

Implementing Plural Analysis of Urban Soundscapes

Jean-Dominique Polack, Elise Geisler, Nathalie Gourlot, Théa Manola, Antoine Perez-Munoz, Silvère Tribout

▶ **To cite this version:**

Jean-Dominique Polack, Elise Geisler, Nathalie Gourlot, Théa Manola, Antoine Perez-Munoz, et al.. Implementing Plural Analysis of Urban Soundscapes. Forum Acusticum, Dec 2020, Lyon, France. pp.1707-1712, 10.48465/fa.2020.1048 . hal-03233772

HAL Id: hal-03233772
https://hal.science/hal-03233772

Submitted on 26 May 2021

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

IMPLEMENTING PLURAL ANALYSIS OF URBAN SOUNDSCAPES

J.D Polack[1] E. Geisler[2] N. Gourlot[3] T. Manola[4] A. Perez Munoz[5] S. Tribout[6]

[1] Sorbonne Université, Institut D'Alembert, CNRS-UMR7190, 4 Place Jussieu, 75252 Paris, France

[2] Pôle paysage - Agrocampus Ouest - CFR Angers, UMR ESO - CNRS (Espaces et Sociétés), 5 bis boulevard Lavoisier, 49045 Angers Cedex 1, France

[3] Atelier de recherche Politopie, 111 rue Gabriel Péri, 94400 Vitry-Sur-Seine, France

[4] CRESSON UMR CNRS 1563 Ambiances, Architectures, Urbanités, Ecole Nationale d'Architecture de Grenoble, 60 avenue de Constantine, CS 12636, 38036 Grenoble Cedex 2, France

[5] BruitParif, Axe Pleyel 4 B104, 32 boulevard Ornano, 93200 Saint-Denis, France

[6] Institut d'Urbanisme et de Géographie Alpine - Université Grenoble, UMR PACTE - Villes et territoires, BP 48, 38040 Grenoble Cedex 9, France

jean-dominique.polack@sorbonne-universite.fr

ABSTRACT

Soundscape analysis aims at bringing elements on the "sound experience" of a population over a portion of territory at a given time. It does not necessarily respond to an identified problem or dysfunction, and has no obligation to be followed by direct "operational action", as it is already a form of action itself. We propose a pre-operational and operational tool, that is, both an information and decision support tool, to better know a portion of territory, based on the experiences of the inhabitants, to reveal the quality of their sound environment, to develop a sound culture, and to better understand people's expectations in terms of preserving, protecting, and improving the soundscape. This tool is composed of technical sheets: "tool" sheets that present tools that can be mobilized to implement a plural diagnosis of urban soundscapes; and "examples" sheets that give ideas of what such a diagnosis might ultimately look like, what it can lead to, but also how others have implemented more or less plural diagnoses of soundscapes, or inspiring ways linked to other themes.

1. INTRODUCTION

Based on the observation of a partial, often quantitative, negative and curative consideration of sound issues in urban projects, the DIAGPART project [1-2] – Postures and practices of occupational groups in the plural diagnosis of the urban soundscape – aimed at understanding how the different occupational groups potentially involved in urban production grasp sound issues. It also aimed at understanding how these different professional approaches can be articulated, intersected and give rise to potentially innovative methods to enrich sound diagnostics.

The objective was to understand the tools, methods, approaches and formalizations mobilized by the different stakeholders of soundscapes in their daily practices and habits, and more specifically in the context of soundscape diagnosis at the neighbourhood level. On this basis, the project also aimed at proposing a tool to help implementing plural diagnoses of urban soundscapes.

This research is at the articulation of several disciplinary fields (physics/acoustics, urban planning, urban studies, geography, architecture) and at the intersection of different fields of thought and urban production (scientific research, institutional action, operational action, artistic action). Its methodological approach combines bibliographic and documentary analyses, field survey and experimentation (through workshops inspired by focus groups and a crossbreeding seminar) on a unique field of investigation/experiment: the garden city of Stains.

2. FIELD SURVEY AND ITS ANALYSIS

Fig. 1 presents of the approach selected for DIAGPART. It is articulated around a field survey which was analysed in depth [1], and completed with a bibliographic analysis in order to document the tools used for field surveys [2].

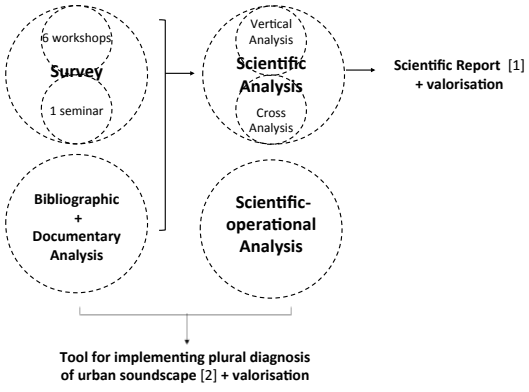


Figure 1. DIAGPART research approach.

Field survey was carried out in the form of workshops of focus group type, bringing together five professional groups, potentially acting on soundscapes, and inhabitants, as they are the first concerned with the approach:

- acousticians;
- local technicians working on environmental issues and particularly sound (territorial action for environment);
- artists who work with sound creation;

- space designers, such as architects, landscapers and urban planners;
- researchers in Human and Social Sciences (HSS) who practice research-action on sensory and sensitive issues;
- inhabitants.

The purpose of these workshops was to have each occupational group exchange on its sound habits and practices, but also ideally to have them develop a common in situ diagnostic method.

The results of the field survey have been published in different places in order to reach different scientific communities [3-6]. Therefore, the present paper is restricted to presenting different tools for field diagnosis.

3. IMPLEMENTING PLURAL DIAGNOSIS OF URBAN SOUNDSCAPE

Soundscape diagnosis aims documenting the state present at a given time of the "sound experience" of a population in a portion of territory. This diagnosis is not necessarily made in response to identified problem or dysfunction, and implies no obligation of action. It can lead to short-term actions, but also simply be a longer-term testimony or a means of assessing the impact of an action on a territory. This diagnosis is therefore intended to be plural because it involves and mobilizes several forms of knowledge and know-how.

3.1 The tool

The tool proposed here:
- does not aim at completeness;
- is intended to be scalable (elements can be added or withdrawn to it over time);
- considers the multiple approaches of soundscape without hierarchy, whether physical, perceptive, sensitive, social or otherwise;
- is not a pre-established methodology to repeat, but on the contrary a multiplicity of possibilities to cross according to contexts, situations, territories ... but also intentions, strategies... each actor according to her/his needs;
- is usable by all: both by connoisseurs of sound issues because it allows them to discover tools and ways of doing complementary to their owns; but also and above all by people who are not "specialists" and wish to discover it.

It is addressed to multiple recipients and actors:
- residents, users and visitors to a neighbourhood;
- local actors at large (politicians, decision-makers, donors);
- professionals and so-called "experts";
- and more broadly, people likely to be interested in noise maps, which currently is the main public policy tool on sound issues.

3.2 Usage

It is a pre-operational and operational tool, for both information and decision support, but even for action that would lead to, if used appropriately:
- know a place, a part of territory, from the experience of its inhabitants;
- make them aware of the quality of their sound environment, or even make them acquire a sound culture;
- better understand people's expectations in terms of preservation, protection, and improvement of their soundscape.

3.3 Composition

The tool contains two types of sheets:
- "tool" sheets that present tools that can be used to implement plural diagnoses of urban soundscapes;
- "example" sheets that give ideas for imagining what such diagnoses can look like, what they can lead to, but also how others have implemented more or less plural diagnoses of soundscapes, or even give inspiration on other themes. Some sheets also show tool applications.

The detailed elements in the "tool" sheets are derived from the 6 workshops presented in Sect. 1 (Tab. 1).

	Acoustics	Space design	Sound creation	Sensitive research-action	Territorial action for environment
Sound sources	Noise maps Own feeling Observation Figures and statistics Map of sound annoyance	Observation		Observation Listening Own feeling	Inventory
Sound levels	Noise maps Listening Measurements Recording Figures and statistics	Own feeling Listening Measurements		Observation Listening Own feeling	Measurements
Memories associated with sounds		Testimonies Walking diagnosis		Resource-persons	
Other information on sound		Sound mapping Sound section Sketches Diagram Graphics	HSS methods	Walk for listening to sound effects, sound motives	Sound evolution according to urban forms and temporality
Functions, uses, practices	Observation Resource-person	Observation Testimonies	Observation Own feeling	Observation Drawings and sketches	Sociotopes Mapping of sensitive institutions
Urban forms	Observation			Observation Drawings and sketches	
Materiality	Observation	Plans Sketches Photos Observation			
Thresholds, variations, changes of atmospheres (at different times)	Sound measurements	Own feeling Maps Plans Sketches Photos Videos Sound recordings Distance measurements Testimonies Comparisons with other sites Observation	Observation Listening Own feeling Photo shooting Audio recordings	Observation Listening Experimentation and body movements at various and diverse rhythms Own feeling	

People's experience, feelings, perception	Sound maps Listening Observation Resource-persons Annoyance survey of inhabitants	Representation of sounds Testimonies	Observation Own feeling Stories and narrations "Pavement-mic" Facilitating ludic installations Mental maps	Urban drift Sound postcards Drawings and sketches Video Imaginaries Past and present resource-persons Sound itinerary Recording feelings Urban games Mediations	Representation of sound sources Interviews Focus group Mental maps 3D models Sentinel network
Neighbourhood-specific information	Neighbourhood perimeter => map, Neighbourhood history => resource-persons, future projects	Neighbourhood history	Diagnosis of territory	General knowledge and neighbourhood history => resource-person	Neighbourhood history and evolution
Other elements	Monetisation elements	Comparisons with other sites References	Comparisons with other neighbourhoods		Resource-persons Mapping of actors

Table 1. Tools to harvest elements (not prioritized) of sound diagnosis according to different groups of actors during workshops.

The "example" sheets try to respond to different formalizations (restitution) proposed by the same groups in the workshops and the crossbreeding seminar (Tab. 2).

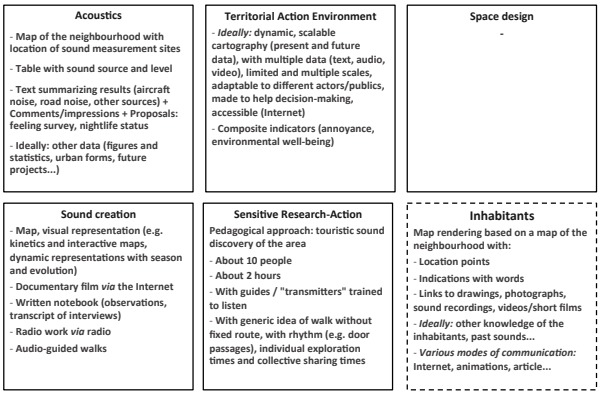


Table 2. Sound diagnostic formalizations made or proposed during workshops.

One type of formalization seems to enjoy consensus and emerges as the most relevant tool to date: dynamic mapping or planning (Tab. 3).

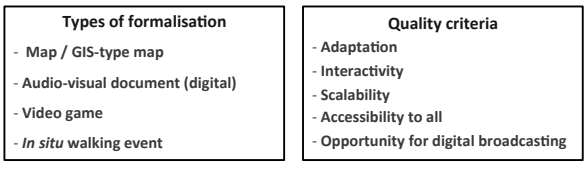


Table 3. Consensus-building formalizations and quality criteria for plural sound diagnosis.

However, beyond the type of formalization, its quality criteria, in the sense of the possibilities that the tool offers, seem to matter. Thus, the qualities and possibilities that should belong to the formalization of a plural soundscape in order to make sense and satisfy all professional groups, but also the inhabitants, are presented in Tab. 3.

4. FUNDAMENTAL THEMES

To make the tool suitable for all, it is composed as a kind of dictionary with an index displayed on 8 themes that emerge as fundamental for shared diagnoses of urban soundscapes.

These themes, and their main justifications, are (non-hierarchical):

1. People's experience / Well-being

- knowing the sound experience of a territory and feeding it with the diagnosis
- taking into account people's expectations and needs
- accessing to other field temporalities than those of the so-called expert
- developing documentation that is not only technical but accessible and meaningful to as many people as possible

2. Own feeling

- putting oneself in situation
- revealing specificities according to one's sensitivity
- being creative
- being able to better know the territory (identifying working hypotheses and problems)

3. Identification, measurement and qualification of sound environment

- responding to legislation
- making sound data objective

4. Functions - uses - practices

- understanding the general organization of the territory
- identifying cohabitation processes and potential conflicts that may affect sound
- questioning sound in light of the complexity of territorial practices and uses

5. Individual and collective memories/heritage

- understanding what makes sound common
- preserving or even enhancing sound heritage
- thinking about intergenerational transmission and the memory of the territory

6. Urban forms

- understanding space extent, since there is no propagation of sound without space
- being able to associate a form with sound diffusion and sound experience

7. Materiality (materials, vegetation...)

- considering both acoustical qualities and other environmental qualities
- giving a sound identity
- creating sound textures

8. Thresholds, variations, changes in atmospheres

- understanding thresholds and therefore the limits and transitions of sound
- understanding the territorial division due to sound and putting it in perspective with other territorial divisions (practices, settlements, urban forms...)
- thinking of threshold and change of atmospheres.

Two *transverse themes* also emerged as important:

- *spatialization*: for plural diagnoses of soundscapes, formalizing spatial data together with sound data
- *temporality*: each theme, each informed element

evolves in time, sound evolves in time (within a day, a week, a year...). It is important to integrate it every time a diagnosis is implemented.

5. DIFFERENT READINGS

Several readings of the tool are possible to help implement plural diagnoses of soundscapes.

The first reading is a "simple" reading: one can read the sheets one after the other or randomly. Both "tool" sheets and "example" sheets are ordered in alphabetical

The second reading, which is recommended since the document was thought of in this way, follows thematic entries. The thematic list of all sheets, both “tool” and “example” sheets, is given in Tab. 4, listed in French alphabetical order. Note that the same sheet can correspond to several themes, and is therefore listed several times.

Themes	Matching "tool" sheets	Matching "tool" sheets
People’s (sound) experience / well-being	Multisensory bundles Mental mapping of sound Sound postcard Survey Questionnaire survey Direct observation Interviews Reactivated interviews Focus groups Sound diary Commented walks Sound itineraries Life story Video	Healing bubbles Sound annoyance mapping Soundscape mapping Mixed mapping of multisensory landscape Craive EVAL PDU IP City Tranquillity mapping
Own feelings	Sketch, drawings Sound drift Written description of sound Body experimentation Direct observation Video	Angersonore Sensitive maps Drawing an atmosphere Sound itineraries Sound simulations Mixed multisensory mapping system
Identification, measurement, qualification of sound environment	Audio recording Acoustic modelling in environment Acoustic measurements in environment Statistics Acoustic indexes Social and environmental indexes (so-called life-quality or well-being indices) Harmonica Index Sound mock-up Sound recording	Acoustic measurement campaign Strategic noise map (European Directive, 2002) Long-term acoustic measurements Acoustic measurements and project-wide modelling Measurements and modelling Large-scale mapping modelling Eureka
Functions, uses, practices	Interviews Direct observation	Sociotopes
Individual and collective memories/heritage	Audio recording Sound recording Life story Commented walks	Montreal sound map Sonar Song-Line: Sonification of Le Mans’s tramway Sound around you Sound Tourism - A travel guide to Sonic Wonders
Urban forms	Sketch, drawings Sound mock-up Direct observation	ASTUCE Bretze - Listen to 18th century Paris Eureka
Materiality	Direct observation Audio recording Sound recording	Nature by the roadside
Thresholds, variations, change of atmospheres	Direct observation Acoustic measurements in environment Direct observation	

Table 4. Thematic list of “tool” and “example” sheets.

6. EXAMPLES

The following two examples are extracted and translated from [2].

6.1 A “tool” sheet: sound itinerary

Sound itinerary is a method inspired by:

- Soundwalking, a research and creative practice that involves listening attentively (and sometimes recording) while walking through a certain neighbourhood [7]. Initiated by the Canadian research group World Soundscape Project in the 1970s, it has been taken up and adapted by many sound artists. Through ordinary walking, soundwalking highlights sound events, practices and processes that are often ignored.
- From the method of itineraries[8], also based on walking, also developed in the 1970s. Unsuitable for sound, it was one of the first methods to consider the discourse of the inhabitants as as valid as that of the "experts" in the reflection on urban space and its layout. Like soundwalking, it involves the movement of the body in immersion in the physical environment and both a perceptive and cognitive action.
- And the method of the commented walk (also described in the tool).

Sound itinerary is carried out by single inhabitants accompanied by the investigator and is associated with the realization of a mental map (also described in the tool). The objective is less to accurately describe the different sound sequences at the time of the march than to trigger the individual's localized discourse vis-à-vis ordinary, but repeated and socialized, sound perceptions in given places, discourse based on the present moment, but also the memory of past experiences, or even on a future projection. Thus it aims at understanding the daily sound experience of the inhabitants/users of a

neighbourhood, in motion situations closer to their usual practices

The *protocol* runs as follow:

1. Preparatory work
2. Pre-interview: have the participant draw the mental map of his neighbourhood on a blank A4 sheet (its limits and representative elements), then add the sound elements characteristic of the neighbourhood or places that she/he particularly likes or not according to their sound qualities. Make her/him choose and trace an itinerary on a map of the neighbourhood, allowing to cross these places or to perceive these elements, and explain the reasons for the choice of this itinerary.
3. Itinerary: follow the itinerary with the participant, during which she/he recounts her/his sensitive experiences live: what she/he hears, what she/he likes or does not appreciate, the uses associated with the sound atmospheres encountered, their evolution over time (day, week, year).
4. Concluding interview: reviewing with participant the most important elements of the itinerary in order to re-enter an overall assessment of the soundscape of the neighbourhood, after analysing it sequentially.

Note that the entire process is recorded.

The specific material consists of: a blank A4 sheet; a map of the neighbourhood; pens of several colours; a portable digital recorder; a lavalier microphone

The corpus thus obtained is then: a mental map of the neighbourhood; the layout of the planned itinerary the recording of the entire interview (Fig. 2). The associate actors are HSS researchers.

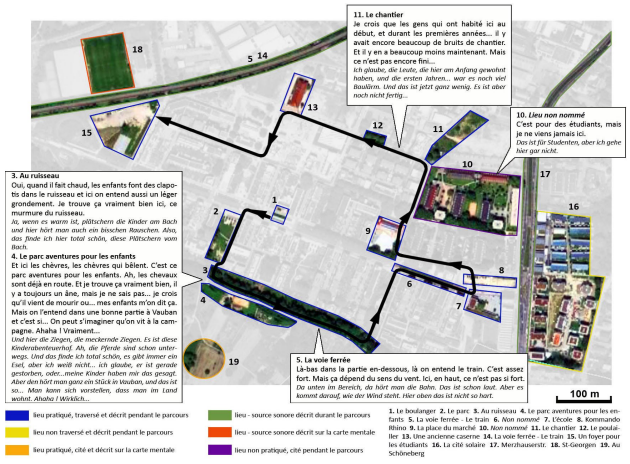


Figure 2. Restitution of sound itinerary [9].

The strength of the tools is a contextualization, both ecological and pragmatic, which proposes situations closer than "classic" interviews, for example, to the daily practices of the inhabitants/users, in particular by the situation of the body in motion and by highlighting the immediacy of sound perception, while appealing to memory, imagination, and representations of the investigated neighbourhood. Its limits are that it is a very time-consuming method in its handling and analysis, and that it resquests prior knowledge of the investigated neighbourhood.

6.2 An "example" sheet: mapping soundscapes

The map of the soundscapes of the Kronsberg's neighbourhood in Hanover, Germany, (Fig. 3) was created as part of a doctoral research on the development of a method for qualifying the soundscapes of German sustainable neighbourhoods (Kronsberg in Hanover and Vauban in Freiburg in Brisgau, [9-10]).



Figure 2. Map of Kronsberg's soundscapes [9].

The map was not a research objective, but it allowed to synthesize and shape some of the results obtained from field observations (urban diagnosis and landscape / sound drift), planning objectives (interviews with the actors of the neighbourhood development project) and from an understanding of the sound experience of the inhabitants through surveys (short interviews, soundwalks and sound logs).

This map distinguishes the places practiced and qualified by the inhabitants, each place being located and described through the cross-analysis of the elements mentioned above, based on:

- a morphological description and neighbourhood practices;
- photographic and sound illustrations (sound recording at fixed listening points);
- elements of the project as expressed by the actors;
- and sound qualification of the neighbourhood by the inhabitants / users (sound markers specific to the neighbourhood, cursor qualification between "calm" and "lively", etc.).

The map outlined in the research was intended to be a qualitative and sensitive alternative to the acoustic-only quantitative approach to noise mapping currently used by the public authorities. Still in "paper" state, this type of map could be developed digitally, making it interactive, scalable and participatory, and thus become a tool of communication and decision-making, around which could gather the actors of the development (decision makers, experts, inhabitants).

7. CONCLUSION

The aim of project DIAGPART was to document the different tools used by different professional actors of soundscapes when discovering a new soundscape, and requested to make a diagnosis of it. The result has been a document that can be read online and downloaded [2]. We hope it will prove useful for all practitioners in charge of diagnoses of urban soundscapes and beyond, be they acousticians or other stakeholders of urban environment.

8. ACKNOWLEDGMENTS

This research was carried out in the context of the call for projects: "Sustainable urbanism and sound environment: tools, guides, technical or materials solutions", launched by ADEME. In this context, we wish to thank Patrice André and Solène Mary for their support and help, Maud Baccarat (Plaine Commune) and Charlotte Saint-Jean (Association des cites-jardins d'Ile-de-France) for their help in the field, as well all participants to the workshops, both professionals and residents.

9. REFERENCES

[1] T. Manola, P. Gaudibert, E. Geisler, N. Gourlot, A. Perez-Munoz, et al.: *DIAGPART - Des postures et pratiques de groupes professionnels au diagnostic pluriel du paysage sonore urbain - Rapport final - Tome 1*, ADEME, 2017, ⟨halshs-01697790⟩

[2] T. Manola, P. Gaudibert, N. Gourlot, A. Perez-Munoz, J.D. Polack, et al.: *DIAGPART - Outil d'aide à la mise en œuvre d'un diagnostic pluriel du paysage sonore urbain - Rapport final - Tome 2*, ADEME, 2017, ⟨halshs-01697804⟩

[3] T. Manola, N. Gourlot, E. Geisler, S. Tribout, J.D. Polack, et al.: "Croiser habitudes et expérimentations pour un diagnostic partagé du paysage sonore", *Proceedings of 3rd International Congress on Ambiances,* pp. 793-798, 2016, ⟨hal-01404359⟩

[4] J.D. Polack, T. Manola, P. Gaudibert, E. Geisler, N. Gourlot, et al.: "Crossing Professional Habits for more Global. Analysis of Urban Soundscapes", *Euronoise 2018*, ⟨hal-01890090⟩

[5] J.D. Polack, P. Gaudibert, E. Geisler, N. Gourlot, T. Manola, et al.: "Croiser habitudes et expérimentations pour un diagnostic partagé du paysage sonore", *CFA 2018*, ⟨hal-01890099⟩

[6] T. Manola, E. Geisler, S. Tribout, J.D. Polack: "Quelle place du sonore dans la production urbaine ? Éclairage par les postures et pratiques professionnelles dans le cadre du diagnostic sonore urbain", *Vertigo*, Vol. 18, No. 3, 2018, https://doi.org/10.4000/vertigo.23818

[7] A. McCartney: "Soundwalking: Creating Moving Environmental Sound Narratives", in G. Sumanth and S. Jason (Ed.), *The Oxford Handbook of Mobile Music Studies,* Oxford University Press, 2011

[8] J.Y. Petiteau, and E. Pasquier: "La recherche des itinéraires : récits et parcours" in M. Grosjean, J.-P. Thibaud (Dir.), *L'espace urbain en méthodes*, Marseille, Parenthèses, pp. 63-77, 2001

[9] E. Geisler: *Élaboration d'une méthode de qualification du paysage sonore. Le cas des quartiers durables allemands Kronsberg et Vauban,* thèse de doctorat en Sciences et architecture du paysage, 500 p., 2011

[10] E. Geisler: "Le paysage, un moyen de (re)qualifier et de cartographier l'environnement sonore", *Sonorités,* Vol. 7, Éd. du Champ Social, pp. 145-159, 2012. https://paysagesonore.net/paysages-sonores-de-kronsberg/