A Preliminary Study of Improving Urban Public Spaces in Surabaya using the Sonic Perception of Visually Impaired People

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Abstract:

1. Introduction

Urban public spaces are vital features for city dwellers. These are the places where city dwellers get free access to gather, socialize, or enjoy solace. Hitherto, urban public spaces are ideally inclusively designed. But, inclusive design is a condition hardly found in developing in many cases. Two urban public facilities, i.e., parks and sidewalks were evaluated in a study collaborated with the visually impaired community of Yayasan Pendidikan Anak Buta (YPAB) Surabaya. This project is a part of a service learning coursework aiming the student involved to actively accompany and collaborate with the visually impaired people to map the less favorable conditions of parks and sidewalks using the sonic perception of the visually impaired people. Here, both communities work in mutualism, where the sighted students learn how to accommodate the needs of people with visual disability, whereas the visually impaired get a chance to experience more of the urban public spaces and that their shortcomings are a useful tool to map, and later, improving the less favorable urban conditions.

2. Theoretical framework/literature review

Perception is an awareness of the elements of environment through physical sensation [1]. The most common senses used to give an instant perception are visual, aural, and tactile. But, since most of us are sighted people, a perception of a space or place is dominated by the visual aspect. Only those with a visual disability use the aural aspect dominantly. Blind people are more sensitive to sound than the normal-sighted people [2], and they are also typically able to process the acoustic information better [3]. Plasticity of the brain helps people with a visual handicap to developing extra abilities in processing auditory cues [3,4,5,6]. These have positioned the blind people to be more attentive to acoustic information and dispose of more brain volume to process the sonic information [7]. The visually impaired are also better echolocators than the sighted [8]. Urban environment has now shifted to be less favorable caused by the escalating environmental noise. Therefore, mapping the urban public spaces using sonic perception is felicitous, particularly the perception of the visually impaired ones.

3. Methods/analysis

The study was conducted using soundscape, a method introduced by Schafer [9]. A soundscape is an acoustic environment as perceived or experienced and/or understood by people, in context [10]. The visually impaired participants were requested to do a soundwalk (a method of soundscape by walking) accompanied by sighted participants who also act as the interviewer. Seventeen urban public spots were selected for soundwalks with 35 visually impaired participants. Eight spots were in Bungkul Park and Flora Park, and 9 spots were along sidewalks of Siola, Bambu Runcing, and Darmo. All spots are in Surabaya, the second largest city in Indonesia. The soundwalks were all conducted in silence then stopped on the designated points to carry out the interview. It was conducted in 5 groups consist of 7 participants each. A spot required approximately 15 to 20 minutes to complete the soundwalk and the interview. The soundwalks were carried out all on Saturday morning between 8 to 11 AM in a normal situation (not peak nor slack period) of Surabaya City. It took four Saturdays to complete the soundwalks. In addition to the in-situ soundscape method, an off-site soundscape method was also conducted to confirm the finding of the parks' soundscape. The off-site soundscape used a series of recorded sound at Bungkul Park. Then, the sounds from 3 spots were reproduced one by one in a quiet room in YPAB, followed by an interview by sighted participants to the visually impaired ones. The in-situ questionnaire was constructed using a very simple bipolar semantic scale of -1 0 1. The three only scales might not provide a sufficient in-depth analysis but were deliberately used considering the barrier of communication between the participants and the accompanying persons. The simplification of the scale, from commonly 5 or 7 to 3 only, was considered so as the interviewee would shortly grasp the question and be able to answer the question instantly. Use the common scale would longer the questionnaire's reading by the interviewer, means a longer time of interviewee to grasp the question and longer time to select the intended answer. It might lead to a miscommunication to generate non-valid answers. Whereas, the off-site soundscape used an open-ended questionnaire asking the attributes selected in the semantic scale and the reason behind those answers. The data was processed using Principle Component Analysis (PCA)

4. Results and Discussion

The soundscape dimensions are selected based on the eigenvalue of the PCA Components (eigenvalue>1). By the in-situ survey, three soundscape dimension of sighted participants arose, i.e., the dimension related to the perception of pleasantness (25%), eventfulness (22%), and dynamic (9%). Whereas, by the visually impaired, there were 5 soundscape dimensions, i.e., dynamic (19%), pleasantness (13%), direction (8%), and spatiality (6%). The off-site survey that only involved visually impaired people revealed the perception of dynamic is dominated by the sound of vehicle and fountain. The perception of pleasantness is affected by the sound of vehicles, fountain, and bird. The perception of eventfulness is mostly affected by the human sound in the environment and vehicle around. Meanwhile, the perception of direction is affected by the previous experience of the space and the sound mark in the location. The perception of space is affected by human activity in the park. Interestingly, the sound of vehicles is related to the perception of width. Another interesting result is the appearance of different soundscape dimension (compared to sighted people): the dimension of direction and the dimension of danger.

These two dimensions clearly show the perception difference between sighted people and visually impaired people. The visually impaired people use their ears not only to perceive the commonly held perception by the sighted people but also to navigate and to detect danger.

5. Conclusions and contributions to theory and practice

The study reported here has strengthened the earlier studies that visually impaired people perceived their sonic environment more detail than the sighted subjects. The visually impaired people also added three more terminologies of the sonic environment than the sighted i.e., the terminology of safety, directivity, and space. For the visually impaired, the dimension of dynamic plays the most important role for mobility and to experience the surrounding. Finally, this study shows that the sound of vehicles seems to be the most perceptive mark of both parks and sidewalks, which is not the embedded sound of a park ideally. The sonic perception of vehicles appears both in negative and positive meanings. All these findings are useful references to improve the condition of urban parks and sidewalks to accommodate city dwellers inclusively.

Keywords: Soundscape, sonic perception, urban public spaces, visually impaired people

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