Hear hear! Why sound in service design should matter

Ana Kustrak Korper, Vanessa Rodrigues, Johan Blomkvist, Stefan Holmlid
ana.kustrak.korper@liu.se
Linköping Univesrity, 581 83 Linköping, Sweden

Abstract

Current tools and techniques used in everyday design practice are focused on managing the complex information of service systems primarily through visualization. The visual in methods has become a dominant norm prevalent in service design practice. In wanting to counteract the emphasis on visualization, we direct attention to qualities of sound in natural and structured form. This conceptual paper offers two important contributions. First, we propose sound as an alternative representation medium to augment design tools and methods. Second, since sound as representation is an under-explored concept, we suggest a conceptual framework. The conceptual framework introduces an understanding of sound as persistent or performative. As such, it serves as a starting point to guide the exploration of sound as a medium of representation in service design, in a way that complements existing tools and methods.

Keywords: sound, visual representations, sonification, service design, auditory experience

Introduction

Representation, according to the Oxford dictionary, symbolically describes or portrays something in a particular way, usually through visual means. Service design uses external representations to address intangible components of present and future service systems, making them more accessible in facilitating articulation, learning, collaboration, communication and empathy (Blomkvist & Segelström, 2014). An indispensable element in service design, the importance of visualizations has been reported in both research and practice (Blomkvist & Segelström, 2014; Kimbell, 2011; Manzini & Vezzoli, 2003; Patrício et al., 2011). However, service in its entirety is only partially visually observable. Where visualizations, such as service blueprints and customer journeys, can be informative of many interactive service components that enable co-creation of customer experience and value outcomes, they rarely account for the nuances of the entire servicescape (Lemon & Verhoef, 2016; Shostack, 1982; Steen et al., 2011). Servicescapes, defined as physical spaces where service is performed, comprise of physical, social, symbolic and natural dimensions (Rossenbaum & Massiah, 2011; Tombs & McColl-Kennedy, 2003). They also include a complex network of intertwined actors, processes and artefacts (Chandler & Lusch 2015, Edvardsson et al., 2005). Thus, there is an interplay of different stimuli that influences interactions in servicescapes and serves to co-create service experience as a service is performed.

One of the most important elements in any servicescape is sound. Sound can have a profound effect on how we experience and interact with the environment by providing cues for action (Brown et al., 2016). Therefore, the effect of auditory elements has been researched across design and service-related disciplines. Research in service marketing has reported the effect of different sound aspects (such as ambient sound, background music or congruency of musical elements and verbal communication) in buying behaviour and perceived service quality (Andersson et al., 2012; Demoulin, 2011; Hung 2000). Product sound and sonic interaction design, on the other hand, explore the relationships between users and objects, and the role of intentional or consequential sounds in inducing action, supporting understanding and evaluating design artefacts aesthetically (Rocchesso & Serafin, 2009, Schifferstein & Desmet, 2008). Finally, sound, with its unique temporal dimension and performative potential can serve as an embodied medium for creative experimentation and new knowledge creation (Orning, 2017). All this suggests that auditory

considerations can have an important application in various settings relevant for service design.

Regardless of the importance of sound in co-creating service experience and its ubiquity within many servicescape layers, it currently plays a surprisingly marginal role in service design methods and techniques. As representations in service design are predominantly visual, mapping the sonic stimuli and ambient sounds, or using sounds as means of representation, is usually unaccounted for. However, sound as representation can augment the experiential information, learning and understanding, and open new, more inclusive methodological opportunities for service design. To the best of our knowledge, research in service design has not so far tried to conceptualize representational categories of sound to address these methodological opportunities. Thus, we have embarked on this conceptual exploration inspired by the paper from Diana et al. (2009) that explicates and systematizes the scope of visual representations. In this paper, as a starting point for discussion, we propose how sound can be conceived of as a representation, its potential for augmenting visualizations and generating unique experiential insights.

Blinded by the sight

Making services visible and tangible is characteristic of service design practice (Blomkvist & Holmlid, 2010). Designers primarily use visualizations as a medium to communicate (Segelström, 2009) and transfer not only knowledge in the form of data and insights, but also enhance empathy, provide inspiration and support engagement (Visser, 2009). Aesthetically a highly visual discipline in comparison (Holmlid, 2007), service design has come a long way from the early days of molecular modelling and service blueprinting (Shostack, 1982) as a way of mapping the elements and structure of services. The rapidly changing service environment and involvement of multiple stakeholders in services has rendered the role of visualizations as crucial in creating shareable objects of thought and design (Blomkvist & Segelström, 2014). In an effort to address the differing needs for visualization that arise during various stages of the service development process, Diana et al. (2009) proposed a taxonomy of visual representations based on their level of iconicity (abstract-realistic) and relation with time (synchronic-diachronic). This interpretation allows for the classification, comprehension and subsequent use of the different representation types.

The level of detail in the representations varies but often progresses from more conceptual in the exploration stages to more articulated as the design is refined. In their typology, tools and techniques such as customer journeys, service blueprints and various flow diagrams can "visualize the sequence of actions and stages that compose the service experience" positioning them on a diachronic pole of the time spectrum (ibid., p.3). Such visual representations condense the temporal dimension to the design of touchpoints in a linear sequence (Koivisto, 2009). Additionally, the synthesis of visualisations requires an understanding of the graphical elements and their consequent organization into meaningful information (Diana et al., 2009). While learning the visual codes increases the readability and reduces time spent drawing the elements, proprietary visualisations often remain specific to a project (Segelström, 2009). Systems mapping techniques such as giga-mapping can greatly enhance the understanding of systems complexity (Sevaldson, 2011). However, such maps can be limited by two-dimensional formats and often struggle to capture nuances in representations without adding visual congestion (Aguirre-Ulloa & Paulsen, 2017). To address these issues, Aguirre-Ulloa & Paulsen (2017) put forth a multi-sensory systemic design tool that uses materials to represent relationships. Sensory cues such as sound could theoretically enhance multi-sensory representation of services. Although other embodied representations such as service walkthroughs and roleplays are interactive, and can more realistically portray and create experiences co-related to the temporal element (Blomkvist & Segelström, 2014), like visualizations they nonetheless rely heavily on the sense of sight and visual aspects of aesthetic qualities. A quick search of the 25 methods listed in *This is Service Design Thinking* (2010) reveals 10 methods that may include sound in any capacity at all.

While visual understanding of the environment is elementary in human perception, other sensory information (auditory, olfactory, tactile) can extend, change and complement the visual element, especially in creative interactive systems (Rocchesso et al., 2008). From a norm-creative perspective (Nilsson & Jahnke, 2018), advancing the use of sound is an opportunity to at least partially counteract the existing norm of relying primarily on visual representations. Sound in service has hitherto been studied as part of the servicescape but more often is limited to being an onomatopoeic feature in representations. This paper argues that auditory cues are not only appropriate for exploring the temporal dimension of service but can also generate distinctive insights into predominantly visual service design tools and techniques. Therefore, an exploration of sound as a medium of representation can enrich articulation, learning, collaboration

4

and communication of visualizations, and simultaneously contribute to creating a more inclusive design space.

Unmuting the sounds of service

Auditory experience is multifaceted, contextual, and connected to the source of the sound not just the sound itself (Rocchesso et al., 2008). As an auditory cue, sound has the following properties: loudness (intensity); timbre ("color" usually pertaining to the sounding source or "instrument"); pitch (height, ordering dimension); and duration (Taylor & Campbell, 2001). Sounds can also be organized and thus, become what we recognize as music. It can be constructed and organized through rhythm (flow of sounds through time), melody (linear sounding "whole"), harmony (group of simultaneously sounding tones), texture (polyphone/homophone) and form (structure of all organizational elements) (Benward & Saker, 1997). Emotional and cognitive response to sounds and music as well as the relation to its socio-cultural creation, development, and practice (performativity) have been explored in a variety of disciplines in humanities, natural and social sciences. Additionally, in some musical traditions there is a long history and strong interrelation between notation as sounds' visual script of varying fidelity levels, and situated performative practices, revealing that it is important to consider the connection between seeing and sounding (Hultberg, 2002). Although important, we will not elaborate further on these aspects as they are outside the scope of this paper. We focus on rather simplified explanations relating to how sound and organized sounding structures might be conceptualized as representations in service design.

In forwarding sound as a medium of representation, we build on the same parameters as described by Diana et al. (2009) i.e. *iconicity* and *relation to time*. The spectrum of iconicity focusses on the coherence between the representation of an object and its actual appearance ranging from abstract to realistic. On the realistic side, lie the sounds that occur in any particular environment, like birdsong or the incessant beep of machines in an hospital giving signals for action. On the other side, we have abstract representations which entail for example, sonification[1] of an object. For instance, the sonification of gamma-ray bursts. All sounds are temporal

---

1 Sonification here refers to the use of non-speech audio to convey information.

and inseparable from the sounding event. Therefore, on the spectrum *relation to time,* sound cannot be perceived as synchronic or static. We can experience the sounding event in many ways but when making the connection with representations it is useful to differentiate between the sound (music) as an activity or an output.

Music can be seen in two ways:

- An activity: The activity is tied to the instantaneous interactive construction of organized sounds (music) through the means of various sounding objects or bodies, for example playing an instrument or singing.
- An output: The output is tied to engagement, primarily through listening to the sounds or music, and does not include instantaneous interactive construction of organized sounds.

In service design, similar to visualizations, sound as an output can serve as a persistent external point of reference (Kirsh, 2010). Based on this understanding, the *relation to time* spectrum is understood as oscillating between persistent and performative. Persistent representations can include the recording of the soundscape consisting of ambient sounds or previously sonified research data that enables auditory analysis of the servicescape. Sound as an activity in service design can serve as a performative representation where service system components, blueprints, customer journeys, flows or customer experience maps are sonified though joint musical performance, with or without the support of visual script.
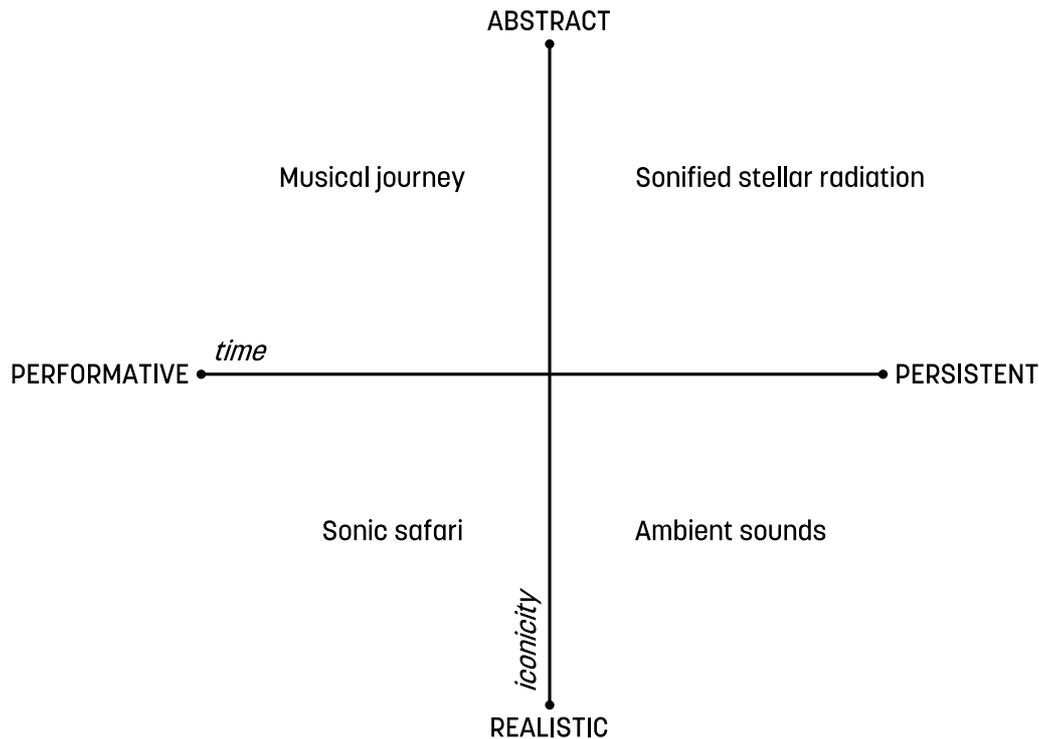
Figure 1: Mapping the landscape for sonic representations

Figure 1 conceptualizes and explicates the possibilities for sonification. The sounds on the persistent side of the spectrum are sound bites that are constant and available in the world. Such sounds could be used for immersive reflection in guiding design work. The performative side imagines sonic representations that could augment existing methods. For example, when designing for a healthcare context, sounds can bring a new layer to understanding servicescapes, experiences and relations. One can use recorded ambient sounds as an immersive technique, embark on field research recording the intentional and consequential sounds of the hospital ward, or sonify the patient journey using sounding objects to account for the pace, dynamics, density, and mood qualities of journey steps that unveil through time.

To the best of the authors' knowledge, no currently available methods correspond to any part of the sonic landscape. Whether using sound as performative or persistent representations, visual elements representing service components such as shapes, lines, and colours, can be substituted or augmented by sounding elements that can provide a higher

level of variability in representation. The simultaneity of constructing multiple melodic flows with varying rhythm and pace, different harmonic qualities, changing polyphonic texture, diverse instrumental colour and performative density is what enables this variability that is difficult to achieve though visualizations. Whether sounds are realistic, such as ambient sounds, or abstract such as instrumental composition, they can still represent a servicescape with unique experiential qualities.

Stop, look and listen

Current tools and techniques, used in everyday design practice, are focused on managing the complex information surrounding services including people, interactions, processes, system elements and the inter-relationships between them, primarily through visualization. We highlight the need to advance beyond the visual-dominant norm prevalent in service design practice to include other sensory information. In wanting to counteract the emphasis on visualization, this paper offers two important contributions. First, we propose sound as an alternative representation medium to augment design tools and methods. Second, since sound as representation is an under-explored concept, we build on the work of Diana et al. (2009) and utilise the parameters of *iconicity* and *relation to time* to construct a conceptual framework. This conceptual framework offers a nuanced understanding of sound as persistent or performative. It serves as a starting point to guide the exploration of sound as a medium of representation in service design, in a way that complements existing tools and methods.

In her TED Talk (2016), Astronomer Wanda Diaz Merced, who lost her sight to illness, highlights how sonification of stellar data enabled researchers to discover patterns and connections obscured by visualizations. She also mentions working with astronomy students, with multiple disabilities, to teach them radio astronomy and sonification techniques to make astronomy more accessible as a field. We see similar potential in the field of service design, where the integration and use of sound in design tools and methods can reveal unobserved patterns, create a more inclusive space and tap into the tacit knowledge of differently abled people. Simply experimenting with a different medium has the potential to bring novel insights to sighted designers, particularly from groups that were systematically excluded before. Additionally, this could also have implications for extending design education to the visually impaired.

8

Our conceptual framework also provides a foundation for future research. We suggest three areas of exploration:

Sound in design research:

First, the inclusion of sound as a distinct part of design research and ethnography. Sound exploration or sound observations can focus explicitly on what and how an activity sounds. But what could such an addition to design research look like?

Techniques for sound and creativity:

This area has huge potential, where sound can contribute through collaborative play and creation of sound with artefacts or materials. It also raises several questions. Who sonifies? Is it the user or designer or both? How would that be different? Is it done one at a time or simultaneously? Is it recorded or is it "co-created"? The use of sound might verify the visual or open up the possibilities for discussion on particularly messy or slow-paced parts of a service journey. Sonification of feelings and/or emotions through the journey could evoke visceral reactions that differ from those elicited through visualizations. As such, utilising sound as a form of external representation can affect the amount and quality of information obtained during the design process.

Representing the future soundscape:

How can designers (or some other discipline), in an inclusive way, work with sounds that new services will produce? This can be crucial for understanding the experiences we are creating. Furthermore, in their framework for understanding experiences, Wright et al. (2003) suggest that people's experiences in relation to any situation are constituted by four threads of experience: compositional, sensual, emotional and spatio-temporal. The sensual and spatio-temporal threads are both impacted directly by sound (through its influence on the senses and presence in locations), and thus influences how we think and act in any given situation. Emphasising sensory engagement can allow participants to understand ideas pre-reflectively and grasp much more of the situation than would otherwise be available (McCarthy & Wright, 2005). In reference to the threads of experience, sound nor visual stimuli, should be used irrespectively of other modalities. From this follows naturally the inclusion of additional senses, such as smell, taste and touch. We see this as an

exploratory process[2] that would, like all design activities, need to be tailored to its specific use. Design is visual-centric, but it is also a reflective practice. Design entails a multi-sensory approach. As we propose, an approach focused on sound can bring a new dimension into service design tools and techniques.

References

Aguirre-Ulloa, M., & Paulsen, A. (2017). Co-designing with relationships in mind. *Form Akademisk-forskningstidsskrift for design og designdidaktikk,* 10(1), 1-14.

Andersson, P. K., Kristensson, P., Wästlund, E., & Gustafsson, A. (2012). Let the music play or not: The influence of background music on consumer behavior. *Journal of Retailing and Consumer Services*, 19(6), 553-560.

Benward, B., & Saker, M. N. (1997). *Music in theory and practice* (Vol. 1). Michigan: McGraw-Hill.

Blomkvist, J., & Holmlid, S. (2010*). Service prototyping according to service design practitioners.* In Conference Proceedings, ServDes. 2010, Exchanging Knowledge. December 1-3. Linköping, Sweden. Linköping University Electronic Press. 1-11.

Blomkvist, J., & Segelström, F. (2014). Benefits of External Representations in Service Design: A Distributed Cognition Perspective. *The Design Journal,* 17(3), 331–346.

Brown, A. L., Gjestland, T., & Dubois, D. (2016). Acoustic environments and soundscapes. In Kang, J. & Schulte-Fortkamp, B. (Eds.) Soundscape and the Built Environment, (pp. 1-16). Florida: CRC Press.

Chandler, J. D., & Lusch, R. F. (2015). Service systems: a broadened framework and research agenda on value propositions, engagement, and service experience. *Journal of Service Research*, 18(1), 6-22.

---

[2] As a starting point, we seek to test and investigate the imagined design methods in a ServDes 2020 workshop.

Demoulin, N. T. (2011). Music congruency in a service setting: The mediating role of emotional and cognitive responses. *Journal of Retailing and Consumer Services*, 18(1), 10-18.

Diana, C., Pacenti, E., & Tassi, R. (2012, September). *Visualtiles: Communication tools for (service) design*. In Conference Proceedings ServDes. 2009; DeThinking Service; ReThinking Design. 24-26 November 2009. Oslo, Norway. Linköping University Electronic Press. 65-76.

Edvardsson, B., Gustafsson, A., & Roos, I. (2005). Service portraits in service research: a critical review. *International Journal of Service Industry Management*, 16(1), 107-121.

Holmlid, S. (2007). *Interaction design and service design: Expanding a comparison of design disciplines.* In Conference Proceedings 2nd Nordic Design Research Design Conference. May 27-30. Stockholm, Sweden. Nordes Digital Archive. 1-8.

Hultberg, C. (2002). Approaches to music notation: The printed score as a mediator of meaning in Western tonal tradition. *Music Education Research*, 4(2), 185-197.

Hung, K. (2000). Narrative music in congruent and incongruent TV advertising. *Journal of advertising*, 29(1), 25-34.

Kimbell, L. (2011). Designing for service as one way of designing services. *International Journal of Design*, 5(2), 41-52.

Kirsh, D. (2010). Thinking with external representations. *AI & SOCIETY,* 25(4), 441-454.

Koivisto, M. (2009). Frameworks for structuring services and customer experiences. In S. Miettinen & M. Koivisto (Eds.), *Designing services with innovative methods* (pp. 136-149): Helsinki University of Art and Design.

Lemon, K. N., & Verhoef, P. C. (2016). Understanding customer experience throughout the customer journey. *Journal of Marketing*, 80(6), 69-96.

Manzini, E., & Vezzoli, C. (2003). A strategic design approach to develop sustainable product service systems: examples taken from the 'environmentally friendly innovation 'Italian prize. *Journal of Cleaner Production*, 11(8), 851-857.

McCarthy, J., & Wright, P. (2005). Putting 'Felt-Life' at the Centre of Human-Computer Interaction (HCI). *Cogn Tech Work*, 7, 262-271.

Nilsson, Å. W., & Jahnke, M. (2018). Tactics for Norm-Creative Innovation. *She Ji: The Journal of Design, Economics, and Innovation,* 4(4), 375-391.

Orning, T. (2017). Music as performance–gestures, sound and energy. *Journal for Research in Arts and Sports Education*, 1(5).

Patrício, L., Fisk, R. P., Falcão e Cunha, J., & Constantine, L. (2011). Multilevel service design: from customer value constellation to service experience blueprinting. *Journal of Service Research*, 14(2), 180-200.

Rocchesso, D., & Serafin, S. (2009). Sonic interaction design. *International Journal of Human-Computer Studies*, 67.

Rocchesso, D., Serafin, S., Behrendt, F., Bernardini, N., Bresin, R., Eckel, G., Franinovic, K., Hermann, T., Pauletto, S., Susini, P., & Visell, Y. (2008, April). *Sonic interaction design: sound, information and experience.* In CHI'08 Extended Abstracts on Human Factors in Computing Systems. April 5-10. Florence, Italy. ACM. 3969-3972

Rosenbaum, M. S., & Massiah, C. (2011). An expanded servicescape perspective. Journal of Service Management, 22(4), 471-490.

Schifferstein, H. N., & Desmet, P. M. (2008). Tools facilitating multi-sensory product design. *The Design Journal*, 11(2), 137-158.

Segelström, F. (2009). *Communicating through visualizations: Service designers on visualizing user research.* In Conference Proceedings DeThinking Design, ReThinking Services–First Nordic Conference on Service Design and Service Innovation. November 24-26. Oslo, Norway. Linköping University Electronic Press. 1-11.

Sevaldson, B. (2011). *Giga-mapping: visualisation for complexity and systems thinking in design.* In Conference Proceedings Nordes 2011- Making Design Matter. May 29-31. Helsinki, Finland. Nordes Digital Archive. 1-20.

Shostack, G. L. (1982). How to design a service. *European Journal of Marketing,* 16(1), 49–63.

Steen, M., Manschot, M., & De Koning, N. (2011). Benefits of co-design in service design projects. *International Journal of Design*, 5(2).

Taylor, C., & Campbell, M. (2001). Sound. In *Grove Music Online*. Retrieved 5 Dec. 2019, from https://www.oxfordmusiconline.com/grovemusic/view/10.1093/gmo/9781561592630.001.0001/omo-9781561592630-e-0000026289.

TED Ideas worth spreading. (2016, February). *How a blind astronomer found a way to see the stars* [Video]. https://bit.ly/2OUafXe

Tombs, A., & McColl-Kennedy, J. R. (2003). Social-Servicescape Conceptual Model. *Marketing Theory*, 3(4), 447–475.

Visser, F. S. (2009). Bringing the everyday life of people into design. Technische Universiteit Delft.