Soundscape, Standardization, and Application

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Summary
The Soundscape concept was introduced as a scope to rethink the evaluation of "noise" and its effects. Since Soundscape suggests exploring noise in its complexity and its ambivalence and its approach towards sound, Soundscape does understand evaluation of noise/ sound from perception to physics. Therefore, Soundscape means to focus on the meaning of sounds and its implicit assessments to contribute to the understanding that the evaluation through perceptual effects is a key issue. The definition and as well the use of a variety of data collection methods related to human perception, acoustic environment and context will here be introduced according to ISO 12913. The international standard ISO 12913 gives guidance to get access to the key components in Soundscape: people, acoustic environment, and context. Soundscape as an acoustic environment as perceived and or experienced and/or understood by people, in context guarantees the involvement of different disciplines but also stakeholders as the promoters to identify the resources a platform for further development in economic and ecologic as well as in noise policy-standards concerning the enhancement of quality of life.

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1. Introduction

The process of standardization of "Soundscape" has a quite long story that demonstrates the challenge when knowledge gained will go through this process which is finally regarded to application in agreement. Moreover, Soundscape is a paradigm shift in the area of noise and noise control. Already the definition that introduces Soundscape as an "acoustic environment as perceived or experienced and/or understood by people, in context" demonstrates that data collection, requirements and analysis will be most different to the classical evaluation of noise and noise effects. Soundscape does not only call for interdisciplinarity: it is interdisciplinary. On this basis, the international standard provides a definition and a conceptual framework of soundscape. It explains factors relevant for measurement and reporting in soundscape studies, as well as for planning, design and management of soundscape.

The first part of the standard clarifies that soundscape is people's perceptions or experiences and/or understanding of an acoustic environment. Measurement, assessment or evaluation of soundscape is regarded to human perception of the

acoustic environment. The second part provides procedures of data collection and requirements for application. This part of the standard is a “Technical Specification” and will be shortly published.

2. Collaboration as the tool

To establish the Soundscape concept and the Soundscape approach, there is the need to advise the respective local actors and stakeholders in communities, parks and wilderness, meaning using the resources given with respect to future generations and socio-cultural, aesthetic and economic effects as well. It was widely discussed in earlier publications that a platform is needed for stakeholders to communicate and find common decisions. Moreover, the current approach within the standardization of Soundscapes and the available standards in psychoacoustics and noise management have provided a big step towards enhancing the quality of life for people.
The ISO/DTS 12913-2 Technical Specification introduces and discuss techniques of interviews and guidelines, exploration of areas through soundwalks, but also the collaboration platform within a soundscape approach regarding urban design. Strategies for ‘measurement by persons’, and those applied in ‘measurement by instruments’ have to be considered to overcome the significant gaps that still exists between the both. There is the need for participation in process by all relevant groups involved. It will be a process based on experiences to understand that participation will also work as a public education tool enhancing the quality of participation. Moreover, activities in urban design that focus on participation of the people concerned will outline that “concerted actions” will be the basic that definitively need a conductor.

3. A piece of the story behind

In environmental noise research, only the accepted upper health limits for exposure are typically taken into account, and this has led to an attitude by administrations and policy makers that they can "fill up" the noise exposure to the maximum level allowed. A result has been that, during the last 20 years, undesirable noise exposure has spread from urban centres to suburban and rural areas, and the times of undesirable exposure have spread from day times into night times. This attitude has reduced the options for the restoration of undisturbed communication between people and for restoration of the health-related and environmental quality of life. Because of recent unfavourable development within research regarding noise and health, strategy papers, guidelines, and directives based on WHO recommendations have advocated more perception-oriented and sustainable assessments, one objective being the protection of quiet in sensitive areas and at sensitive times. Therefore, when it comes to urban design „people’s perceptions or experiences and/or understanding of the acoustic environment” will be the guiding feature.
The concept of soundscape was adopted to provide a holistic approach to the acoustic environment, beyond noise, and its effect on the quality of life. Soundscape suggests assessing all sounds perceived in an environment in all its complexity. To do this, soundscape studies use a variety of data collection and measurement methods related to human perception, the acoustic environment and the context, which is known as triangulation. This increases the validity and reduces the uncertainty of the measurements, compared to relying on a single method. Importantly, the study of soundscape relies primarily upon human perception, and only then turns to physical measurement. By discussing possible options for soundscape management and design with stakeholders such as residents, citizen groups, or transport authorities, planning technicians such as architects, engineers, urban planners, consultants involved, and decision makers such as local authorities, for example, light will shed on the best applicable solutions and on the user’s expectations. Noise control measures and strategies are used to reduce or eliminate unwanted sound levels where possible. Masking techniques may be adopted by making use of the psychoacoustic phenomena by enhancing or introducing sounds of preference that will mask unwanted sound components or will divert the attention of the listener to other more pleasant sounds. When new sounds are introduced they must correlate with the place and with the human activities and expectations so as to assure overall coherence and context.
To establish the Soundscape concept and the Soundscape approach, there is the need to advise the respective local actors and stakeholders in communities, parks and wilderness, meaning using the resources given with respect to future generations and socio-cultural, aesthetic and economic effects as well. It was widely discussed in earlier publications that a platform is needed for stakeholders to communicate and find common

decisions. Moreover, the current approach within the standardization of Soundscapes and the available standards in psychoacoustics and noise management have provided a big step towards enhancing the quality of life for people.

4. Soundscape applications

The city of Sheffield is a good example where water features have been embedded in urban design to enhance the perception of the acoustic environment's quality. Particularly, at the central train station, a complex system of fountains and noise barriers, implements a masking strategy for the traffic noise coming from the nearby major road. Different water features provide spectral variety and different frequency ranges resulting in an effective masking of the traffic noise. The interventions demonstrate the importance of utilizing diversity when designing soundscapes and created spaces with a cultural meaning (the water of the fountains and the metal of the barrier stand for the river and the steel industry, which are key symbols of Sheffield's history) to enhance residents' and visitors' enjoyment of the areas and reduced noise annoyance. Examples from: J. Kang, et al., Ten questions on the soundscapes of the built environment, Building and Environment (2016), http://dx.doi.org/10.1016/j.buildenv.2016.08.011

In the Valley Gardens project in Brighton soundscape analyses were conducted to implement the management of the acoustic environment in a broader urban regeneration scheme. The interventions helped residents to feel safer, suffer less from noise pollution, and increased a sense of social cohesion through citywide collaboration
The project Nauener Platz in Germany: Remodelling for Young and Old represents a successful implementation of the soundscape approach to the management and design of the urban sound environment. Data were triangulated through measurements on sound propagation, traffic censuses, binaural recordings, and qualitative evaluations such as soundwalks and open interviews introducing the local experts' perspective. The soundscape intervention included installing a gabion wall along one of the main roads to protect against noise around the playground and a number of ‘audio islands’ integrating sounds that people would listen to when using the place.

The resulting solutions reduced residents' exposure to noise at Nauener Platz and provided novel approaches to enable the most wanted sounds in the area to be heard. The desire of the residents to escape road traffic noise through hearing natural sounds was realized creating a relevant and usable city park with audio islands. The improvement of the residents' soundscape experience was measured using soundwalk and narrative interviews methods. The redevelopment of the Nauener Platz was awarded in 2012 with the European Soundscape Award by the European Environmental Agency and the UK Noise Abatement Society.

5. Participation in Progress

Interdisciplinarity is considered a necessity in the Soundscape approach. Planning procedures have to be directly related to local individual needs. Noise sensitive and other vulnerable groups should play a major role. Studies should account for cultural aspects and the relevance of natural soundscapes, sometimes referred to as quiet areas. These factors can be the most important issues for the people impacted by a soundscape, and their study requires the insightful tools developed through various fields of study.
The Nauener Platz project, for instance, required the direct collaboration of architects, acoustics engineers, environmental health specialists, psychologists, social scientists, and urban developers. Integrating the Soundscape Approach from the beginning of the Nauener Platz redevelopment project enabled a horizontal, long-term dialogue with the people in the area. The project that resulted was effectively guided by its many participants, with a final outcome in a unique solution for mitigating noise and creating a much-needed ‘backyard’ for the local residents through an improved soundscape.
The temptation with this level of success is to apply the strategies from Nauener Platz wholesale to other locations and attempt to replicate its achievements. This would be a false promise, even at seemingly very similar sites, because it is vital to understand the overlapping functions that a site can serve. Stakeholder involvement at Nauener Platz revealed the different expectations people held about the space. The success of Nauener Platz offers many lessons for future Soundscape work in facilitating a community-driven shaping of the built environment. The built environment, after all, is not

a monolithic construction; questions of comfort, engagement, and connection depend on the history and current purpose of a place or space.

6. Conclusions

An acoustic environment is constructed in its entirety by the people who use it and their interactions with the space. Thus, the strategies used to understand any particular location must be adapted to these singularities. The Soundscape approach for the Nauener Platz redesign, for instance, provided a feedback loop between physical measurements and stakeholder communication based on mutual respect, trust and cooperation.

Balancing between acoustic measurements, architectural planning and the expertise from people living in the area has to be conveyed through a new understanding not only of urban planning but also of data collection. The second part of the Soundscape standard in its technical specification will guide stakeholders and people concerned to reconstruct their acoustic environment with regard to people's expectation. As always when innovative processes are starting it looks like a stony path but considering the first steps and running projects we are on a good way. The next step regarding the standard is already underway: the analyses of the data collected.

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