Storywork & Reciprocity: On the Design of an Audio Documentary that Extends HCI Research back to Participants

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ABSTRACT

Participatory design means building reciprocal relationships with research participants and opening up conversations with larger communities. We describe and reflect on our design-led research of creating an hour-long audio documentary. Participants' desires to better understand the experiences of others within our study is our key motivation. We see the creation of the documentary as an important reciprocal step to invite further participation within a longer-term, multi-year project. Rooted in a decolonial perspective on translating academic knowledge to the general public, our work builds on our own prior fieldwork with 9 people with blindness on their reminiscence experiences. The audio documentary aims to deliver insights from research findings and inquiries, inspired by participants' stories through their voices in the interview recordings. The documentary serves as a gift for participation and a genuine invitation for future research. We conclude with opportunities for future HCI research and practice.

CCS CONCEPTS

• **Human-centered computing**;; • **Interaction Design**;; • **Human Computer Interaction (HCI)**;

KEYWORDS

Sound, Blindness, Alternative Forms of HCI Knowledge, Design-led Research

1 INTRODUCTION

The HCI and design research communities have long been concerned with studying and designing novel ways for people to use and live with interactive systems. The traditions of participatory design and co-design aim to directly involve people as core stakeholders in and across design processes. These approaches have enabled HCI and design researchers to make substantial contributions to improving and extending many ways in which technology can enable and support people across the many tasks and experiences that encompass their everyday lives. Yet, researchers who work closely with participants in the field are often confronted with ethical challenges. One specific issue is how to equitably and reciprocally "give back" to research participants once the project comes to an end [28, 58, 72]. While HCI and design researchers agree that plans need to be envisioned for what happens when a research project is completed and they "leave the field" (e.g., [32, 41, 67, 70]), it still is a recurring challenge on how exactly such strategies can be feasibly enacted. Additionally, translating theoretical or empirical knowledge derived from HCI research into a form that can positively engage both the people that participated in the research itself and the general population alike, can be slow, unpredictable, and incongruent (e.g., [10, 16, 56]).

In what ways can HCI and design researchers contribute back to the research participants and communities that support the advancement of academic knowledge for our field? How could designing more engaging and accessible forms of knowledge for the populations we work with help us take a step toward supporting such relations? And, what insights might be reflexively revealed through producing such alternative forms of knowledge?

Our point of departure into investigating these questions and grounding our own thinking in this space begins with our recent prior field study with 9 participants that are living with blindness [79]. The majority of HCI research related to people living with blindness has focused on overcoming practical challenges (e.g., spatial navigation [6] and usability [12]). The goal of our previous field research was to establish a grounded understanding in how technologies can be designed to support experiences of everyday reminiscence for blind people. Findings revealed that blind people drew on their sensorial capabilities, their possessions, and their social relationships as resources for reminiscence, and tensions emerged complicating their practices. Interpreting these findings led to opportunities for future research aimed at creating technology

that better supports capturing, sharing, and reflecting back on significant memories of past life experiences for blind people.

Another important finding was that participants realized that they had rarely been prompted to consider how they record, remember, and share their life experiences. Clearly, these practices are vital for blind people, as they are for all humans. Nearly all participants in the field study wished to find out more about the other study participants' reminiscence practices and, more generally, the experiences of other people living with blindness. This desire from our participants indicates that there is a necessary and needed step to deliver the results from the field study back to the population of study in a form that is appropriate and accessible, to spark further conversations between participants, while opening a channel to researchers as a continuation to explore longer-term participatory research. This resulting implication is aligned with broader calls in HCI and design research communities to develop alternative ways of creating and distributing knowledge back to research participants in the service of establishing more equitable relations [44, 48, 58, 64, 74]. Yet, specific cases demonstrating how such rich, unique, and accessible forms of knowledge can be created through design practice, especially in engaging with diverse groups of participants, are relatively sparse and more examples are needed to nurture and diversify this emerging area.

Building on our prior research [79], we describe and critically reflect on the seven-month design-led research process to create an engaging audio documentary made through the inclusion of our participants' voices and narratives. While research communication has gained significant momentum in the recent years – most notably audio based artifacts and performances like podcasts and science slams – a key issue is that channels between participants and from participants back to researchers are usually lacking. Our goal was to create a form that can be given back to the participants themselves as well as the broader blind community. Through specific design decisions and, eventually, implementing our audio documentary via the interactive sound platform *SoundCloud*, we aimed to both give back and simultaneously open the opportunity for participants to communicate with us, the research team, as well as with each other. This form of research dissemination simultaneously helps us create a stronger relationship which is supportive to the longer-term participatory research we aim to produce and in building reciprocal relations. However, designing this audio documentary was not merely an act of translating their recent research paper into an audio format. Rather, this process required careful consideration to overcome several tensions related to narrative flow, treatment of participant voices, pacing, and building in communicative silences [1] for pause, reflection, and response.

To grapple with such tensions and frame our design inquiry, we are informed by concepts which are, in part, drawn from decolonial theory. Inspired by Tony Fry's assertion to 'dig where you stand' [31] – which broadly provokes designers and researchers to engage with the contemporary cultural, political, and ethical realities of where design work takes place – we were motivated to draw on key concepts from decolonial methodologies across our creative practice. Giving back to communities has long been a goal of participatory design, and this concern, along with key commitments to how knowledge is transferred, has also been examined through decolonization lenses. In the context of our own work, a set of

distinct decolonial concepts helped to guide the design of the audio documentary.

In this paper, we describe and reflect on our design-led process of creating this audio documentary and interpreting critical-reflexive insights emerging through our process to propose questions, commitments, and opportunities for future research and practice. This paper makes two contributions. First, it details insights into how a design-led process can be applied to transforming an HCI research publication into an intelligible alternative form for research participants in the service of supporting reciprocity. Second, it offers a case study that helps expand conceptual strategies for mobilizing audio-based forms of HCI research.

2 BACKGROUND AND RELATED WORK

Related work falls into the two areas: 1) participation, reciprocity, and science communication & 2) decolonial theory and sound studies.

2.1 Participation, Reciprocity and Science Communication

Involving people is a common goal in design, as it improves the chance that design outcomes are aligned with people's life worlds and needs [60]. From ideation to deployment, there are many design processes that promote closer involvements and participations, including a wide variety of well researched workshops, methods, and toolkits. However, the beginnings and endings of participatory design processes are notoriously difficult issues to tackle. Most academic funding cycles have set start and end dates. It is difficult to begin participatory design work because researchers have to establish relationships with people, communities, and the general public; they have to build infrastructures for fruitful disagreement, joint decision making, and negotiating values and goals. It is similarly difficult to end participatory design work. After all, participants are often quite involved in the design process and later on, may continue to integrate the tangible outcomes of the participatory design process into their work and life. It is an open challenge to make sure results are sustained when the project ends and that participants are valued for their involvement [41, 67]. As such, the participatory design community spends considerable research in designing touch points and bridges for successful onboarding and offboarding [71].

For many years, disseminating knowledge in academic papers was the somewhat natural end-point for research, with papers often being published behind paywalls and relying on academic jargon, making them hard to get and hard to grapple for people. More recently, much progress has been made in disseminating scientific publications through alternative forms such as social media, science slams, comics, zines, podcasts, DIY tutorials, design artifacts, or exhibitions (e.g., [13, 20, 22, 27, 28, 33, 35, 53]). Here, researchers explain or manifest their often complex and complicated work in more approachable and accessible terms or artifacts. Taken together, these approaches also open a way for the interested general public to have a direct backchannel to researchers. HCI design research is particularly well-suited to investigate novel avenues for opening and sustaining these modes of communication. Fallman [25] argues that the core activity of design research is to give shape and form

to intangible knowledge, and in doing so, establish bridges between theory and practice. There exists a remarkable array of tangible design artifacts, aimed at initiating and upholding conversations between designers, co-designers, and the general public (e.g., [11, 14, 23, 44, 71]).

There is, however, comparatively little attention on the opportunities of audio-based artifacts bridging design knowledge and practice. Such artifacts for science communication and knowledge dissemination span from hyper-audio to wiki-style knowledge structures explorable for marginalized groups [5], or better accessible within museum contexts [52], science songs, and even spoken newsletters in messenger apps [78]. Podcasts are perhaps the prime example of manifesting scientific knowledge in a digestible form that, together with social media, also enables a backchannel. They are valuable sources of exchange between the scientific community and the general public, acting as a public space to share and to discuss scientific knowledge, to get an informed understanding of science [3, 43]. Certainly, listeners of podcasts may utilize social media to connect back to the speakers. But, audio-based artifacts have not been utilized to their full potential, to continue, to deepen, and to widen the conversations with and among participants.

2.2 Decolonial Theory and Sound Studies

The history of Western sound studies research is foundationally tied to the World Soundscape Project, which primarily focused on recording soundscapes across time and exploring new ways of tracking environmental changes invisible to a visually centric society [69]. As the field has evolved from its environmentalist agenda in its early years [75], sound studies has become a theoretical approach to understanding a variety of sonic inquiries: the evolution of the ear and listening technology [37, 54], the history of voice [9, 18, 40], and more recently an exploration of listening as a culturally diverse, racialized, and individually unique process [55, 65, 68]. For example, critical geography scholar Am Kanngieser examines the use of sound as a political and social tool to identify the presence of inequality in order to "build new and creative terrains for human and more-than-human negotiations" [42]. Collectively, the field of sound studies offers an ear to non-visual relationships through which to understand evolving realities between the natural world and human interaction. Similarly, the inequalities present in these sonic relations can also be used to illuminate inequalities among populations and communities [42].

While these works are often referenced as pivotal forces and foundational texts for sound studies research, one prominent challenge of this field is that it is historically situated in colonial thinking and Euro-centric perspectives on listening. To decolonize this field, Dylan Robinson's research identifies the normative and unmarked forms of listening privilege that exist within settler colonial listening positionality. Confronting listening positionality as it is enacted through research production, researcher interviews, and the listening process, are integral to engaging in stories and conversations with individuals who exist within diverse perspectives. Robinson suggests that a critical listening positionality and decolonial lens seeks to prompt questions regarding "how we might become better attuned to the particular filters of race, class, gender, and ability that actively select and frame the moment of contact between listening body and listened-to sound" [55]. Sharing stories through sonic

interventions extends a decolonial research approach, maintaining stories within shared story worlds [4], while also encouraging listeners to confront their own societal, cultural, physical, and emotional filters that impact how and why they engage in various listening practices.

Another prominent decolonial dimension explored within the field of sound studies, and an integral aspect of sonic production, is the use of storytelling and voice in knowledge sharing and dissemination. Stories offer a glimpse into diverse lived realities and position researchers in response to these spaces; "Stories can intervene on dominant narratives, create space for counternarratives and in doing so challenge the settler-colonial status quo in pursuit of decolonial futures" [76]. Sonic forms of storytelling allow qualitative researchers to extend their work and create space for individuals to share using their own voice and on their own terms [76]. Considering a researcher's ethical implications in this work, Archibald remarks that a researcher needs to respond through a set of seven principles: respect, responsibility, reciprocity, reverence, holism, interrelatedness and synergy [4]. These principles demand that a researcher consider their participants in each aspect of research and production, ensuring that stories are not removed from their context and that individuals are not overlooked or abandoned throughout the process. In sum, storytelling can be explored through a decolonial lens by creating a space for participants to recall events and experiences, by appreciating diversity of lived experience, by honoring such as a powerful teacher [45], and by affirming the collaborative creation of knowledge [38, 45]. In shared storytelling spaces, the collaborative nature may also open a dialogue from individual experience to a larger collective worldview [57].

The production of audio-based research may offer spaces to explore these new dialogues with participants in various settings, placing them in conversation through audio editing; however, there is still a need to decolonize research production itself, emphasizing legitimacy of sonic stories as a form of knowledge production and distribution [2]. Along these same lines, there has also been a push to recognize the social and political markers of this form of creative design-led research and distribution. Sonic production allows researchers to maintain affective responses held between interviewer and interviewee, while also encouraging and building ethical relationships with participants. By maintaining stories within the speaker's voice, it lends well to decolonial aspirations of *storywork*, maintaining stories within the communities, thereby building upon said principles of respect, responsibility, reciprocity, and synergy [4]. Similarly, community-led research projects can contribute to equitable, reciprocal relationships and increase public impact by engaging with the community beyond the interview process [61]. In essence, the primary issue that sonic forms of research aim to combat is the development of research that does not serve the community in conversation [21]; when working with specific communities there is accountability tied to how research findings are disseminated, to honour the process of learning and sharing as ceremonial [77]. From a listener's perspective, sonic production also develops a social activity in that listeners are unable to remain passive; instead, they are called into a form of conversation and dialogue, and, in this way, subtly asked to develop kinship with the

narrators and storytellers as an attentive and responsive listener [39].

The design-led process of creating the audio documentary detailed in this paper allowed us to consider the ways in which participants' voices from our previous field study [79] traversed sonic spaces and how their experiences create collective soundings and understandings. In essence, this form of engagement encourages an empathetic listener, positioning them in conversation with the interviewee. Considering sound as a political medium [42], the use of sound and voice in this format helps to create spaces to challenge common forms of subjugation tied to the visually impaired communities. It allows for collective individual experiences to navigate shared various forms of reminiscence, and it enhances some of these experiences through sonic cues added in post-production. Similarly, the production of an audio documentary allows us to maintain *communicative silences* which carry embodied expression and emotion that are lost in translation of an audio format to written word [1].

Our work aims to bring together these strands of research. Drawing on guiding concepts from decolonial and critical sound studies literature, we want to investigate how an HCI research publication can be transformed into an intelligible alternative form for research participants in the service of supporting reciprocity. We aim to consider how a decolonial approach to creative research production with storytelling may offer new approaches to HCI research and design, exploring how their stories might help us find ways to disrupt and redesign existing ableist technologies and systems, and to open a backchannel for the exchange between the scientific community, our participants, and the general public. Through describing and unpacking our design-led approach through a critical-reflexive lens, a secondary goal is to extend strategies for mobilizing audio-based forms of HCI research.

3 PROCESS AND APPROACH: DESIGNING THE AUDIO DOCUMENTARY

3.1 Theoretical Concepts and Motivation

Our approach originates with and is tied to the design-led research approach in HCI. We adopt a designer-researcher position that gives prominence to first-hand insights emerging through the creation of real things that materially ground conceptual ideas through their actual existence—"a process of moving from the particular, general and universal to the ultimate particular – the specific design" [46]. Designer-researchers often function as a small but multidisciplinary team that is reflexively focused on the experimental and novel outcomes of the design process that critically and reflectively arrive through creative practice (c.f. [15, 50]). Thus, design research in HCI can contribute a highly insightful, first-hand, and reflexive view of practices of making in relation to higher-level concepts, framing key decisions in the design process. From a high level, our work builds on a trajectory of research in DIS and HCI that emphasize the creation of new knowledge through design practice and a reflexive designer-researcher approach (e.g., [8, 17, 25, 66, 80]). We take inspiration from research calling for moments of pause and critical reflection on key episodic moments in longer-term design processes (e.g., [19, 29, 30, 47, 49, 73]).

As a design research team, we created the audio documentary drawn from our prior fieldwork [79], to engage in a process of transforming their research publication into a format that could be given back to participants largely motivated by their own desires to better understand the experiences of each other. We wanted to create an engaging format that resonated with the research participants' interest in audio as a rich format to tell stories. We also wanted to build in moments of pause to actively invite reflection, contemplation, and response throughout the audio documentary.

To frame our design inquiry, we are informed by concepts from decolonial theory and the need to strengthen the communication between researchers and participants. As noted earlier, our own research and the positionality of our design research team is primarily situated in a Canadian context where there exists a movement to engage with decolonizing methodologies, theories and ways of knowing in academic research and education (c.f. [36, 62])[1]. In this sense, decolonial methodologies also concern themselves with reciprocity and how knowledge can be shared with communities, which influenced the context of our own work that helped guide the creation of the audio documentary.

3.2 Method

A set of distinct, but related concepts helped guide our design-led process of creating the audio documentary. We draw inspiration from concepts of *storywork* and *storyworlds* where the stories and sonic worlds bound in the voices of participants are maintained, allowing conversations to exist in reciprocal and interrelated ways [4]. This lens also pushes us to consider sound as a political medium through questioning the researcher and the listener positionalities, and, in this way, encouraging empathic listening by positioning the researcher and listener in conversation with the research participants [55]. We similarly have worked to produce an audio experience that aims to disrupt normative practices of research dissemination and production in HCI work through, in part, maintaining stories in the voices of our participants. This choice is one we have made to challenge listening positionalities, to situate the listener in a space to question their listening filters, and to consider a different worldview [55]. The production of an audio piece works to create these moments of listening through another space and in conversation with and among the other participants, and our structural format of the audio documentary, with the inclusion of questions, aims to prompt these moments of inquiry. Finally, the goals of our work are aligned with the decolonial recognition that written dissemination of knowledge is not 'enough' and that research must be returned in a way that supports and aligns with our participants and invites response [21]. Archibald remarks that a primary aspect of respect and responsibility when working with communities is to produce the research dissemination in a format most accessible and supportive of the community that had contributed to the work [4]. Our choice to create an audio documentary works to align itself with recent HCI initiatives to maintain relationships and dialogue following research (e.g., [58, 64, 67]), decolonizing the abstractive forms of interviewing by prioritizing equitable and relational forms of communication. The audio documentary format has been chosen because it is easily accessible for individuals to find online, and

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[1]We respectfully acknowledge that other areas of the world also contain major contemporary movements to engage with decolonizing methodologies (e.g., see [62] for an in depth synthesis of perspectives across Australia, New Zealand, and Canada). We here emphasize Canada as it is the site where this research takes place.

it is a supportive medium for our blind participants. Audio documentaries are also more accessible than written distribution which typically remains behind paywalls and institutional barriers.

This audio documentary is part of an ongoing multi-year participatory design research project. Participants specifically asked us to share insights from all interviews to understand and to reflect on each other's experiences. For our participants, an audio format was preferred over written dissemination, specifically hearing each other's voices instead of researchers retelling stories on each participant's behalf. With this audio documentary we support reciprocity and mutual learning. At the same time, it was a collective decision among all parties to not involve participants directly in the production of the audio documentary. Importantly, upon completing the final draft of the documentary, we sent the audio file to participants to confirm that they are fully comfortable with what is being shared. In sum, the documentary serves to maintain, deepen, extend the conversation, and support subsequent participatory design work within our collective longer-term project.

With this as a backdrop, the development of the audio documentary consisted of the following. Over the course of seven months, we carefully reviewed the data from our previous fieldwork [79], which consisted of mostly raw interview recordings and theoretical literature. Similar to Schoñ's notion of design as a conversation with materials [59], we engaged in a reflexive dialogue with the empirical and theoretical, our understanding of our participants and academic jargon, and rounds of development and critique, to arrive at the final audio documentary. This iterative and creative process enabled us to reflectively examine the interplay among the original field recordings of the participants' stories, voices and lived environments, the script developed to thematically guide the listener, sound design choices to amplify the participants' storyworlds, the SoundCloud platform for distribution, and their individual and collective relation to our conceptual framing.

3.3 Researcher Positionality & Ethics

Our design research team was comprised of four researchers. None of which are blind or experience severe visual impairments; and it is important to acknowledge our positionality. **Author 1** has conducted 2 years of participant engagement and observation with a local non-profit organizational branch of a major national institute for the blind. **Author 2** has not had experience working directly with blind populations. However, author 2 has recently completed a graduate degree in communication, specializing in sound studies and decolonial theory. Alongside the academic work, author 2 has ample experience as a sound designer and audio producer in both academic and community roles. **Author 3** has prior experience in volunteering with a non-profit social program that paired younger adults with older adults that are living with vision impairment, where the primary goal is to support positive intergenerational socialization and dialogue. Author 3 also has over a decade of experience in sound design and music production. **Author 4** has completed 1 year of community service volunteer work in a school for blind and visually impaired students and, more broadly, has 6 years of experience in co-designing together with people from different walks of life and different abilities.

The lived experiences that the participants have largely provided our design research team, individually and collectively, offered first-hand insights into the lives of people with vision impairment. However, we ourselves cannot experience what it is like to live with vision impairment or blindness; and this is an important limitation to acknowledge. These experiences did play a role in our intention to extend our prior field research [79] through a decolonial lens that aimed to situate participants' voices and stories in relation to each other in a rich audio format that could potentially be more engaging and inviting than the original paper, which was primarily written for an academic HCI audience. For this audio documentary participants agreed to have their voices used and shared, their names have been anonymized and the Research Ethics Board of the first author's university approved this approach.

We documented our design-led process as it progressed, and annotated key design choices and decisions in light of our conceptual framing as we moved towards the final audio documentary. This paper offers a collective account by us as a research team; however, it does not aim to report on each and every design decision. We attend to specific design decisions that were productively shaped by key higher-level concepts, as well as cases in which frictions emerged. Next, we offer a synthesized account of design decisions and instances in relation to key guiding theoretical concepts.

4 BEYOND LOOKING BACK: UNPACKING THE MAKING OF THE AUDIO DOCUMENTARY

Our previous field study explored the reminiscence experience for people with blindness and draws design insights that could enrich the experience from 9 interviews with people with blindness [79]. Largely, the findings are categorized in three areas; (i) Pathways to Capturing and Remembering the Past – how people with blindness currently reminisce, (ii) Possessions as Resources for Reminiscence – types of personal belongings that provoke recollections and tensions in social sharing, and (iii) Towards the Future of Reminiscence – alternative and possible ways to extend the reminiscence experience. Building on these findings, we suggested design implications in three areas; sound, social interaction and tactile expression. The audio documentary aims to translate and describe these research outcomes to give back to the participants and the community.

The graphic featured in Figure 1 offers a visual description and annotation of the audio documentary. Additionally, we encourage the reader to listen to the *Beyond Looking Back* audio documentary which is available on SoundCloud.[2] The visual overview of the audio documentary (Figure 1) outlines color codes and different types of markers. Importantly, this figure does not aim to marginalize or quantify our participants' participations, but to recognize and appreciate their contributions, in addition to provide a reference for navigating the documentary. The main foci are the three themes in the findings section of the paper with a hint of the design initiatives in the discussion section. The opening begins with explaining the

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[2]To listen to our full audio documentary, please refer to the following URL on SoundCloud: https://soundcloud.com/homewarelab/beyond-looking-back-full-audio-doc, A textual transcript of the entire audio documentary can also be downloaded as an auxiliary material through the ACM digital library.
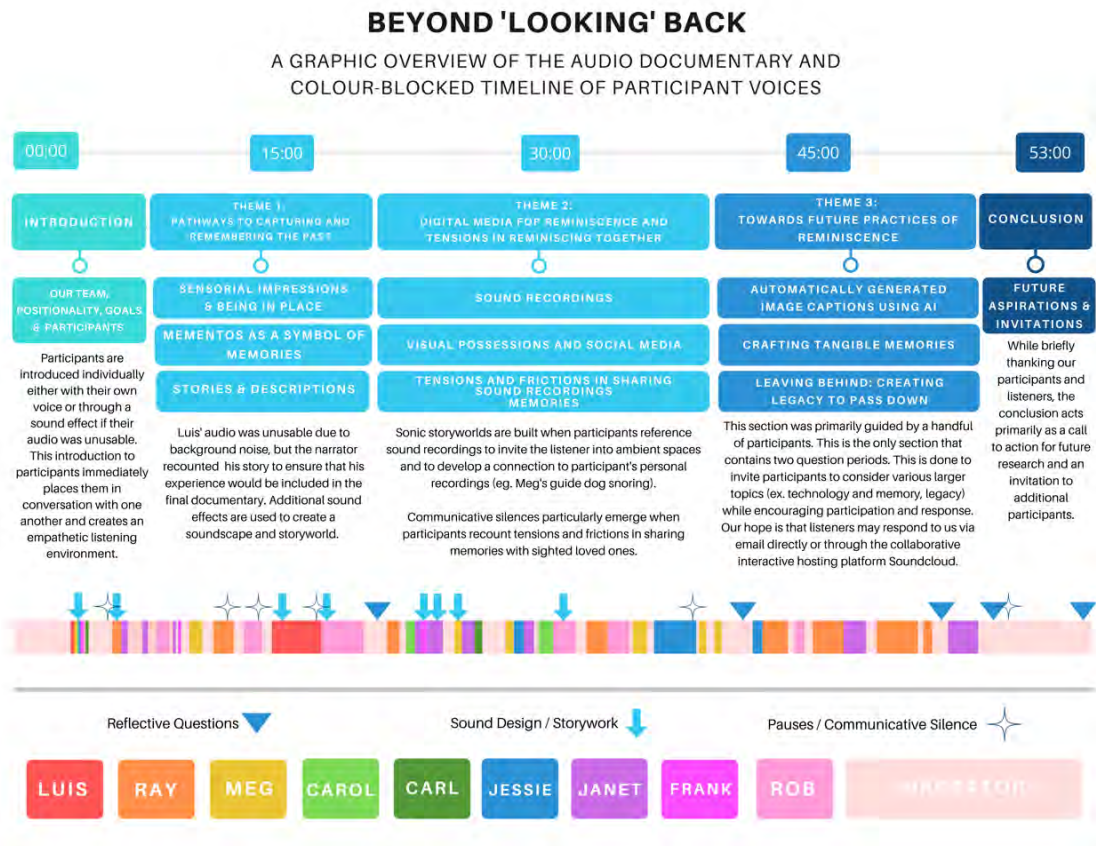
Figure 1: Visualized infographic of the audio documentary. From the top, each line represents; (i) the timeline, (ii) thematic distribution and descriptions and (iii) the color-coded timeline indicating the participants, sound techniques and reflective questions.

purpose, motivation, positionality as well as participant introduction. Largely, the first and the last themes are identical, but the second theme is focused more on the digital media, social interactions, and tensions in reminiscing together with the loved ones. The audio documentary concludes with the appreciation to the participants and an invite to get involved in future research. In what follows, we report on the key frictions that we encountered through the process of making the audio documentary and the design decisions with underlying theories that supported us in ultimately overcoming these frictions in three separate categories: Composition, Production and Publishing.

4.1 Composition

At the early stage, design goals prior to recording were to reduce the complexity of the audio documentary for better digestion, and to offer questions that bring the listener into this reflective conversation. In composing the audio documentary, we describe the frictions in the following areas; (i) Setting a Proper Tone, (ii) Equity and Equal Representation in Large Data, and (iii) Creating Space for Reflection and Engagement.

4.1.1 Setting a Proper Tone. The first key decision was defining an appropriate tone for the audio documentary while considering our positionality. Translating academic knowledge from a published paper required a critical reflection on who we are, why we do this translation, what we translate, and finally, how we deliver this knowledge. Inspired and influenced by epistemic decolonization [63], the audio documentary is our attempt to shun the misperception of assuming ourselves as representatives of knowledge, generated through working with the blind community. Our dissemination of the voice recordings is us "talking back" and with [63] our participants and the community. While the publication from our prior field study [79] offered a space to collectively explore some of the topics, themes, and quotes that emerge across participants, the audio documentary is not to report the research findings in an academic tone. Our goal was to ensure the audio documentary is approachable and amalgamates the research outcome into an easily digestible audio format for our main audience.

We wrote the script in plain language that avoids technical or theoretical terms, and academic jargon. Also, grammatical structures were revised. For example, long and complex sentences are broken

into simpler structures, and impersonal pronouns are replaced by definitive pronouns. Further, we were careful in using analytical words. Interpretive terms, such as 'effective', 'investigate' or 'study', were removed and rephrased to neutral terms, such as 'tell', 'explain' or 'describe'. We focused on elaborating in-depth statements on our positionality, intensions, and personal motivations, rather than introducing a thorough theoretical background and preceding research. In sum, we aimed to maintain the affective responses and emotional relationships that were held between interviewer and interviewee, as well as their recollections of memories.

4.1.2 Equity and Equal Representation in Large Data. Our next dilemma was rooted in pursuing equity and fairness. We aimed to equally balance each participant's share (duration in audio). This is to appreciate and recognize all participant's contribution to the project. For those whose voices are not featured in the documentary (due to technical issues), their contributions are recognized by mentioning their pseudo-names and describing their stories in the narration. After the first round of editing, we noticed that assembling merely the quotes presented in the academic paper resulted in over three hours of audio before the narration was attached. While we aimed to integrate each participant equally, there were moments where we had to highlight quotes from certain participants and drop less significant themes. Compared to academic publications in a written format, audio snippets were much harder to cut or paraphrase. For example, when participants used pronouns (e.g., it, him, we, they...), a proper context must be provided, which made the quote even longer. In another situation, if participant quotes included extensive descriptions, we had to decide whether to include such details for richness or to remove them for the sake of space. We must find an adequate balance between completeness and compactness, while paying careful attention that we do not lose each participant's intention in the quotes.

Also, we re-structured the themes in the audio documentary. Presenting more themes may offer additional areas to reflect from the listener's point of view; however, from the second author's previous experience, we noticed there is a higher mental load for the listener as the running time of the audio documentary would become quite long. Following this insight, our audio documentary is designed to remain under an hour. We had to be very selective about what we cover in the documentary. The audio documentary is a linear structure with little movement and confusion between larger themes and sub-themes so that themes can flow easily and concisely for the listener. We found the audio format is not efficient for presenting a complex structure as opposed to an academic publication in a written document. In a written document, accessibility tools, such as screen readers, are available to assist people with blindness to move between the overall structure by reading the headings. With such tools, even in the middle of the document, it is possible to skip back to anchor points for each heading as checkpoints. However, it is much more challenging in the context of an audio documentary as the listener may get lost in the complex thematic structure. Therefore, sub-themes in the research findings were pruned and re-arranged for a better flow in the audio format.

In the original data analysis, we developed three major themes, which were broken into 13 sub-themes and 5 sub-sub-themes. In the published paper [79], these findings were distilled to three major themes, and 9 sub-themes in total, merging and dropping minor themes that are described by fewer quotes. In the audio documentary, although the number of themes and sub-themes remained the same, we re-organized the structure to emphasize themes that were shared by the participants. For example, our theme on mementos is one of the key findings that shows how participants used physical possessions as a gateway to their past memories. In the paper, this topic is presented under the theme of sensorial impressions. However, since all participants mentioned mementos and described how they cherish them, we decided to create a separate sub-theme for the audio documentary. Overall, these decisions and reconstructions have yielded a more compact, tightly organized documentary which we were able to produce in a shorter timeframe.

4.1.3 Creating Space for Reflection and Engagement. Once quotes, themes and the structure were set, the next friction that surfaced from our motive for creating space for the listener to engage with the participants and our inquiries in the documentary. Written accounts of participants' narratives are often unable to capture the emotional impact of phrasing and the pauses that contain stories in and of themselves. Thus, audio is a suitable medium for offering sonic space for asynchronous conversation. We achieved this goal by implementing two techniques in the documentary: three types of reflective questions and *communicative silences* [1].

Building on our analysis and reflections, we posed questions for the listener. These questions offer a different dimension in the audio documentary that pushes the boundary beyond the passive listening. They intend to lead a dialogue between various audiences: the researchers and the participants, the participants themselves, and the participants and listeners. They encourage listeners to reflect on the reminiscence experiences described and unfolded from our participants' stories. As a result, we developed three types of questions – **Correlate**, **Expand**, and **Envision**.

Correlating questions ask the listener to think back on their own personal experiences in connection to what's presented in the documentary. For example, "What are the ways you recall memories?" "What are your own ways of using digital possessions to look back on your past?" "What does it mean for you to craft a legacy? What are the possessions that you would like to pass down?"

Building on the listener's personal experiences, **Expanding questions** encourage the listener to think further into what is described in the documentary, to consider new insights given participant's stories and research findings. "What are some other ways that we could create a moment of collaborative reminiscence?" "What are some other ways that encourage deeper engagements between blind and sighted people in remembering and sharing memories together?"

Envisioning questions invite the listener to imagine experiencing a given situation. "Suppose you are able to create a figure that represents a specific moment from the past. What moment would you create? How would it be translated into a physical figure?" "What if an audio repository collects audio recordings paired with additional information captured at the time of recording, such as timestamp, GPS location data, weather, date, or season? How would you use this audio repository?"

In the context of our research, the asynchronous dialogue works to create a form of pseudo-synchronicity to maintain the participatory nature of this project and encourage reflection in specific moments. The explicit moments, created by a mixture of three types of reflective questions invite the listener to enter the co-design mindset. Correlating questions put the listener on the same page with the participants by asking them to share in similar experiences. Finally, expanding questions and envisioning questions are aimed to explore future participations and imply our research inquiries.

Another important quality throughout the piece is the maintenance of silence. Throughout the documentary, there are a few moments where silences are removed to ensure the flow of the sonic piece, but there are numerous pauses that contained emotion and communication within the stories. In this asynchronous conversation, the maintenance of silence plays an important role in creating a sensitive connection, inspired by Acheson's perspective of communicative silence. As Acheson explores, we consider silences in the documentary as more than "a background for expressed thought". Rather, we actively use silence as a "gesture" where the listener, the participants in the documentary, and the listener's inner self are encouraged to meet together [1].

Overall, having the right tone, equal balance for each participant, and being able to interact with the silences between participant stories, narration, and reflective questions, all contribute to offer a nuanced and relational understanding of our participants' responses, offering insight which is removed from the edited textual descriptions. Next, we report on the frictions and challenges we faced when working with the audio files in the process of producing the audio documentary.

4.2 Production

In producing the audio documentary, we aimed to emphasize the emotional textures that are present within our participants' stories. We believed an emphasis on these emotions could help to immerse the listener in the documentary and engage in active listening by responding to participants' stories and reflective questions. For this purpose, we decided to use the participants' own voices in the documentary. Yet, the dominant challenge was to address sonic disruptions in audio files so that we could feature each voice clearly, ensuring they blend well with the other sonic components in the documentary (e.g., narration and background music) for a better listening experience.

4.2.1 Overcoming Sonic Disruptions in Interview Recordings.
Audio quality was one of the key determining factors as to whether we included a participant's voice from their recorded interview. When we conducted in-person interviews, we did not anticipate the field recordings would be used for another project in the future. Their interviews were conducted in participants' homes and, thus, casual 'living' noises (e.g., children playing, home appliances) had leaked into the field recordings. We had to listen to the audio field recordings and determine which clips should be included based on the audio quality, as some recordings are muffled while moving the mic, some are distorted by small electrical blips from the microphone, and some recorded in loud / noisy situations which disruptions like a car honking or airplane engines overhead. By ensuring we had clear audio, it was much easier to sonically invite the listener to

the interview location and to clearly disseminate the findings in a succinct and clear way.

Participants' voices add uniqueness not only to the listening experience but also to their personal stories that were shared in the audio documentary. Unlike reading participant quotes in academic publications, getting to know each participant by their voices and paying attention to their tones as they tell their stories establishes a strong emotional connection. This connection is first introduced in the beginning of the audio documentary when the participants' voices are attached to their individual introduction statements. While this introduction increased the overall length of the documentary, we strongly felt it is a needed portion in the documentary. Yet, another friction arose for the participants who did not have a quote in the documentary, either due to poor audio quality or those who were removed for space. We had gone through an extensive discussion about whether to hire voice actors to fill in these gaps, but we decided not to bring in a third person to 'act' on behalf of our participants as we did not want to blur the authentic value of the voices; instead, we wanted to prioritize consistency by featuring the participants' voices only. There was one quote in particular where Luis was describing his experience of seeing natural phenomena through his friend's eyes. His voice could not be included in the final audio edit even after careful adjustments to the clip, as it was overpowered by loud sonic disruptions. Instead, we borrowed the narrator's voice to describe the scene and the experience on behalf of the participant to preserve a seamless flow in the documentary.

4.2.2 Re-creating Scenes with Additional Sonic Layers.
Jo-Ann Archibald utilizes the term *storywork* [4] to signify the importance of Stó:lō stories and storytelling as a form of knowledge. Archibald shares there is power in stories and teachings outside of structured educational and social value. Inspired by these concepts and decolonial aspirations of knowledge formation and dissemination, we began to consider the implications of our work when abstracting stories from our participants for written dissemination and analysis. In essence, we were stripping our participants and storytellers of their voices through an extractive editable format. Wanting to give back to this community and consider the importance of maintaining stories with our storytellers, an audio documentary allowed us to explore these aims and to develop reciprocal and responsible relationships with our participants. Creating an audio documentary surrounding the interview recordings worked to situate the listener in conversation, as well as the participants in conversation with another. These moments for cross-conversation between shared perspectives emerge throughout the audio documentary and offer moments of synergy and connection. They also develop an empathetic listening experience where listeners are invited to listen and respond to the questions and considerations, creating moments for both speaker and listener to engage in storywork or communal discussion within the space of shared storytelling. Sonically, there are moments where we were able to develop the soundscapes of our participants' storyworlds. In conversations with participants' who share the importance of these sonic cues, we are able to transport the listener to these locations and memories, to situate the story within the soundscape, and to sonically embody their emotional experience.

When we began to edit the audio documentary, we relied heavily on the contextual clues from the written quotes in the academic paper and the voices from the interview recordings to design the sonic environments imaged by the participants. After numerous iterations, we implemented carefully chosen sounds that highlight the characteristics of participants in connection to their descriptions. For example, when Janet describes a boating trip, the listener will hear the sound of water and boat engines in the background. At other times when there was no hint to a sound reference in a participant's quote, we chose moments where the addition of a soundscape felt natural. Yet, there were some moments in editing where we noticed that additional sound effects took away from a rich description, as it became too distracting, or it felt out of place. For example, Rob described the shared experience of creating a documentary with his family. While there may have been an opportunity to include sonic cues in this space, to imagine the soundings of this family memento, the addition of these sounds would detract from the sincerity of the story and would deter listeners from focusing on Rob's emotive experience. In this scenario, his storytelling and voice required full listening attention. Moreover, the background music was used for boosting an emotional atmosphere of the stories and as a sonic cue for smooth transitions between different sections (e.g., themes, reflective questions and communicative silences). From the producer's perspective, designing and choosing sounds and soundscape had been a unique experience as we constantly reimagining and reflecting on re-creating participants' rich experiences through sound.

The sound layers form a well-blended mix of focused sound (e.g., a participant's voice and additional sounds to their stories) and ambient sound (e.g., soundscape and background music to help create the mood and the scenes) , which extends our previous study's finding on the two types of sound components [79]. Participants' reflections in the form of focused sound, mixed with additional forms of ambient sound, was designed to offer a rich listening experience. Overall, sharing the stories through sonic interventions extends our decolonial approach, maintaining the stories within the participants' shared storyworlds, while also following Robinson's suggestion of challenging listener positionality [55], encouraging listeners to confront their particular perspectives and worldviews that impact how and why they engage in certain moments of shared listening.

4.3 Publishing

Finally, we report on the design and ethical decisions regarding the public dissemination of the audio documentary, during and after completing the audio documentary. We hope our audio documentary maintains the emotional aspects of storytelling which further sensitize the listener and the design team as they are able to sort through the data and stories through the voices of our participants. Further, we wish to establish a continuous communication around and beyond the audio documentary by publishing the audio recording on a platform with public access.

4.3.1 Publishing as Single Episode Documentary. Our audio documentary naturally flows as a form of knowledge translation from story to listener when situated in this format. It is made from multiple rounds of edits that collectively tell a story, but the flow from

the storytelling space to the listening experience feels quite linear, moving from the recording to audio sharing experience easily. The role of the sound designer resembles that of the writer of an article, choosing quotes, mixing, and mastering voices to develop a sonic world. However, where writing has more leeway to move or paraphrase words to create seamless reading, manipulating a quote to abstract the key theme in sonic dissemination is far more difficult and often impossible to manipulate flawlessly. Thus, the individual's knowledge and experience sharing is fully maintained, pulling their full description and relaying this to the listener's experience.

To better present these collective and homogeneous stories from 9 interviews, we chose to produce the audio documentary as a single episode – a dedicated, independent episode that gives a sense of completeness. It also allows for enough time to invite listeners to hear the stories of the participants and research findings without placing any expectations on their return for future episodes. We hoped to capture audiences in one sitting, to introduce them to the topic and share key findings. The purpose of project is not to deliver the entire analysis. It is meant to be a gift for participants and therefore the design of a single episode to be distributed also aligns with this goal.

4.3.2 Choosing the Platform for Distribution. We had carefully reviewed and selected a platform to publish the audio documentary. In selecting the platform, we did not have deeper knowledge on whether the platforms support accessibility features and are compatible with screen readers. We leveraged our broader network and relationships with the blind community to elicit their own opinions and experiences on using various digital platforms for listening to audio. Although these discussions touched on platforms like Anchor, PodBean, and YouTube, SoundCloud emerged as the most promising platform for distribution. SoundCloud is an open audio distribution platform that has a large popularity among people living with blindness and visual impairments due to its integration on smartphones and well supported accessibility features. Equally, there exist numerous sound studies scholars and sound artists that regularly upload audio projects and documentaries to SoundCloud for distribution. It allows the creator to easily embed their sound on other websites in accessible formats. SoundCloud is also highly participatory in nature as it allows listeners to comment on specific sections or on the piece as a whole. This quality was well aligned with our goal of inviting listeners to respond to the reflective questions posed in our audio documentary. A free SoundCloud account allows for up to 3 hours of audio (maximum file size of 4 Gb). Thus, we uploaded the full audio documentary, while also uploading separate sections which we combined into one playlist. In this way, listeners can choose to engage with the full audio documentary or jump to specific themes. The process of distribution through SoundCloud creates space for facilitating participation and co-creation as listeners are encouraged to respond to the questions via comments or potentially to reach out to us directly.

5 DISCUSSION & IMPLICATIONS

Although participatory design and related approaches have been widely adopted in the HCI and design research communities, the need to develop novel and diverse strategies for nurturing reciprocal relationships with research participants remains a central

concern. In parallel to recent research [28, 58, 67], our approach to making the audio documentary directly aims to cultivate a reciprocal connection with research participants and continue dialogue after a major phase of field research had concluded and the research team had 'left the field.' A key contribution of the audio documentary is to employ a design-led practice to create an alternative form of research publication for the participants. Inspired by guiding concepts at the intersection of decolonial scholarship and critical sound studies, we created this transformation and extension of knowledge by foregrounding participants' own voices and engaging in storywork to set them in dialogue. We also leveraged their sonic environments and our own subtle sound design techniques to generate unique storyworlds that re-create lived experiences. Through integrating reflective questions and communicative silences, we provoke the listener to consider their own positionality and encourage involvement in the moment of listening and, potentially, in future stages of our participatory research. Next, we explore and reflect further on our making and unpacking of the audio documentary and articulate opportunities this design research case suggests for future HCI research.

5.1 Mobilizing a Decolonial Lens for Supporting Reciprocity through Audio-based Interactions in HCI Research

A decolonial lens may offer different ways to view the Research through Design process and to question and unlearn the researcher and listener positionalities. Listening to the stories as storywork is a prominent decolonial choice that has been made through this process that challenges the listening positionality. Situating our findings within the stories and participants' own voices leaves power in their soundings and places participants in conversation with one another. Our recognition of this positionality and the inquiries we offer, aims to encourage listeners (and ourselves) to confront these positionalities and unlearn some of our ingrained behaviour and sensory processing. This recognition could suggest a new perspective on how researchers design sonic interaction to communicate research inquiries or findings with participants. Throughout the research process, different types of communication can occur. It could be interactive and synchronous, such as screening procedures and individual/group interviews. For this type of communication, there is an opportunity to include a sonic interaction designed around participants' or researcher's voices to explore motivations, inspirations, and instructions in a collective listening experience. This strategy could give rise to stronger emotional connection and shared understanding among participants and researchers, as opposed to reading findings or questions from a prepared script. For communication that is more subtle and asynchronous like emails and letters, sonic interventions could come into play; on top of the written words, a supplementary audio instruction can be attached to offer a rich emotional layer that text alone cannot deliver.

Revisiting Robinson's view, critical listening positionality challenges the listener to seek for the filters (e.g., race, class, gender, etc.) that select and frame what we listen and how we listen [55]. This idea of critical listening positionality has a potential to influence participatory design and inclusive design approaches. Storytelling is one of the dominant methods in inclusive design for respectful engagement with knowledge from a different perspective [7]

and for unpacking unique and situational experiences [51]. Critical listening could offer an additional layer to reflect on how the stories are heard and presented. For example, through the development of small pockets of storyworlds (e.g., Luis' boating trip), the listener is transported to these moments of intimate, nonhuman storytelling. Decolonizing listening in these spaces requires the listener to consider some of the ways that they not only relate to those forms of sonic information, but also how they relate to our soundings. Unlearning the leading position in research could redefine the researcher's positionality to situate themselves equally with participants in considering new insights together and forming collaborative research relationships. Thus, a recognition of the listeners and researchers' positionality, a push towards listening outside of this positionality, and an appreciation of sound in and amongst sounding agents, can all be applied in future HCI research aimed at better supporting reciprocity with the communities that research teams design for and with. More broadly, these implications build on and extend recent efforts in the HCI and design research communities to continue dialogue and relations after leaving the field and critically reformulate research 'outcomes' in more reciprocal and equitable ways [28, 58, 64, 67].

5.2 Embracing Different Forms of Engagement with and Embodiments of Participants' Data

Performing research with a specific community requires that a researcher be highly attuned to the needs and preferences of that community [77]. Our research participants asked us, the research team, to produce a piece of knowledge transfer in a form they could access, absorb, and use to reflect. These desires and our reciprocal creation and distribution of the audio documentary highlight how creating such artifacts can be useful, if not essential, to keeping longer-term participatory processes going, even if they are not created by everyone involved. This also highlights the need for design research teams to be flexible and to adapt the participatory design process when circumstances and participants ask for such.

When working with people living with blindness, there is an accountability of knowledge sharing that is tied to the research findings and honouring the relationships with participants that emerged through the research project. Selecting and working within an accessible medium that participants already utilize demonstrates the researcher team's flexibility to these needs. Likewise, it demonstrates that the team is not only honouring the relationships built and stories told, but they are maintaining a healthy relationship with current and future participants. In our case of continually working with research participants from our previous work [79], the most accessible medium was audio. There are two key factors that guided us to arrive at the final form; (i) participants' preferences and experiences and (ii) the characteristics of collected data.

Insight into participants' preferences and experiences were originally developed and synthesized through our previous field study [79]. From the collected data, it was clear their research participants preferred a few dominant qualities: physical presence, tactile impression, social interaction, and audio. We chose two of these qualities in the form of audio documentary – social interaction, as sharing stories, and audio. We believed the audio documentary

resonates well with participants because they expressed a high sensitivity to different forms of audio and, more practically, all possessed digital devices that can play sound files as well as audio-books. We could have pursued creating other alternative forms of knowledge derived from the reporting from the prior field study. For example, a series of 3D-printed souvenirs that represent a snapshot of moments the research findings, which was a proposed design implication in their work, although it likely would not produce the same narrative form, emotional resonance, and capacity to initiate further dialogue and bring participants together.

In HCI and design research, there exist an ongoing interest in exploring alternative forms of representing data (e.g., [24, 26]). Our approach shares the same view, focusing on a corpus of field data collected and analyzed for an HCI audience. Looking into the characteristics of the participant data can suggest creative ways of connecting research outcomes to an alternative form. While there are other types of data, including photos, field notes and video clips, audio files from interviews are often the most prominent data. Indeed, audio can encapsulate many rich elements in the recording, such as tonal qualities, soundscapes, emotions in each participant's voice, and social interactions when participants' loved ones jumped in the conversation. The qualities captured in the data are not easily reproduced. There is an opportunity for future research to extend this approach through new design cases and unpack how field data can be given new forms that, in turn, might inspire new ways of explorations conversations about research outcomes with research participants. Our research expands existing methods of science communication by utilizing participants voices. This approach may offer the added benefit of enabling interviewees to listen to the other interviews in a structured way and to relate to or reference them when being involved in future participatory design work. In this way, interviewees are extended the opportunity to come up with their own, perhaps more fitting, analysis that might illuminate details that the research team may not have been able to grasp. More broadly, future research in this area could lead to new insights on how creating alternative forms of HCI knowledge can further open pathways toward participatory sensemaking, analysis, and design among research and the communities they work with, while also contributing to ongoing efforts aimed at supporting broader distribution [20, 22, 28, 33, 34, 53].

6 CONCLUSION AND FUTURE WORK

We have described and critically reflected on our design process of creating an audio documentary that aims to extend HCI research back to participants in a valuable and accessible form. Reflecting on the entire process of creating the documentary, from composition and production to publishing, we described key frictions that we encountered and explained how we worked to eventually address them. To support our design decisions, we drew on guiding concepts at the intersection of decolonial theory and critical sound studies, using techniques such as storywork, storyworlds and communicative silence to achieve a better way of unpacking research outcomes. Based on these reflections, we highlighted opportunities for adopting a decolonial lens in the context of HCI research for future explorations into alternative approaches for engaging with participant data against the backdrop of longer-term

participatory design processes with research participants. As the audio documentary is finished and published, we distributed the documentary to our participants as we move toward the next research stage. In this way, the audio documentary not only serves as a gift for participants, but also acts as a genuine invitation for future research. Ultimately, we hope our approach inspires future research into how academic knowledge produced in the HCI and design communities can be more approachable and delivered to the broader public, especially research participants and their relevant community members.

REFERENCES

[1] Kris Acheson. 2008. Silence as Gesture: Rethinking the Nature of Communicative Silences. Communication Theory 18, 4: 535–555. https://doi.org/10.1111/j.1468-2885.2008.00333.x
[2] Liza Agrba. 2021. Extending scholarship to oral traditions through podcasting. Macleans.ca. Retrieved February 18, 2022 from https://www.macleans.ca/education/extending-scholarship-to-oral-traditions-through-podcasting/
[3] Pakinam Amer. 2020. Working Scientist podcast: Science communication made simple. Nature: d41586-020-01526-y. https://doi.org/10.1038/d41586-020-01526-y
[4] Jo-ann Archibald. 2008. Indigenous storywork: Educating the heart, mind, body, and spirit. UBC press.
[5] Audiopedia. 2022. Fair Access to Vital Knowledge for All. Retrieved February 7, 2022 from https://www.audiopedia.community
[6] Mauro Avila, Markus Funk, and Niels Henze. 2015. DroneNavigator: Using Drones for Navigating Visually Impaired Persons. In Proceedings of the 17th International ACM SIGACCESS Conference on Computers & Accessibility (ASSETS '15), 327–328. https://doi.org/10.1145/2700648.2811362
[7] Manuhuia Barcham. 2021. Towards a radically inclusive design – indigenous story-telling as codesign methodology. CoDesign 0, 0: 1–13. https://doi.org/10.1080/15710882.2021.1982989
[8] Jeffrey Bardzell, Shaowen Bardzell, and Lone Koefoed Hansen. 2015. Immodest Proposals: Research Through Design and Knowledge. In Proceedings of the 33rd

Annual ACM Conference on Human Factors in Computing Systems (CHI '15), 2093–2102. https://doi.org/10.1145/2702123.2702400

[9] Roland Barthes. 2012. „The Grain of the Voice ", u: The Sound Studies Reader, Johnathan Sterne (ur.).

[10] Jordan Beck and Hamid R. Ekbia. 2018. The Theory-Practice Gap as Generative Metaphor. In Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems. Association for Computing Machinery, New York, NY, USA, 1–11. Retrieved February 1, 2022 from https://doi.org/10.1145/3173574.3174194

[11] Arne Berger, William Odom, Michael Storz, Andreas Bischof, Albrecht Kurze, and Eva Hornecker. 2019. The Inflatable Cat: Idiosyncratic Ideation of Smart Objects for the Home. In Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems (CHI '19), 401:1-401:12. https://doi.org/10.1145/3290605.3300631

[12] Yevgen Borodin, Jeffrey P. Bigham, Glenn Dausch, and I. V. Ramakrishnan. 2010. More than meets the eye: a survey of screen-reader browsing strategies. In Proceedings of the 2010 International Cross Disciplinary Conference on Web Accessibility (W4A) (W4A '10), 1–10. https://doi.org/10.1145/1805986.1806005

[13] Andy Boucher, Dean Brown, Liliana Ovalle, Andy Sheen, Mike Vanis, William Odom, Doenja Oogjes, and William Gaver. 2018. TaskCam: Designing and Testing an Open Tool for Cultural Probes Studies. In Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems (CHI '18), 71:1-71:12. https://doi.org/10.1145/3173574.3173645

[14] Rachel Charlotte Smith, Heike Winschiers-Theophilus, Asnath Paula Kambunga, and Sarala Krishnamurthy. 2020. Decolonizing Participatory Design: Memory Making in Namibia. In Proceedings of the 16th Participatory Design Conference 2020 - Participation(s) Otherwise - Volume 1 (PDC '20), 96–106. https://doi.org/10.1145/3385010.3385021

[15] Amy Yo Sue Chen and William Odom. 2021. Crafting temporality in design: Introducing a designer-researcher approach through the creation of Chronoscope. In The Routledge International Handbook of Practice-Based Research. Routledge, 368–380.

[16] Lucas Colusso, Cynthia L. Bennett, Gary Hsieh, and Sean A. Munson. 2017. Translational Resources: Reducing the Gap Between Academic Research and HCI Practice. In Proceedings of the 2017 Conference on Designing Interactive Systems (DIS '17), 957–968. https://doi.org/10.1145/3064663.3064667

[17] Peter Dalsgaard. 2016. Experimental Systems in Research Through Design. In Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems (CHI '16), 4991–4996. https://doi.org/10.1145/2858036.2858310

[18] Jacques Derrida. 2012. The voice that keeps silence. The sound studies reader: 495–503.

[19] Audrey Desjardins and Cayla Key. 2020. Parallels, Tangents, and Loops: Reflections on the "Through" Part of RtD. In Proceedings of the 2020 ACM Designing Interactive Systems Conference. Association for Computing Machinery, New York, NY, USA, 2133–2147. Retrieved April 17, 2022 from http://doi.org/10.1145/3357236.3395586

[20] Audrey Desjardins, Ron Wakkary, Will Odom, Henry Lin, and Markus Lorenz Schilling. 2017. Exploring DIY tutorials as a way to disseminate research through design. Interactions 24, 4: 78–82. https://doi.org/10.1145/3098319

[21] Lisa G. Dirks. 2021. Collaborative Research Results Dissemination: Applying Postcolonial Theory to Indigenous Community Contexts. In Diversity, Divergence, Dialogue (Lecture Notes in Computer Science), 394–403. https://doi.org/10.1007/978-3-030-71305-8_33

[22] Thomas Dykes, Mark Blythe, Jayne Wallace, James Thomas, and Tim Regan. 2016. RtD Comics: A Medium for Representing Research Through Design. In Proceedings of the 2016 ACM Conference on Designing Interactive Systems (DIS '16), 971–982. https://doi.org/10.1145/2901790.2901821

[23] Pelle Ehn. 2008. Participation in Design Things. In Proceedings of the Tenth Anniversary Conference on Participatory Design 2008 (PDC '08), 92–101.

[24] Chris Elsden, Mark Selby, Abigail Durrant, and David Kirk. 2016. Fitter, Happier, More Productive: What to Ask of a Data-driven Life. interactions 23, 5: 45–45. https://doi.org/10.1145/2975388

[25] Daniel Fallman. 2003. Design-oriented human-computer interaction. In Proceedings of the SIGCHI conference on Human factors in computing systems, 225–232. Retrieved October 21, 2014 from http://dl.acm.org/citation.cfm?id=642652

[26] Melanie Feinberg. 2017. A Design Perspective on Data. In Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems (CHI '17), 2952–2963. https://doi.org/10.1145/3025453.3025837

[27] Sarah E. Fox, Rafael M.L. Silva, and Daniela K. Rosner. 2018. Beyond the Prototype: Maintenance, Collective Responsibility, and Public IoT. In Proceedings of the 2018 Designing Interactive Systems Conference (DIS '18), 21–32. https://doi.org/10.1145/3196709.3196710

[28] Sarah Fox and Daniela K. Rosner. 2016. Continuing the Dialogue: Bringing Research Accounts Back into the Field. In Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems (CHI '16), 1426–1430. https://doi.org/10.1145/2858036.2858054

[29] Batya Friedman and Lisa P. Nathan. 2010. Multi-lifespan information system design: a research initiative for the hci community. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, 2243–2246. Retrieved from http://dl.acm.org/citation.cfm?id=1753665

[30] Batya Friedman and Daisy Yoo. 2017. Pause: A Multi-lifespan Design Mechanism. In Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems (CHI '17), 460–464. https://doi.org/10.1145/3025453.3026031

[31] Tony Fry. 2009. Design futuring. University of New South Wales Press, Sydney: 71–77.

[32] Julia A. Garde and Mascha C. van der Voort. 2014. Participants' view on personal gains and PD process. In Proceedings of the 13th Participatory Design Conference: Short Papers, Industry Cases, Workshop Descriptions, Doctoral Consortium papers, and Keynote abstracts - Volume 2 (PDC '14), 79–82. https://doi.org/10.1145/2662155.2662194

[33] William Gaver, Andy Boucher, Nadine Jarvis, David Cameron, Mark Hauenstein, Sarah Pennington, John Bowers, James Pike, Robin Beitra, and Liliana Ovalle. 2016. The Datacatcher: Batch Deployment and Documentation of 130 Location-Aware, Mobile Devices That Put Sociopolitically-Relevant Big Data in People's Hands: Polyphonic Interpretation at Scale. In Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems, 1597–1607. Retrieved September 26, 2016 from http://dl.acm.org/citation.cfm?id=2858472

[34] William Gaver, Andy Boucher, Michail Vanis, Andy Sheen, Dean Brown, Liliana Ovalle, Naho Matsuda, Amina Abbas-Nazari, and Robert Phillips. 2019. My Naturewatch Camera: Disseminating Practice Research with a Cheap and Easy DIY Design. In Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems (CHI '19), 1–13. https://doi.org/10.1145/3290605.3300532

[35] William W. Gaver, John Bowers, Kirsten Boehner, Andy Boucher, David WT Cameron, Mark Hauenstein, Nadine Jarvis, and Sarah Pennington. 2013. Indoor weather stations: investigating a ludic approach to environmental HCI through batch prototyping. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, 3451–3460. Retrieved from http://dl.acm.org/citation.cfm?id=2466474

[36] Alison Gerlach. 2018. Thinking and Researching Relationally: Enacting Decolonizing Methodologies With an Indigenous Early Childhood Program in Canada. International Journal of Qualitative Methods 17, 1: 1609406918776075. https://doi.org/10.1177/1609406918776075

[37] Mack Hagood. 2019. Hush: Media and sonic self-control. Duke University Press.

[38] John Hallett, Suzanne Held, Alma Knows His Gun McCormick, Vanessa Simonds, Sloane Real Bird, Christine Martin, Colleen Simpson, Mark Schure, Nicole Turnsplenty, and Coleen Trottier. 2017. What Touched Your Heart? Collaborative Story Analysis Emerging From an Apsáalooke Cultural Context. Qualitative Health Research 27, 9: 1267–1277. https://doi.org/10.1177/1049732316669340

[39] Lynn M. Harter. 2019. Storytelling in Acoustic Spaces: Podcasting as Embodied and Engaged Scholarship. Health Communication 34, 1: 125–129. https://doi.org/10.1080/10410236.2018.1517549

[40] Don Ihde. 1976. Listening and voice: A phenomenology of sound. Human Studies 1, 3.

[41] Ole Sejer Iversen and Christian Dindler. 2014. Sustaining participatory design initiatives. CoDesign 10, 3–4: 153–170. https://doi.org/10.1080/15710882.2014.963124

[42] Anja Kanngieser. 2015. Geopolitics and the Anthropocene: Five Propositions for Sound. GeoHumanities 1, 1: 80–85. https://doi.org/10.1080/2373566X.2015.1075360

[43] Lewis E. MacKenzie. 2019. Science podcasts: analysis of global production and output from 2004 to 2018. Royal Society Open Science 6, 1: 180932. https://doi.org/10.1098/rsos.180932

[44] Wendy Moncur, Miriam Julius, Elise Van Den Hoven, and David Kirk. 2015. Story Shell: the participatory design of a bespoke digital memorial. In Proceedings of 4th Participatory Innovation Conference, 470–477.

[45] Devi Dee Mucina. 2011. Story as Research Methodology. AlterNative: An International Journal of Indigenous Peoples 7, 1: 1–14. https://doi.org/10.1177/117718011100700101

[46] Harold G. Nelson and Erik Stolterman. 2003. The design way: Intentional change in an unpredictable world: Foundations and fundamentals of design competence. Educational Technology. Retrieved from https://books.google.ca/books?hl=en&lr=&id=ymDUJVwICmEC&oi=fnd&pg=PR9&dq=nelson+and+stolterman&ots=ZfPBc2Ne26&sig=7Hvt5Xc76br8Xt8vZqkQZfKZKEY

[47] William Odom, Richard Banks, Abigail Durrant, David Kirk, and James Pierce. 2012. Slow Technology: Critical Reflection and Future Directions. In Proceedings of the Designing Interactive Systems Conference (DIS '12), 816–817. https://doi.org/10.1145/2317956.2318088

[48] William Odom, Arne Berger, and Dries De Roeck. 2021. Co-Designing and Co-Speculating on Different Forms of Domestic Smart Things. In Rozendaal, M., Marenko, B., & Odom, W. (Eds.) Designing Smart Objects in Everyday Life: Intelligences, Agencies, Ecologies. Bloomsbury Publishing, 224–246.

[49] William Odom, Siân Lindley, Larissa Pschetz, Vasiliki Tsaknaki, Anna Vallgårda, Mikael Wiberg, and Daisy Yoo. 2018. Time, Temporality, and Slowness: Future Directions for Design Research. In Proceedings of the 2018 ACM Conference Companion Publication on Designing Interactive Systems (DIS '18 Companion), 383–386. https://doi.org/10.1145/3197391.3197392

[50] William Odom, Ron Wakkary, Ishac Bertran, Matthew Harkness, Garnet Hertz, Jeroen Hol, Henry Lin, Bram Naus, Perry Tan, and Pepijn Verburg. 2018. Attending to Slowness and Temporality with Olly and Slow Game: A Design Inquiry Into Supporting Longer-Term Relations with Everyday Computational Objects. In Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems (CHI '18), 1–13. https://doi.org/10.1145/3173574.3173651

[51] Ihudiya Finda Ogbonnaya-Ogburu, Angela D.R. Smith, Alexandra To, and Kentaro Toyama. 2020. Critical Race Theory for HCI. In Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems (CHI '20), 1–16. https://doi.org/10.1145/3313831.3376392

[52] Daniela Petrelli, Elena Not, Marcello Sarini, Oliviero Stock, Carlo Strapparava, and Massimo Zancanaro. 1999. HyperAudio: location-awareness + adaptivity. In CHI '99 extended abstracts on Human factors in computing systems - CHI '99, 21. https://doi.org/10.1145/632716.632732

[53] James Pierce and Eric Paulos. 2015. Making multiple uses of the obscura 1C digital camera: reflecting on the design, production, packaging and distribution of a counterfunctional device. In Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems, 2103–2112. Retrieved from http://dl.acm.org/citation.cfm?id=2702405

[54] John Richardson. 2004. Jonathan Sterne, The Audible Past: Cultural Origins of Sound Reproduction. Duke University Press, Durham & London, 2003. 450 pp. Paperback. ISBN 0-8223-3013.X. Organised Sound 9, 1: 117–119. https://doi.org/10.1017/S1355771804230151

[55] Dylan Robinson. 2020. Hungry Listening: Resonant Theory for Indigenous Sound Studies. U of Minnesota Press.

[56] David J. Roedl and Erik Stolterman. 2013. Design research at CHI and its applicability to design practice. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '13), 1951–1954. https://doi.org/10.1145/2470654.2466257

[57] Cara A. Samuel and Drexler L. Ortiz. 2021. "Method and meaning": Storytelling as decolonial praxis in the psychology of racialized peoples. New Ideas in Psychology 62: 100868. https://doi.org/10.1016/j.newideapsych.2021.100868

[58] Laura Scheepmaker, Kay Kender, Christopher Frauenberger, and Geraldine Fitzpatrick. 2021. Leaving the Field: Designing a Socio-Material Toolkit for Teachers to Continue to Design Technology with Children. In Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems (CHI '21), 1–14. https://doi.org/10.1145/3411764.3445462

[59] Donald Schön and John Bennett. 1996. Reflective conversation with materials. In Bringing design to software, 171–189. Retrieved from http://dl.acm.org/citation.cfm?id=230044

[60] Jesper Simonsen and Toni Robertson (eds.). 2013. Routledge international handbook of participatory design. Routledge Taylor & Francis, New York London.

[61] Jonathan Bentley Singer. 2019. Podcasting as Social Scholarship: A Tool to Increase the Public Impact of Scholarship and Research. Journal of the Society for Social Work and Research 10, 4: 571–590. https://doi.org/10.1086/706600

[62] Linda Tuhiwai Smith. 2019. Decolonizing research: Indigenous storywork as methodology. Bloomsbury Publishing.

[63] Linda Tuhiwai Smith. 2021. Decolonizing Methodologies: Research and Indigenous Peoples. Bloomsbury Publishing.

[64] Katta Spiel, Christopher Frauenberger, Eva Hornecker, and Geraldine Fitzpatrick. 2017. When Empathy Is Not Enough: Assessing the Experiences of Autistic Children with Technologies. In Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems (CHI '17), 2853–2864. https://doi.org/10.1145/3025453.3025785

[65] Gus Stadler. 2015. On Whiteness and Sound Studies. Sounding Out! Retrieved February 18, 2022 from https://soundstudiesblog.com/2015/07/06/on-whiteness-and-sound-studies/

[66] Erik Stolterman and Mikael Wiberg. 2010. Concept-driven interaction design research. Human–Computer Interaction 25, 2: 95–118.

[67] Nick Taylor, Keith Cheverst, Peter Wright, and Patrick Olivier. 2013. Leaving the wild: lessons from community technology handovers. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '13), 1549–1558. https://doi.org/10.1145/2470654.2466206

[68] Emily Thompson. 2004. The soundscape of modernity: architectural acoustics and the culture of listening in America, 1900-1933. MIT press.

[69] Barry Truax. 2019. Acoustic Ecology and the World Soundscape Project. In Sound, Media, Ecology, Milena Droumeva and Randolph Jordan (eds.). Springer International Publishing, Cham, 21–44. https://doi.org/10.1007/978-3-030-16569-7_2

[70] Daisuke Uriu and William Odom. 2016. Designing for Domestic Memorialization and Remembrance: A Field Study of Fenestra in Japan. In Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems (CHI '16), 5945–5957. https://doi.org/10.1145/2858036.2858069

[71] John Vines, Rachel Clarke, Ann Light, and Peter Wright. 2015. The beginnings, middles and endings of participatory research in HCI: An introduction to the special issue on 'perspectives on participation.' International Journal of Human-Computer Studies 74: 77–80. https://doi.org/10.1016/j.ijhcs.2014.11.002

[72] John Vines, Rachel Clarke, Peter Wright, John McCarthy, and Patrick Olivier. 2013. Configuring participation: on how we involve people in design. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '13), 429–438. https://doi.org/10.1145/2470654.2470716

[73] Ron Wakkary, Henry Lin, Shannon Mortimer, Lauren Low, Audrey Desjardins, Keith Doyle, and Philip Robbins. 2016. Productive Frictions: Moving from Digital to Material Prototyping and Low-Volume Production for Design Research. In Proceedings of the 2016 ACM Conference on Designing Interactive Systems, 1258–1269. Retrieved from http://dl.acm.org/citation.cfm?id=2901880

[74] Jayne Wallace, Jon Rogers, Michael Shorter, Pete Thomas, Martin Skelly, and Richard Cook. 2018. The SelfReflector: Design, IoT and the High Street. In Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems. Association for Computing Machinery, New York, NY, USA, 1–12. Retrieved February 1, 2022 from https://doi.org/10.1145/3173574.3173997

[75] Hildegard Westerkamp. 2006. Soundwalking as ecological practice.

[76] Sarah Marie Wiebe. 2019. "Just" Stories or "Just Stories"?: Mixed Media Storytelling as a Prism for Environmental Justice and Decolonial Futures. Engaged Scholar Journal: Community-Engaged Research, Teaching, and Learning 5, 2: 19–35. https://doi.org/10.15402/esj.v5i2.68333

[77] Shawn Wilson. 2008. Presentation: How We Transfer Knowledge. In Research is ceremony: Indigenous Research Methods. Fernwood Publishing, 122–125.

[78] Wissenschaftskommunikation. 2022. Forms of Science Communication. Retrieved from https://www.wissenschaftskommunikation.de/formate/

[79] MinYoung Yoo, William Odom, and Arne Berger. 2021. Understanding Everyday Experiences of Reminiscence for People with Blindness: Practices, Tensions and Probing New Design Possibilities. In Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems (CHI '21), 1–15. https://doi.org/10.1145/3411764.3445212

[80] John Zimmerman and Jodi Forlizzi. 2008. The role of design artifacts in design theory construction. Artifact 2, 1: 41–45.