the vehicles. The human sound is considered
to be eliminated, but the reduction of human sound usually will decrease the eventful perceived quality. The animal sound – chipping of bird and crickets – needs to enhance, while the sound of natural needs to improve significantly. Most of the respondent wants the sound of gurgling water and the rustling leaves in the wind in their residential area, where it is described that they want the residential close to nature.

4. Conclusion Remarks

The research shows that the acoustic environment in Jakarta residential area is different from the real condition and the expectation. Therefore, the environmental conditions of these residential areas must be improved so that their living environment is in line with expectations. Efforts to improve the sound environment will indirectly organize the environment as a whole, which will support this area to be more sustainable. In addition, a good acoustic environment will improve mental health for residents.

In the case of Jakarta, it's more important to reduce the loudness of sound to give the softness and relaxing environment. This can be done by reducing the sound from the vehicles – the muffler of car and motorcycle, and the horn of vehicles. The residents didn’t expect to hear the sound of vehicles, but in this era, when the vehicles become important for transportation that cannot be eliminated. Therefore, we only can mask the sound with the other positive sound, like the water or the rustling tree.

This research has the potential to be continued to better understand the perceived affective patterns received by residential residents in the city of Jakarta or from other cities. By understanding the expected affective with the real conditions, then a solution can be found to improve the quality of the residential environment for the long term. This research can be a further discussion for designing residential areas or making policies related to residential areas in Jakarta for better life sustainability.

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