FORUM ACUSTICUM EURONOISE 2025

EXPLORING THE BENEFITS AND BOUNDARIES OF AUDITORY REPRESENTATIONS IN SERVICE DESIGN

Ana Kuštrak Korper[1*]   **Johan Blomkvist**[1]   **Vanessa Rodrigues**[1]

[1] Department of Computer and Information Science, Linköping University, Sweden

ABSTRACT

Service design has been recognized as an expanding field with a strong focus on designing for experiences and interactions in complex service systems. One of the main tenets of service design is its ability to communicate intangible aspects and immaterial dimensions of service systems through visual representations in different stages of the design process. These representations serve as a tool for articulation, learning, collaboration, communication, and maintaining empathy. However, despite the prevalence of sound in service environments, its auditory dimensions remain largely overlooked in service design practices.

We argue that incorporating the auditory dimension into a predominantly visual repertoire of service design can provide new ways to access collaboration, learning, creating, and communicating about experiential, contextual, and social qualities embedded in service systems. This study builds on the framework proposed by Blomkvist and Holmlid (2011) to articulate the benefits and boundaries of auditory representations in service design. Additionally, it provides an illustrative case highlighting the role of auditory representations in fostering creativity and stakeholder engagement based on insights collected from 3 workshops with professional service designers. This research contributes to the advancement of sound as a material of service design with implications for both researchers and practitioners.

Keywords: *service design, auditory representations, service prototyping*

---

[*]***Corresponding author***: *ana.kustrak.korper@liu.se*

1. INTRODUCTION

For the past two decades service design established itself as a discipline focused on understanding how design can shape, support and transform organizations, industries and entire services systems that are operating in the environment of increased complexity [1]. Following the market shift towards the service logic that emphasized the role of interactive value creation between actors, as well as systemic outlook on services as configurations of people, technology and internal and external systems [2, 3], service design emerged as a discipline that could address different aspects of service-related challenges. This includes different foci from designing experiences [4], developing new services [5, 6] to systemic transformation [7].

A central tenet of service design are visual representations of the current and future service systems that are used in various stages of the design work. Because of their intangibility, visual representations play a crucial role in enabling collaboration, maintaining empathy, and facilitating shared understanding across multidisciplinary teams and stakeholders [8]. Visual representations are, thus, not only important during exploratory design work, but especially during service prototyping. However, service design research and practice has so far stayed predominantly in the visual paradigm although service environments are multisensory. Specifically, sound as a modality is prevalent in service environments but often overlooked in service design practices, although it can have a prominent influence on the overall service experience [9, 10]. In this paper, we argue that incorporating auditory representations in service design repertoire can not only support but enhance the experiential, contextual and emotional dimensions embedded in service systems. Based on the framework by Blomkvist and Holmlid [11] that explicates different dimensions of service prototypes as visual tools for learning and communication, and empirical insights from 3 workshops with design experts, this paper

proposes how auditory representations can be used to support experiential articulation, creative provocation and collaborative engagement. This paper provides a contribution to the ongoing development of service design methods and tools by positioning auditory representations, and consequently sound, as a prospective but underutilized service design material.

2. CONCEPTUAL BACKGROUND

2.1 Visual representations in service design

One of the core tenets of service design relates to visually representing a service, thus translating intangible to tangible, such as service processes, experiences, interactions and systems. Service can be understood as a basic level of any exchange, and within the service-dominant logic paradigm [12], that service design often embraces [13], the focus shifts from the output to the process and experience aspects of value creation. This further emphasizes immaterial aspects of a service related to different complexity levels relative to the "object" of what service design aims to change and which can include service encounters, value cocreating systems, and socio-material configurations [14]. Thus, whether the focus of design is on the encounter, such as design of a hotel check-in process; on a value co-creating system, such as a residential bike sharing platform; or on a socio-material configuration, such as designing a system for the future public transportation service, visual representation of a service, both current and the future is indispensable in design work.

Prior research has highlighted how visual representations in service design serve the purpose of materializing and concretizing often dispersed information and abstract aspects of service systems, and help in collaboration, ideation and empathizing with different actors [15]. However, service situations are not only embedded in physical and social contexts, but they also unfold in time, thus making temporality an important attribute. Diana et al., [16] have proposed a typology of visual representations in service design based on whether the representations are abstract or concrete (i.e. level of iconicity) and whether they are synchronic or diachronic (i.e. relation with time). Depending on type, they can include diagrams, maps, storyboards, blueprints or walkthroughs that can either focus on understanding the current service situations or exploring the future ones.

When visual representations are aimed towards the future use situations they are referred to as prototypes and they can be defined as "any shared physical manifestation externalizing an otherwise internal or unavailable vision of a future situation" [17]. Blomkvist and Holmlid [11] argue that prototyping is a mindset or a practice rather than a set of specifci tools and activities. They provide a prototyping framework explicating five interdependent ascending perspectives: position in the process, purpose, stakeholder (including audience and author), activity (including technique and validity), and prototype (including fidelity and representation). They also argue that prototypes in service design have two roles. First is learning, which includes gaining insight, ideating and testing assumptions. Second is communication, which includes stakeholder alignment, sharing joint visions and provoking feedback.

2.2 Sound as a service design material

While prototypes are often visual representations, not all visual representations are prototypes [17]. Nevertheless, visual representations have their boundaries in representation temporality and phenomenological qualities of service experience [16]. Their purpose and variability are rarely explored with methods and tools that engage other modalities. This can hinder learning and communication of representations used in service design and restrict the further development of representational methods. Against this backdrop we propose that auditory representations can address this challenge.

Sound is a temporal and affective modality that has evocative representational qualities [18]. Thus using sound as a material for auditory representations has several opportunities. Service environments, known also as servicescpes, are filled with sounds that influences how actors navigate, interpret and experience service interactions. Sound shapes the affective, behavioral and cognitive dimension of service and should be considered as an important service design material [19]. Thus designing with and through sound can lead to more contextually rich and inclusive service concepts. However, the understanding of the integration of sound as a representational material in service design practice remains scarce [20]. Therefore, in the next section we will discuss the benefits and boundaries of auditory representation based on the empirical insights from the three workshops with design professionals.

3. THE BENEFITS AND BOUNDARIES OF AUDITORY REPRESENTATIONS

The purpose of this paper is to explore the benefits and boundaries of auditory representations. For that we relied on the Blomkvist and Holmlid [11] prototype framework and empirical insights from three workshops with the total of 35 expert design participants focused on exploring and

creating auditory representations. In the workshops the auditory representations were used to complement, challenge, and extend traditional visual tools used in service design. Thus, this section presents a conceptual overview of auditory representations supported with illustrative case examples from the workshops. The illustrative case insights stem from collaborative activities where participants engaged in sonifying service representations, such as service concepts, storyboards, or customer journeys, into auditory representations. These activities uncovered new ways of making sense of service situations, while also surfacing tensions related to skill, comfort, and epistemological fit within existing design practices.

The exploratory workshops uncovered three dominant insights. First, sound invites designers to perceive and express latent aspects of service experiences that are difficult to articulate visually. Participants often described sound as a way to "zoom out" of analytical modes and instead enter a relational mode of interpretation. Second, sound introduced both opportunities and friction in the design process. Participants reported moments of creative flow as well as hesitation when translating visuals into sounds. Third, the process of creating auditory representations sparked discussion about methodological practices in service design. Participants expressed uncertainty about their capabilities in using sound to convey service ideas and concepts, as well as the difficulties related to knowing the right vocabulary that could support that process. Based on the literature and the empirical insights, we further intersect auditory representations with the five perspectives from the Blomkvist and Holmlid [11] framework: position in process, purpose, stakeholders, activity and prototype.

The position in the process demarcates auditory representations between those focused on the current versus future service situations. Auditory representations are considered well suited for exploratory phase, especially in providing depth of understanding and analysis. However, using auditory representations for learning and communicating about the future service situations is considered more speculative.

When it comes to the purpose, auditory representations predominantly serve exploratory and communicative goals. They can enable designers to uncover tacit dimensions of service experiences and stimulate reflection and discussion. Participants reported that sound could shift them out of routine thinking and enable new emotional or systemic interpretations.

The stakeholder perspective includes the author and the audience perspective. With regards to the author perspective, certain tensions can arise, although auditory representations are usually created in collaborative way. This reflects broader issues of skill, identity, and power in participatory settings—and reinforces the importance of scaffolding, shared vocabularies, and inclusive practices when introducing new materials. In the audience perspective sound introduces both accessibility and ambiguity. Auditory representations could create entry points for non-visual thinkers or less design-literate participants. However for those uncomfortable with sound-making, it could result in distance or uncertainty.

Activity perspective includes technique and validity. In terms of technique and unlike traditional visual techniques, using sound to represent requires designers to engage with temporal and relational qualities, and to select or compose sounds for service moments. This demands new listening and designing practices that are currently underdeveloped in the service design toolkit. When it comes to validity perspective, sound can enable designers to approximate experiential aspects of real servicescapes. By embedding ambient cues, designers could simulate aspects of context that are often lost in visual prototyping.

Finally the prototyping perspective combines the representation and the fidelity. In the former sound could function both as a representation and as material for creating representations. This challenges the visual dominance in service prototyping and proposes an expanded repertoire of representational techniques. In the later, auditory prototypes can convey rich experiential and emotional content, regardless of the fidelity level, that could be understood on a spectrum between abstract and concrete.

4. CONCLUSION

This paper has explored the benefits and boundaries of using auditory representations in service design, positioning sound as an underutilized but promising design material. Using Blomkvist and Holmlid [11] service prototyping framework, we have discussed how sound can enrich service design practices with auditory representations.

From our empirical insights, we show how auditory representations prompted participants to engage with temporal, affective, and contextual qualities of service that are often omitted or unattainable in commonly used visualization tools. As a material for exploration, sound helped in facilitating embodied knowledge and emotional nuance; as a medium of communication, it offered a way for evoking empathy, provoking reflection, and disrupting habitual thinking. Thus, sound both supported and

reconfigured several prototyping perspectives—particularly purpose, representation, validity, and audience.

However, there are boundaries to the use of auditory representations. The introduction of sound resulted in unfamiliarity and discomfort, particularly among designers with no musical experience. Unlike sketching or journey mapping, there is currently no shared sound-driven language or toolkit in service design. This makes it difficult to integrate sound seamlessly into existing workflows. The interpretive ambiguity of sound, while creatively generative, also posed challenges in collaborative settings where clarity and consensus are often crucial for driving the service design work.

5. REFERENCES

[1] I. O. Karpen, S. Holmlid, and E. Yu: "Service design in the context of complexity: Moving between plurality and tension towards a future research agenda," International Journal of Design, vol. 15, no. 3, pp. 1–10, 2021.

[2] C. Grönroos and A. Ravald: "Service as business logic: implications for value creation and marketing," Journal of Service Management, vol. 22, no. 1, pp. 5–22, 2011.

[3] P. P. Maglio and J. Spohrer: "Fundamentals of Service Science," Journal of the Academy of Marketing Science, vol. 36, pp. 18–20, 2008.

[4] L. G. Zomerdijk and C. A. Voss: "Service design for experience-centric services," Journal of Service Research, vol. 13, no. 1, pp. 67–82, 2010.

[5] E. Yu and D. Sangiorgi: "Service design as an approach to implement the value cocreation perspective in new service development," Journal of Service Research, vol. 21, no. 1, pp. 40–58, 2018.

[6] L. Patrício, R. P. Fisk, J. Falcão e Cunha, and L. Constantine: "Multilevel service design: from customer value constellation to service experience blueprinting," Journal of Service Research, vol. 14, no. 2, pp. 180–200, 2011.

[7] K. Koskela-Huotari, L. Patrício, J. Zhang, I. O. Karpen, D. Sangiorgi, L. Anderson, and V. Bogicevic: "Service system transformation through service design: Linking analytical dimensions and service design approaches," Journal of Business Research, vol. 136, pp. 343–355, 2021.

[8] F. Segelström and S. Holmlid: "Benefits of external representations in service design: a distributed cognition perspective," The Design Journal, vol. 17, no. 3, pp. 331–346, 2014.

[9] A. Kuštrak Korper, V. Rodrigues, and J. Blomkvist: "Hear hear! Why sound in service design should matter," in Proc. ServDes'20, 7th Service Design and Service Innovation Conf., RMIT University, Melbourne, pp. 6–9, Jul. 2020.

[10] M. Patterson and G. Larsen: "Listening to consumption: Towards a sonic turn in consumer research," Marketing Theory, vol. 19, no. 2, pp. 105–127, 2019.

[11] J. Blomkvist and S. Holmlid: "Existing prototyping perspectives: considerations for service design," Nordes, no. 4, 2011.

[12] S. L. Vargo and R. F. Lusch: "Institutions and axioms: an extension and update of service-dominant logic," Journal of the Academy of Marketing Science, vol. 44, pp. 5–23, 2016.

[13] K. Wetter-Edman, D. Sangiorgi, B. Edvardsson, S. Holmlid, C. Grönroos, and T. Mattelmäki: "Design for value co-creation: Exploring synergies between design for service and service logic," Service Science, vol. 6, no. 2, pp. 106–121, 2014.

[14] L. Kimbell and J. Blomberg: "The object of service design," in Designing for Service: Key Issues and New Directions, London: Bloomsbury Academic, vol. 27, pp. 20–34, 2017.

[15] J. Blomkvist and F. Segelström: "Benefits of external representations in service design: a distributed cognition perspective," The Design Journal, vol. 17, no. 3, pp. 331–346, 2014.

[16] C. Diana, E. Pacenti, and R. Tassi: "Visualtiles: Communication tools for (service) design," in First Nordic Conference on Service Design and Service Innovation, 2009.

[17] J. Blomkvist: Representing Future Situations of Service: Prototyping in Service Design, [Dissertation No. 618], Linköping University, 2014. P.23.

[18] L.-L. Chen, L. M. G. Feijs, M. Hessler, S. H. M. Kyffin, P.-L. Liu, C. J. Overbeeke, and B. Young, Eds.: "Design and semantics of form and movement 5: DeSForM 2009," Taipei, Oct. 26–27, 2009.

[19] A. Kuštrak Korper and V. Rodrigues: "Sound," in J. Blomkvist, S. Clatworthy, and S. Holmlid (Eds.), The Materials of Service Design, Cheltenham: Edward Elgar Publishing, 2023.

[20] A. Kuštrak Korper and V. Rodrigues: "Ear opening": Conceptualizing auditory representations in service design, 2023.