

Designing Sounds Means Designing Relationships

A New Approach to Sound Design for Addressing Sound-Related Issues in Contemporary Design Projects

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Abstract

In this article we propose the perspective of relationship as a conceptual approach to the discipline of sound design. Based on literature reviews and case studies, we state that making sound design means designing relationships, even before sounds, and we propose to include this expression in the current definitions of the sound design discipline. Moreover, we observe that sound design practices can be inscribed in more than one relational perspective, thus widening the scope of sound design possibilities. This multi-perspective view of sound as the barycentre of a relationship system becomes a useful analysis and design tool: it allows sound designers to investigate the complex problems of contemporary projects, aiming toward fruitful and unexpected design directions.

Keywords

Sound design
Relationship design
Soundscape design
Product sound design
Auditory display design

Introduction

What does sound design mean?

Recent research has attempted to address this question, highlighting the ontological, methodological and epistemological aspects of the practice of sound design, which aims to become a “discipline of study in its own right” (Misdariis, 2018; Zattra et al., 2021), like design (Archer, 1979; Cross, 2001).

Nevertheless, multiple definitions are proposed in literature. In it, sound design can refer to “the acoustic and perceptual manipulation of the audible domain” (Valle, 2016), a broad definition that gives us information on the object of the designer’s work (the totality of the audible, including any sound expression, beyond any technical, cultural or disciplinary boundary), the action of the designer (the manipulation) and the workspace, which stands between the objective and the subjective. Likewise, sound design can be described as “the process of making intentions audible” (Susini et al. 2014), an alternative definition which assumes that, beyond making sounds, the real scope of sound design is to express an intention of function or form.

The simplest and most concise definition may well be “Making sound design is designing with sounds” (Dandrel in Rodriguez, 2003) given that, in an almost tautological way, the focus is solely on designing sounds. In line with this assumption, “sound design can be considered as a field of design which consists in taking into account the *sonic dimension* of an object (matter and form) within the *designing process* [...] the term ‘object’ being able to be embedded either in the *tangible* (manufactured products), *digital* (man-machine interface) or *spatial* (environmental context) dimension” (Zattra et al., 2019). This definition explicitly includes the practice of sound design within the broader perimeter of design, establishes the action of sound designers within the design process and delimits the boundaries of the application fields.

However, neither this definition, nor those examined by the above-mentioned authors, focus attention on the issue of relationships. Yet, through case study investigations, we can observe that designing sound has a significant impact on the relations with objects, spaces or people. For instance: *soundscape designers* can regenerate places through sound (establishing a new relationship between the users and the environment and other people); or, *product sound designers* attribute specific quality to an object through sound influencing the user’s experience and the interaction quality — and thus the relationship — with the object; or even, *UX sound designers* pay attention to the dialogue between a digital system and users by means of auditory displays that can improve either the ergonomics or aesthetics of human-machine interaction.

Our hypothesis then is that the relational value of sound, however it is experienced daily by users, is not always adequately investigated by researchers and consciously developed by designers. In the following paragraphs, we will examine several case studies to elucidate the importance of the relationship issue in sound design. By investigating the multiple ways of dealing with relationships, we will build an argumentation for a new and complementary element of definition: designing sounds means designing relationships.

Thus, the aim of the paper is to leverage this new definition to formulate the perspective of relationship as a conceptual approach to the discipline of sound design and propose it as a paradigm for analysis and design. The investigation method has focused on the publications and works that significantly contributed to the definition of sound design as a tool to define relationships between parts in complex systems. For a more comprehensive and analytically-developed definition of sound design in the literature, we refer to literature reviews associated with the different collaborative research projects (SOB, S2S2, CLOSED, SID, SKAT-VG) that have progressively, since 2001, built the scientific communities, the knowledge and practices of the sound design discipline, at least in Europe (see Rocchesso, 2014, for extensive details).

Finally, we will propose the multi-perspective view of sound at the barycentre of a relationship system as a useful analysis and design tool, to address the complex issue of sound design in the contemporary project.

Design and Relations

Following the above-mentioned assertion that sound design may be considered as part of the field of design (Misdariis, 2018; Zattra et al., 2019), we first ask ourselves to what extent the question of relationship is present in the field of design.

In his last book, Moholy-Nagy recognized the complexity of design and argued the importance of developing the ability to think in terms of relationships: between different disciplines, between the multiple dimensions of complex projects, between the project itself and the needs of individuals and the community. “Designing is a complex and intricate task. It is the integration of technological, social and economic requirements, biological necessities, and the psycho-physical effects of materials, shape, color, volume and space: thinking in relationships” (Moholy-Nagy, 1947, p. 42).

In the more recent theoretical debate, the issue of relationship in the discipline of design remains crucial.

Findeli, author of the theory of project-based research (Findeli, 2004), in discussing the ontological issues, affirms that the object of design research “is the world as a project [bold in original], and not the world as an object of the descriptive sciences”. But in the clarification that follows, he shifts the focus from the world as a project to the relationships that human beings establish with it. “In reality, it is not so much the artificial world itself as the relationship [bold in original] that human beings, individual or collective, designers and users, have with this world that should interest us, in other words the world-for-human beings” (Findeli, 2004, pp. 11-12, our translation). Finally, in a further publication, Findeli states that “the aim of design is to increase, or at least to preserve, the habitability of the world” (Findeli, 2015, p. 51, our translation).

The issue of relationship occurs in the multiple practices of design, on many occasions and in different historical periods.

For instance, in architectural design, the Villa conceived by Palladio is not just a rural residence: it is the focal point of a system of physical and visual relationships with the surrounding countryside (Ackerman, 1995). The *fenêtre en longueur* designed by Le Corbus-

ier is more than a window: it's an opening to the outside, specially designed to allow visual connection with the vast landscape and horizon (Le Corbusier, 1923). Vittorio Gregotti's architecture is strictly tied to sites and their history, to allow citizens to establish a close bond with the place, and thus to inhabit it (Gregotti, 1966).

When urban design meets civic design, the issue of relationships takes on a social and political connotation. *Civic city* is the innovative project, conceived and developed by designer Ruedi Baur (2019), that seeks to stimulate the dissemination of a new paradigm: relationship design, as opposed to the spirit of concurrency design. In this perspective, users are no longer consumers seeking to satisfy their personal needs, but conscious and responsible citizens, ready to go beyond their personal interests and take care of their surroundings. To move toward this new paradigm, it is necessary to shift the focus to relationships, connections, and positive interdependencies.

The topic of the relationship is central to academic research. By way of example, at the Université de Strasbourg, the research group *Poétique et conception du design des relations* was set up in 2021 under the direction of Pierre Litzler, professor of architectural and design theory, with the aim of rethinking design in terms of relations. In the presentation text¹, it is stated that "In recent decades, design has been an important vector for social progress [...]. Today, other dimensions and imperatives are emerging to re-enchant our societies: the question of the intricacy and interaction of places, environments and people, which require us to reflect on the links, relations, relationships, interfaces between man and what faces and surrounds him." (our translation)

Sound Design and Relations

What space does the issue of relationships occupy in the contemporary sound design?

We will attempt to answer this question by examining existing literature and selected case studies of different sound design practices unfolding in the three dimensions outlined in (Zattra et al., 2019): *soundscape design* (spatial dimension), *product sound design* (tangible dimension), *auditory display design* (digital dimension).

Spatial Dimension

In soundscape study theory, the relationship is an inherited concern. In fact, Truax argues that "the communicational approach focuses on the *relationships* [italic in original] between the individual and the environment, as mediated by sound or other elements. The shift is away from artefacts, and causes and effects, towards processes" (Truax, 2001, p.110). In this spatial perspective, the listener, the environment and the sound are non-isolated entities, but connected in a unique system of relationships. Doing acoustic design — another name for sound design, and historically used by Schafer (1977) — means intervening in this system of relationships and modifying it, if necessary, by designing sound artefacts, Truax states.

In soundscape design practice, many designers often implicitly apply the theoretical principles developed by Truax. Among oth-

ers, Cerwén (2017) elaborates a model for intervention in the urban soundscape, consisting of 23 actions based on a common strategy of considering sound sources, the environment and the listener as part of a single system of relationships: the designer is called upon to analyse these relationships and reconstruct them. Cerwén's contribution is part of a broader action research² which, in considering sound as a resource instead of a waste, investigates how soundscape thinking can be implemented in landscape architecture planning and to what extent soundscape designers can effectively support urban designers in the process of crafting public spaces (Kang et al, 2015).

In a different manner, some projects explicitly address the possibility of evoking, regenerating and establishing relationships between users and the environment, mediated by sound. For instance, in the *Cavalry 360°* project³ at the Chesters Roman Fort, the visitor's gaze changes while contemplating the surrounding area, because a new relationship with the memory of the place has been established, thanks to the soundscape generated by the large-scale open-air sound installation. Moreover, in the permanent installation *Harmonic Bridge* at the MASS MoCA⁴, the soundscape obtained by tuning the sound of traffic regenerates the space under the motorway, thus reconnecting two parts of the city and restoring lost urban relationships. Finally, in the *Sea Organ* project⁵ in Zadar, by shaping the profile of the waterfront and introducing a new soundscape generated by the power of the waves, the artist invents a new urban place with a strong identity, in which the community rediscovers its relationship with the sea.

The use of sound to build relationships in the physical world extends and adapts to virtual spaces. In a virtual world, such as that of videogames, layers of audio files establish an algorithmic relation between the user and the virtual environment. To develop immersive virtual experiences, and thus to build relationships among the parts, designers leverage the sound to compensate for the lack of other sensory perceptions — such as smell and taste — in building believable virtual spaces (Garner & Grimshaw-Aagaard, 2014). This kind of synesthetic compensation can also be found in the work of media artist Ryoichi Kurakawa, who combines sounds, architectural laser scanning data and environmental footage to build hybrid relations between tangible and intangible.

Tangible Dimension

In the tangible dimension, product sound mediates the relationship between user and object. This is the product sound design domain (Özcan et al., 2006, 2009; Hendrick et al., 2007), where we can also take up the distinction, made by Langeveld et al. (2013), between consequential and intentional sounds: the former are produced acoustically through direct action on the physical components of the object, the latter are applied to the object and reproduced digitally, usually through small embedded speakers or actuators.

In this perspective, sound is designed to express and enhance specific product features, such as 'quality' — the precise sound of the door of the Japanese-designed *Acura TSX* car (Lind-

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<https://soundscape-cost.org>

3
<https://www.neon.uk/cavalry-360>

4
<https://massmoca.org/event/bruce-odland-sam-ainger-harmonic-bridge/>

5
<http://www.croatia.org/crown/articles/9359/1/Nikola-Baiae-author-of-the-Zadar-Sea-Organ.html>

strom, 2005) — or ‘safety’ — the pop sound of the *Snapple* drink bottle — or even ‘effectiveness of the cleaning’ — the quiet sound of the *Method* nozzle (Byron, 2012).

On the other hand, product sound designers seem to place little attention on the potential role of sound in mediating the relationship between the user and the environment. Yet, some products allow users to shape and qualify their presence in the environment precisely through sound. We can introduce here an example related to a challenging frontier of design: food sound design. It has been shown that sound is an integral part of the flavour experience (Spence, 2012). The spectral profile and energy level of the crunch sound determines a consumer’s attribution of values: the higher the overall sound energy, and particularly on the high frequency band, the higher the perceived crunchiness (Spence et al., 2006). While most companies pursue this mapping and revamp their recipes in order to increase the perceived crunchiness of crisps, corn flakes and chocolate frostings, conversely PepsiCo announces the design of low-crunch but full taste profile crisps, aimed at users who do not want to be heard while eating⁶. These users choose to assume a discreet presence in relation to their surroundings through low-crunch sound.

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<https://freakonomics.com/podcast/i-wasnt-stupid-enough-to-say-this-could-be-done-overnight>

7
<https://icad.org/>

8
<https://www.cost.eu/actions/IC0601>

9
<https://delftdesignlabs.org/criticalalarmslab/about/>

Digital Dimension

In the digital dimension, sound is once again at the center of the relationship between user and object, and more specifically in human-machine interfaces. Auditory display design aims to improve interaction and qualify the user experience in the human-machine interactions and relations. In this respect, the International Community on Auditory Display (ICAD)⁷ deploys fundamental and applied research works that tend to consider the sonic dimension as part of the information process between humans, or between humans and machines or systems.

Basically, this link between sound design and interaction design gave rise to a new field of investigation named Sonic Interaction Design⁸ (Franinovic et al., 2013) which “explores ways in which sound can be used to convey information, meaning, aesthetic and emotional qualities in interactive contexts” (Hermann et al., 2011, p.87).

On the other hand, in a wider relational perspective that also includes the relationship with space, the range of possible design solutions expands. For instance, Intensive Care Units (ICUs)⁹ are critical environments as they are both technologically advanced but also acoustically hostile workspaces. All warning sounds from vital sign monitoring devices result in a level of cacophony that causes alarm fatigue in clinicians and stress in patients. Despite numerous efforts, auditory display solutions for intensive care units are still far from optimal (Özcan et al., 2018). Significant steps have been taken when abandoning the object perspective and shifting to a spatial perspective, in which alarm sounds are considered as part of the soundscape that inhabits the hospital environment (Kristensen et al., 2016): thus, auditory display design can be framed as a soundscape design project, focusing on the relationship between clinicians, patients and the hospital ward spaces.

In virtual environments, sound acts as a link with the artefacts' original materiality. Used as an auditory skeuomorphism, sound makes digital artefacts relate to their physical counterpart by serving as feedback mechanism for the user handling them. Recorded sound libraries collect real world object and material sounds that can be used as auditory textures for virtual models. Sound design, however, can be used to explore new relations between the visual representation of the object and how it sounds. Physical artefacts can be explored from a different perspective through their sound qualities, opening new design opportunities as discussed by Stasiulyte through the analysis of sonic expressions in fashion design (Stasiulyte, 2020). Similarly, sound can be used to redefine tangible/intangible relations for virtual objects.

Conclusion and Future Perspectives

The analyses conducted so far on existing literature and selected case studies show that sound design can be conceived as a practice of creating connections in the tangible, digital and spatial dimensions.

This allows us to affirm that making sound design means designing relationships, to propose this expression as part of the definition of sound design and to introduce the perspective of relationship as a conceptual approach to the discipline of sound design. In addition, we propose the multi-perspective view of sound at the barycentre of a relationship system as a powerful analysis and design tool, useful to investigate the complex problems in contemporary projects.

By way of example, a challenging playground for sound designers is represented by electric vehicle sound design.

For decades, the roar of the engine has played a crucial role in qualifying the driving experience, communicating brand identity and building relations between drivers and cars. The rise of the electric motor, and the consequent loss of the sound of internal combustion, resulted in a significant reduction in the quality of the experience. Most car companies ran for cover by commissioning sound designers to invent the new sound of the electric car, which could restore the lost thrill and adrenaline surge for the driver (see for instance, Misdariis et al., 2019).

On the contrary, designers who adopt the relationship perspective as a conceptual approach and the multi-perspective view as a tool for analysis and design, will understand that the root of the problem is not the loss of a sound: it is the loss of a relationship. Consequently, they will be able to redefine this problem in terms of relationships and investigate which lost connections must be reconstructed (for instance, the relationship with movement and speed) and which new ones can be established (the relationship with the natural environment, with the urban environment and pedestrians, with passengers, with one's self in self-driving cars).

Based on the approach proposed so far, automotive sound design will open to new perspectives and find fertile ground for development.

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