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Sound as Cultural Memory: Participatory Immersive Audio Production for the Witness VR Environment

Kirk McNally[1] and Hayalthkin'geme (Carey Newman)[2]

[1]*University of Victoria, School of Music*
[2]*University of Victoria, Department of Visual Arts*

Correspondence should be addressed to Kirk McNally (kmcnally@uvic.ca)

ABSTRACT

This paper presents a case study of the Witness Blanket VR project, examining how immersive audio production workflows can support Indigenous-led safeguarding of intangible cultural heritage within virtual environments. Motivated by UNESCO's resolution on the importance of sound, the project applies Indigenous epistemologies of listening to investigate how spatial audio can communicate cultural, behavioural, and relational dimensions of sound for diverse audiences. The VR adaptation of Carey Newman's Witness Blanket incorporates Ambisonic recordings of natural environments, Indigenous cultural sounds, and community-contributed materials, rendered and spatialized in relation to virtual objects. The paper details the participatory process through which sound assets were gathered and outlines production decisions shaped by Indigenous cultural protocols. User experiences from three community-engaged events inform an interpretive analysis of "listening with," emphasizing ethical, relational modes of auditory attention. Findings demonstrate how VR can function as a community-oriented space for cultural memory and immersive, protocol-informed listening.

1 Introduction

The original, analog version of the Witness Blanket [1] was created as a response to the Truth and Reconciliation Commission of Canada's call for Commemoration Initiatives. It is made from over 880 objects, documents and photographs gathered from residential schools, cultural centres, churches and government buildings from across Canada. Measuring 40' long and 10.5' tall, the installation was completed in 2014 and is now in its long-term home at the Canadian Museum for Human Rights, see Fig. 1.

The VR adaptation re-creates the blanket, and adds a spatial, interactive environment in which listening becomes a mode of ethical engagement grounded in care, consent, and responsibility. This combination of art, VR technology and sound represents an approach to engaging critical thought and awareness about truth and reconciliation. This is an ongoing need because despite a comprehensive Truth and Reconcilliation Commission Report and 94 Calls to Action, as well as thousands of testimonials documenting residential school



Fig. 1: Original Witness Blanket large-scale art installation, photo courtesy of Carey Newman

Survivor experiences, residential school denialism is on the rise [2] in Canada and beyond [3].

First-order ambisonic recordings of natural environments [4], a modular, nonlinear soundtrack, Indigenous cultural sounds and sounds contributed by Indigenous community members were rendered into immersive formats and placed in relation to virtual objects on the Blanket. The use of the sounds then model what Robinson terms "listening with," a mode of attention that honours the cultural, ceremonial, and affective dimensions of Indigenous sound practices [5].

Inspired in part by the UNESCO resolution, "The importance of sound in today's world: promoting best practices [6], the project examines how sound carries cultural meaning and how it helps preserve and shape the behaviours and understandings of both Indigenous and non-Indigenous people.

Unlike research focused on accurately reconstructing the acoustics of archaeological or historical sites [7][8][9][10], this work investigates how VR can support community led storytelling, intergenerational knowledge transmission, and the ethical stewardship of cultural memory. The participatory process through which Indigenous contributors shared sound assets, adds to the literature on crowd sourced approaches to cultural heritage [11].

2 Methods

This study employs a qualitative single-case study design following Yin's [12] methodological framework and is focused on the process used for sound contributions from Indigenous community members, the response to the approaches used to assign sounds with virtual objects, and the reception of the work at three community-engaged events. Case study data includes meeting notes, email correspondence, form responses collected as part of the sound contribution process, audience observations, and critical reflections by the project principles.

2.1 Sounds and technology solutions

The sound design for the WBVR project consists of three components: first-order ambisonic ambiances that represent the different geographical regions of Canada; modular, nonlinear soundtrack by Anishinaabe composer, Olivia Short; sound contributions from Indigenous peoples including songs, voice memos, historical recordings and stories. The project was created using the Unreal Engine 5 software, with pre-processing of audio cues using Reaper and spatial mixing and binauralization of the soundtrack using IEM ambisonic plug-in suite. Binauralization of all other audio assets was done using the built-in Unreal engine plug-in.

2.1.1 Sound collection

A call for sound contributions was designed using Indigenous protocol and teachings from the original Witness Blanket collection process, which is based on the Kwakwaka'wakw principle captured by the Kwakwala word *maya'xalapa*, meaning to be respectful of all things, including self and others. The call was made public in June 2023 using a press release and personal networks, which was then amplified through the media attention the project garnered. To promote Indigenous cultural resurgence, the contribution form asked to identify Indigenous identity (First Nations, Inuit, Métis) and specific community and cultural connections, and



Fig. 2: Yellow ceramic bowl, contributed by Sharon Edmonds, Northwest River (Yale) Residential School, NL

if known the geographical origin of the sound or where it was recorded. The opportunity to provide a story, personal account, or identify the cultural significance of the sound contributions was also given. In addition, they were given the opportunity to consent to the level of modification permitted in post-production. The following excerpt from the form instructions illustrates the guidance provided regarding the nature of the sound contributions:

"This initiative builds on the work of the Witness Blanket. The original is made of objects gathered from residential schools, churches, government buildings, and cultural structures. In the same way that we gathered the objects themselves, we are collecting sounds of the very cultures that were targeted by residential schools. We will then use these contributions to create the sounds that people hear when they interact with the VR Witness Blanket."

Personal networks were also used to engage potential contributors and recording sessions in Victoria, BC, Toronto and Nipissing, ON were coordinated as another opportunity for Indigenous community members to provide sound contributions.

2.1.2 Sound placement

Given the diverse nature of the objects that make up the Witness Blanket and because of the traumatic history they represent, great care was taken with regard to the placement of sound contributions and the sonification of artifacts appearing on the blanket. In an effort to not re-traumatize residential school Survivors and encourage discovery, inquiry and critical thought by both Indigenous, but importantly, non-Indigenous audiences, literal sound-design choices i.e., the school bell when interacted with makes a school bell sound, was avoided.

To enact Robinson's concept of "listening with" a relational mode of sonification was used where objects were connected to thematic narratives, or Indigenous epistemologies of sound were embedded into the sonification of objects. For example a bowl, see Fig. 1, was paired with a story from a survivor about their experience with food at residential school, rubble from demolished residential schools were paired with rattle sounds, used for ceremony in Indigenous cultures, and a single hand drum beat – which represents the heartbeat – is used as a sound effect when the virtual bricks, stones or other materials from government buildings are returned to the blanket after being interacted with in the VR environment.

In other instances, songs were contributed by Indigenous artists and these were named for objects on the blanket, often of striking visual impact. These connections were honoured and signal to the audience that sound and song in Indigenous culture has emotional, ceremonial, and cultural weight, not just aesthetic or informational value. Through both these approaches sound is not treated as material to be consumed but as something encountered in relationship with Indigenous people and their histories. The intentional juxtaposition of non-literal sounds with virtual objects further creates the condition for Robinson's "listening with" and asks the audience to listen with communities, stories, histories and places.

2.2 Community engagement

The WBVR project was demonstrated on three separate occasions and at various stages of design and development to both Indigenous and non-Indigenous community members. These engagement opportunities prioritized Indigenous audiences, including residential



Fig. 3: Basil Amber's hat, contributed by Matthew Amberse, Private collection, BC

school Survivors, and provided an opportunity to test interactions and hear feedback on the WBVR project. Guidance and assistance was provided to all users by the authors, which provided for immediate feedback and direct observations of in-situ responses to different aspects of the project. This mode of participant observation created opportunities for so-called significant or revelatory moments [13]. The three engagement events are listed below:

- *Considering Sound in Relation: The Witness Blanket VR experience*, Listening-With an Open Space off-site program, Baumann Centre, Victoria, BC, May 24, 2024.
- *Across Lands and Waters*, a gathering of Heather Igloliorte, Canadian Excellence Research Chair in Declolonial and Transformational Indigenous Art Practices, University of Victoria, Victoria, BC, May 1, 2025.
- *The Witness Blanket VR Experience*, as part of the Sounding Grounds festival, University of Victoria, BC, February 1, 2026.

3 Results

3.1 Indigenous sound contributions

Fourteen individuals contributed sounds to the WBVR project using the online form, all identified as Indigenous. A larger number of sound contributions resulted from the requests made through personal networks and the sound recordings opportunities that were organized. The technology, and process of uploading sounds was identified as a barrier by some contributors, particularly elders and Survivors. In total, the WBVR includes 185 discrete sound contributions, excluding the soundtrack and ambiances.

To illustrate the reasons for contributing and the choice of sound, examples from the online form include:

"Lac des mille lacs is where I feel peace. I need to hear the water, the trees every week, so that I can live in a good way, when I am in the city. The noise and smells from the city make me feel anxious. I chose this because I like to remember my children and how much joy they felt when playing and swimming in the water. I think this made my grandparents happy, and it makes me happy."

"A story about the experience of having one's hair cut in residential school, and the different stages of processing emotions, both crying and laughing."

Only one individual did not provide consent for their sound contribution to be modified in post-production. Of note, this individual contributed a song, and when describing the source they indicated that they were, "*given* the song by another Indigenous community member," and as such wished it to remain intact, and asserts Indigenous protocol regarding the use and transmission of songs.

The majority of sound contributions were in two categories: musical ie. songs, instrumentals, or individual sounds made with instruments; and narrated stories or oral histories. Examples of other sounds contributed are listed below:

- Scraping of moose hide
- Wood carving
- Environmental, e.g., water, wind, footsteps in snow, fire
- Archival, e.g., phone messages, archival recordings, documentary audio

3.2 Sound placement and mappings

As outlined in section 2.1.2 the placement of sound in this project was relational, and intentionally non-literal with regards to the sonification of virtual objects. The one exception to this guiding principle was the hand



Fig. 4: Drum and drumstick, contributed by Kwikwetlem First Nation, Kwikwetlem First Nation, BC

drum, see Fig. 4. The drum was designed as an interaction within the VR environment, where users could pick-up the beater and virtually play the drum. It was observed that, as an identifiable musical instruments on the blanket, it did attract significant attention by users. This attention was likely reinforced because the drum is in a visually prominent location on the blanket, and because of the cultural significance the drum represents for both Indigenous and non-Indigenous peoples.

The reception of the relational, non-literal use of sound did not result in significant comments, questions or indications that users found the approach challenging. In general, once comfortable in the environment and having learned the navigation and interaction potential, users appeared quite willing to accept the approach used. Feedback received from users who attended the community engaged events appear to support this, and in particular focus on the stories and narrative elements used in the project,

*"We remember seeing the Witness Blanket in person in Victoria some years ago and now can spend more time learning about the **stories** through the moving VR version that you have created"*

*"A profound way to engage with the artifacts and **testimonies**.*

3.3 Public response

The three community engagement events provided the opportunity for observation of participants, both Indigenous and non-Indigenous, while interacting with the WBVR project. In the majority of cases, the participants were either new to virtual reality, or had limited experience with this type of technology. As noted, guidance and assistance were provided for all users, and through observation and upon reflection, this resulted in a pattern of directing users towards the most engaging interactions, followed by a process of fading, where users were left to explore the blanket independently. It was observed that users returned to these visually rich interactions, but as noted above, it was the songs, stories and narrative elements that appeared to engage users in a more lasting fashion.

For Indigenous participants there was a strong response to the use of Indigenous language in the WBVR project. The largest and most diverse group of Indigenous people attended the second community engagement session, *Across Lands and Water* hosted at the University of Victoria. Sound contributions in Indigenous languages include songs, archival recordings from radio broadcasts and single words that function to translate written English words into Kwak'wala. Reactions to interacting with these sound elements included an offer to record other words in Inuktitut, questioning the number of languages represented and who the individuals were who contributed.

4 Discussion

Soliciting sound contributions using the public, online form did not prove as effective as contacting contributors through personal networks and by inviting elders and residential school Survivors to recording sessions. These personal connections and direct engagement mirrors the experience of making the original blanket, where relationality and trust are critical to engaging contributions. The opportunity to contribute via the organized recording session also removed technology barriers.

With regards to the motivations of contributors, the WBVR project adds the dimension of truth telling as an intrinsic motivator, which combines with the social motivations of connectedness or membership, or sharing and generosity that has been identified as common reasons for engaging users with other crowdsourced



Fig. 5: Dr. Mique'l Dengali interacts with the hand drum inside the WBVR project

projects [11]. Many Survivors are committed to ensuring that history does not repeat itself, so sharing and preserving the truth of their experiences in residential schools is a primary motivator for their participation.

The element of storytelling and song was found to be very engaging and effective as sound material in the WBVR project. Agrawal et al.[14] have identified that complex, well well-developed narratives aid in immersion for users in audiovisual experiences. Although not formally tested, the WBVR narrative – the telling of the history of residential schools – which the individual stories, songs and testimonies contribute to, appeared to be engaging and understood by participants.

The concept of Robinson's "listening with" was particularly evident in the different responses to the same sounds from Indigenous and non Indigenous people. In one poignant example, it was observed that most non-Indigenous listeners had a somewhat lighthearted response to laughter that is connected to a section of ceiling tile appearing on the blanket. However, understanding the strength and power of laughter as a means of healing, one young Indigenous man was overcome by emotion after hearing it for the first time. Some sounds, such as words or songs in Indigenous languages operate on different levels for Indigenous and non Indigenous users. Where Indigenous users are uplifted by hearing excerpts of traditional language, non Indigenous users are offered a moment to listen, learn and reflect on a time when children were punished from speaking those very same languages. The VR environment provided a fertile ground to explore and engage with this mode of listening. One that emphasizes that the auditory experience is not a one-way extraction of sound by a passive listener. Instead, the sonic encounter is an active relationship between the listener and the "listened-to."

5 Summary

This study examined the Witness Blanket VR Experience as a case study in Indigenous-led immersive audio production. The project integrated first-order Ambisonic ambiences, a modular non-linear soundtrack, and 185 community-contributed sound assets to support culturally grounded modes of listening within a virtual environment. As described in the paper, sound placement followed a relational, non-literal strategy informed by Indigenous epistemologies of listening, avoiding representational cues that could risk retraumatization and instead emphasizing thematic, ceremonial, and narrative associations. Observations of users and their responses gathered across three community-engaged events indicate that participants accepted this approach and engaged most strongly with the songs, narrative and story-based elements of the experience. The findings suggest that VR can function as an ethically grounded, community-oriented space for cultural memory, and that participatory sound workflows offer a viable method for embedding Indigenous cultural protocols into immersive audio design.

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