

The Sensual Experience of Waterways Immersive Exhibition: Applying the Visual Matrix Evaluatory Method

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Abstract

This paper describes the sensory and emotional responses provoked by “Waterways: Past, Present and Future,” an immersive digital exhibition exploring human water relations in the Okanagan valley in Canada. It posits that the exhibition transcends traditional digital media displays by creating a deeply embodied and visceral interaction with the theme of water through sight, sound, and suggested tactility. Applying the visual matrix evaluator method, we discern that the exhibition captures the profound sensory engagement of participants, highlighting how the exhibition facilitates access to the emotional and cultural significances of water. We find that the exhibition not only amplifies the sensory experience of visitors but also resonates with Indigenous epistemologies that celebrate the interconnectedness of life and the holistic acquisition of knowledge. The findings illustrate that Waterways acts as a sensory catalyst that evokes a deeper cognitive and emotional awareness of water’s centrality in ecological and cultural continuums. The paper underscores the value of sensual ethnography in environmental understanding and the integration of Indigenous perspectives in contemporary museology, advocating for an enriched, inclusive dialogue on immersive exhibition design and evaluation.

Keywords

Digital media museology, sensual ethnography, visual matrix method, immersive exhibition evaluation, Indigenous epistemologies, water stewardship.

Introduction

Artistic expression across diverse mediums has become a pivotal means for raising awareness and fostering public engagement with the complex issue of climate change, underscoring the vital role of semiotic and phenomenological visual and interactive methods. Educational video games for example, have been used to catalyze reflection and dialogue, particularly among youth [1-3]. The visual arts, through installations such as Eliasson’s “Ice Watch,” offer a tangible encounter with the impacts of global warming [4], while the film industry, with documentaries such as Gore’s “An Inconvenient Truth” has contributed to popularizing the discourse [5]. In literature, the cli-fi genre, exemplified by Atwood’s “MaddAddam” trilogy, imagines the lived realities of future climates [6] and the performance arts, with initiatives such as the Climate Change Theatre Action and Adams’ symphony “Become Ocean,” has leveraged the emotive power of performance to communicate climate

narratives and represent the grandeur and fragility of nature [7] [8]. Similarly, public and digital art forms, along with artistic activism by groups such as Extinction Rebellion, use public spaces and digital innovation to create impactful, participatory experiences [9]. Thus, by communicating the science of climate change in culturally resonant ways, these artistic endeavours have served not only to inform but also to galvanize a collective response to the existential challenge of climate change.

Evaluating the impact of artistic expressions presents an intricate blend of challenges that complicate the research process, demanding evaluative methodologies that can navigate the individual and cultural diversity of experiences [10]. To address these complexities, evaluators have employed a multiplicity of research tools, including surveys, in-depth interviews, and focus groups [11]. Observational research can shed light on behavioural engagement with the exhibit, capturing non-verbal cues and interactions with the sensory elements of the art [12]. The transient and intimate nature of sensory experiences, however, often demands that these traditional approaches be augmented by more innovative techniques that strive to construct a nuanced picture of the museum-goer’s sensual experience, despite the challenges posed by the deeply personal and ephemeral qualities of sensory engagement with art [13]. Visual matrix, a qualitative group-based research method that employs visual stimuli to examine collective emotions and experiences, is one such method [14-16]. With its focus on imagery, visualization, and affect rather than discourse, it facilitates the emergence of individuals’ “unthought” dimensions to come to light within a collective setting.

Applying the visual matrix method, this paper outlines the results of an evaluation of the *Waterways: Past, Present, and Future*, a digital media museum exhibition that explores the diverse meanings and common interests of water in British Columbia’s Okanagan Valley, Canada. The paper has two aims: (1) to examine the exhibition’s effect on the sensory and emotional engagement of participants; and (2) to solicit participants’ feedback on the effectiveness of the visual matrix method.

Conceptual Background

In the expanse of contemporary scholarship, three concepts—Digital Ethnography, Sensual Ethnography, and Landscape/Environmental Aesthetics—form a vibrant mosaic that articulates the human experience in the digital age.

These domains, though distinct in their focus, are interconnected through their exploration of culture, sensation, and the environment, engaging deeply with Indigenous scholarship. This intricate connection informs our understanding of how these scholarly arenas are both influenced by and influence the intersection of technology, sensual experiences, and ecological consciousness.

Digital Ethnography capitalizes on the surge of digital technologies to delve into and convey cultural phenomena. Embracing audiovisual media, this field enriches the portrayal of human experiences, intertwining being, knowledge, and practice. As Howard and Mawyer [17] note, it dissolves traditional research confines, facilitating deeper insights into the digital threads woven into the cultural fabric. Underberg and Zorn [18] further suggest that digital media not only depicts but also engages audiences with cultural experiences, reflecting an integrative approach. This synthesis of technology, ethnography, and artistry is vividly displayed in interactive museum exhibits, epitomizing the co-evolution of technology and cultural expression within the expansive landscape of media ecology.

Anthropology has increasingly focused on multimodal media [19, 20] and the senses [21-23]. Sensory ethnography is a research method in anthropology and related social sciences that emphasizes the use of the senses as a key aspect of the ethnographic experience and data collection. As an emerging trend, sensory ethnography studies sensual and multimodal experiences. As an approach to inquiry, it enables researchers to be attentive to how participants as collaborators express knowledge in sensual and nonverbal ways. This practice encourages researchers to be fully attuned to the sensory aspects of being, knowing, and doing, challenging them to find novel ways to observe, record, and represent cultural knowledge. Scholars like Sarah Pink have stressed the need for anthropological representations that encapsulate embodied experiences, employing tools like audiovisual media to enhance traditional written narratives.

The obstacles this presents are complex, as they involve capturing and expressing the full spectrum of human sensory experiences within cultural studies. To address these challenges, anthropologists are exploring diverse methods such as writing, visual arts, and experiential design to achieve comprehensive ethnographic representation. The shift towards public-facing and interdisciplinary scholarship has encouraged collaborations across fields like ethnography, digital media, and computational science, fostering the development of immersive and accessible sensory ethnographic work. These collaborations are particularly pertinent in creating participatory media for environments such as museum exhibitions, where they can facilitate engaging, culturally sensitive experiences for wider communities.

Sensory ethnography and Indigenous epistemologies converge in multiple ways [24, 25]. Both prioritize experiential knowledge and holistic learning, for example, that engages all senses with the environment. Similarly, they both emphasize non-verbal communication and material culture in understanding and perpetuating cultural narratives and share a profound respect for the role of place, acknowledging how

physical and spiritual connections to the land shape cultural perceptions and stories. Storytelling, a key component of knowledge transmission in Indigenous communities, is also central to sensory ethnography, which uses narratives to reveal cultural identities and values through sensory experiences. These methods prioritize a relational approach to knowledge, recognizing the dynamic interplay among individuals, their communities, and their environments. They advocate for immersive, community-focused research that challenges Western linear time concepts in favour of cyclical time, essential to grasping cultural phenomena. Both value intangible knowledge like emotions and spirituality, offering a comprehensive cultural perspective, as well as critiquing dominant epistemologies by bringing to light diverse and often overlooked ways of knowing.

Media art's challenge in depicting sensual knowledge is tied closely to aesthetics, a principle that governs our sensory engagement with the world and appreciation of beauty [13]. This concept highlights the impact of our sensory interactions with the environment, prompting a reawakening to beauty that can inspire ecological stewardship, as exemplified by the iconic Earth image from space, which invokes a sense of global responsibility. Gregory Bateson's work advocates for a fusion of aesthetics, ecology, and spirituality, proposing that recognizing life's sacred patterns through aesthetic experience can foster an ecocentric ethos and deeper ecological comprehension [26]. Similarly, John Dewey views the aesthetic as an everyday experience that connects us to our environment, with the potential to drive societal change through a cultivated sensibility to the natural world around us [27].

The Waterways Exhibition

“Waterways, Past, Present and Future,” – referred to hereafter as Waterways – is a museum exhibition on human-water relations in the Okanagan valley of British Columbia (BC), Canada. Waterways was carried out on the territory of the Syilx (Okanagan) First Nation, a transboundary tribe separated at the 49th parallel by the border between Canada and the US that has resided in this region for time immemorial. The Syilx people have an intrinsic relationship with water, equating water with life and considering water their sacred relation, which they have an obligation to protect and steward [28]. The Waterways inquiry and exhibition was aimed at highlighting Syilx water values in the context of the past, present and future of Okanagan waterways.

Spatially, the Waterways installation includes a circular inner space comprising video screens that feature continuous accounts from Syilx Knowledge Keepers and Western experts discussing the meaning of water and water stewardship (see Figure 1). The narratives are superimposed with audio and video clips of Okanagan water, land, and soundscapes. The exhibit combines portable physical installation infrastructure design, audio-visual media, storytelling, flexible computational compositions, and 3D immersive visualizations that overlay the past with the present to reveal seeds for resilient futures. Immersion is achieved through flexible



Figure 1. Waterways installation view.

aural, visual, textual, and imaginary media weaved into a portable spatial infrastructure. All elements were collaboratively created through a community-engaged process, following, and celebrating the most impressive Indigenous-led restoration initiatives in the Okanagan.

Sensual ethnographic strategies were used to select the topics, collect data, record, analyze, and edit media, and present and evaluate an immersive exhibit. The resulting work provides a sensual space to reflect on challenging concepts of water and water stewardship through a close look at the waterways that sustain us, the responsibilities we hold for our water, and the ways we govern reflected in our values and worldviews. We articulate methodological, compositional, and reception challenges and opportunities in integrating hybrid computational media experiences within the exhibition.

Methods

The Waterways evaluation consisted of two sessions at the Kelowna Heritage Museum held in February and March 2022, with eight and 13 participants, respectively. Participants included members of the public, water experts from the Indigenous and non-Indigenous communities, and members of the academic community – a diversity that reflected the target audience of the exhibition. The evaluation comprised of a four-step process:

- Participants gathered and viewed the exhibition, including the inner circle of land and soundscapes and an outer circle that included 3D visualizations of the region and Indigenous didactical presentations. Participants were encouraged to reflect on the components of the exhibit and stimulate their own associations and images in preparation for the visual matrix exercise that would follow. This portion took about 30 minutes.
- Participants sat in a campfire-style full circle with an imaginary firepit in the center (see Figure 2). This configuration diverged from the Visual Matrix method, which suggests a snowflake seating aimed at preventing participants from gazing at and engaging with other participants [14]; however, the circular sitting arrangement was more in line with Syilx ways of convening. To overcome the tendency to observe others, participants

were asked to close their eyes as they reflected and spoke. To initiate the process, participants were prompted with “*if you let your mind wander, what mental images, associations and feelings arise?*” Participants were asked explicitly to avoid judgment and opinion, eye contact, and discussion with others. This portion took about 60 minutes.

- A post-matrix session was held in the same circle, where participants commented on the evaluatory experience, including if and how they benefited, and if they experienced any discomfort or negative associations. Participants were asked to contribute emergent ideas by metaphorically “throwing thoughts in the firepit.” This portion took about 15 minutes, which despite its time limitations, offered the advantage of fostering immediate, diverse, and culturally sensitive reflections on the method.
- Following the evaluation exercise, researchers met to discuss their initial and overall impressions, feelings, and thoughts from the evaluation exercise.

Sessions were transcribed, and thematic analysis was conducted. As described by Braun & Clarke [29], the thematic analysis method offers an accessible and theoretically flexible approach to analyzing qualitative data compared to other methods. The analysis broadly followed Braun & Clarke’s phased method to generate, view, and analyze themes, which was carried out in a reflective and iterative process between phases [30].

Findings

The evaluation of the visitors’ experience distilled a rich tapestry of insights into our connection with water, woven through several underlying concepts. The indispensable nature of water to life and its capacity to stir deep emotional responses was evident. Concerns about sustainability and the implications of human impact on water systems underscored a shared sense of guardianship for this precious entity. The art’s multisensory engagement was lauded for fostering communal contemplation and a deeper grasp of



Figure 2. Participants sitting in a circle reflecting their reactions after viewing the exhibition.

water's complexities. Additionally, visitors acknowledged water's omnipresence in various forms and cycles, urging a broader awareness of its hidden yet vital roles. Emotionally, the exhibition struck a chord, highlighting the role of collective emotional investment in water conservation and the way our feelings towards the environment shape our actions. Together, these reflections form a narrative of reverence, responsibility, and emotional engagement with the world's water systems (see Figure 3 for examples of images viewed by and reflected on by participants).

Water as life

Visitor feedback highlights a deep connection to water, recognizing it as a fundamental element that is vital to life and imbued with both practical and spiritual significance, consistent with Syilx values. Water is revered not just as a necessity for survival but as the lifeblood that weaves through the fabric of existence, connecting all forms of life with its sustaining presence. It is celebrated as a dynamic force, fostering vitality and unity across diverse ecosystems. The exhibition prompted participants to reflect on water's profound role in their own lives, provoking emotional and introspective responses that underscore its intrinsic value beyond mere utility and its powerful influence on individual and collective identities. Some reactions included:

- “Water is much like a living being; it is constantly moving; constantly moving through time and space and changing its form from solid to gas and constantly permeating different mediums.”
- “As water moves and changes, it provides life for everything that is living and we need to slow down to open up to this sensation of beauty.”
- “When I reflect on the image of the waterways, the Syilx concept of living water, water as a sentient being, comes to mind....It also provides connections among all life. We are partly made out of water and water is part of our environment.”
- “Full immersion in Okanagan Lake has a sense of fullness in the summer. There's no sound other than your heart beating. And you enter a different world with a sense of unique spiritual experience.”

Responsibility to Water

Participants reflected an acute awareness of the critical challenges posed by climate change and the vital need for water responsibility. Comments reflected the urgency of addressing these challenges, acknowledging the importance of safeguarding water for current and future generations, preserving ecological integrity, promoting equitable access to clean water, and mitigating the impacts of climate change. The experiences and concerns shared by participants, such as dealing with droughts and erratic weather, highlight a shared apprehension about the escalating impacts of climate change in the Okanagan. Feedback shared reflects the sensual experience of Waterways as it relates to climate change and responsibility to water, for example:

- “This past spring and summer, we had a drought here in the Okanagan. It was hard to function in that environment. I'm becoming very aware of my personal need for water, but I could see the suffering in plants and in other animals, birds panting because they didn't have enough moisture.”
- “The heat from last year was scary. The drought was scorching. The fisheries were closed. Blue herons in Vernon were suffering. And we're dealing with floods one year, and then fires and droughts in another, sometimes even in the same year, and this is scary.”
- “The image of the waterways as bloodlines of the land we live in can act as a connective element for all life. It calls us to take responsibility for the water we share. Responsibility for understanding the ways of the water.”
- “The idea is that there is a responsibility to know those plants, to know those animals, to know where they live, to know how they live, and know how to use them and how to harvest them; it isn't necessarily a responsibility only for Syilx people.”

The exhibition profoundly impacted participants, invoking a sensory experience that transcends mere visual observation, as they report feeling the textures and atmospheres of the water and landscapes. The art immerses them, recalling personal connections to water's dual nature—tranquil yet formidable. These shared sensory encounters foster a community, uniting visitors in reflection on water's complex roles.

- *“I felt immersed... It reminded me of diving into the lake... You enter a different world with a sense of unique spiritual experience.”*
- *“Water is, at times, peaceful, calming, soft and healing. Other times it is frightening and powerful.”*
- *“It brings me back to being a kid in a canoe with my dad and my brother in Ontario in Algonquin territory and being on a lake that was a beautiful, calm, gentle feeling, and the wind came up, and suddenly that same water was threatening and scary, terrifying.”*

Evoking Feelings and Emotions

Waterways elicited strong emotional responses within the group, emphasizing the collective nature of both the experiences and the responsibility towards water conservation. It inspired shared feelings of joy and healing, especially poignant in experiences such as the refreshing rain after drought. This collective joy underscores the emotional connections people have with water and the natural world. Moreover, the idea of collective love for water is proposed as a catalyst for its protection. Visitors resonate with the exhibition's ability to provoke a range of emotions, from joy to anger, fostering a deep aesthetic appreciation for nature and a connection to water that extends beyond the visible, into the emotional and spiritual realm.

- *“The day that it rained after that long drought. That switch between that oppressive hard feeling of the suffering of beings deprived of water in the summer, moving into a feeling of just utter joy of rain. Feeling the rain and smelling the earth, the soil, bacteria, the plants.”*
- *“The idea is that if we can fall in love together with our waters, natural habitats, places, and the land where we live—we can protect it. Protect what we are in love with.”*
- *“I think there's something very wonderful about the slowness of the exhibit, the attention to detail and the quietness of images and sounds, that allows space to feel and love in contrast to an often otherwise overwhelming sense of anger or sadness.”*

The Visual Matrix as an Evaluatory Method

Participants' feedback on the evaluation experience suggests that the visual matrix method is an effective collective, sensory-driven approach for evaluating the Waterways exhibition, enhancing communal reflection and engagement, transforming individual experiences into shared insight, and fostering emotional connections and communal narratives about water. Participants noted the method's capacity to

draw out profound personal associations with water: *“You get so much more out of the experience... What did other people feel? See? Hear?... Many beautiful images of water came forward...”* Others commented that the method nurtures a dual benefit, enriching participants while contributing to a community's collective wisdom: *“While I hope you got something out of it... we also got something out of it... it is also about being together in a community.”* Furthermore, the group dynamic encouraged a holistic view of the exhibition, valuing collective intelligence and emotional responses over individual cognitive interpretation, for example: *“This process allows for group intelligence... I find that valuable because I see how people read the installation and images.”*

Interestingly, the freeform and organic nature of the visual matrix approach paralleled the exhibition's fluid subject of water, supporting a natural and dynamic exchange: *“I liked this freeform process... it also felt organic because we are surrounded by all these organic images.”* Physical sensations and emotional reactions took precedence over cognitive analysis, leading to a holistic understanding of the exhibition's impact: *“What I liked about the process... we dealt with the physical sensations of the show and the power of the images we developed together.”* A non-judgmental, free-flowing dialogue space reflects the fluidity of water, fostering creativity and openness: *“You called this process an image matrix... I think that this provided an open space in which participants are not feeling judged... to create together images in the circle.”* Finally, a few participants commented on the value of silence for personal reflection, balancing environmental urgency with a space for emotional respite: *“I'm used to thinking about environmental issues here with a lot more urgency and anguish... Those moments of silence allowed us to be alone with our thoughts...”*

In short, according to the Waterways experience, the visual matrix method was not merely a tool for evaluation but a reflective experience that resonated with the essence of the exhibition. It provided a communal sensory platform that was as fluid and transformative as the water it sought to represent, ensuring that both individual voices and collective insights could be heard and valued in the continuous dialogue.

Discussion

Our findings suggest that digital platforms such as Waterways provide a unique and effective approach to representing cultural encounters by weaving together affect, cognition, and meaning. In the realm of cultural anthropology and ethnography, such collaborations between artists, anthropologists, and computational experts are expanding the modes of communicating knowledge about people, habitats, and places, which are so central to issues such as climate change and sustainability. These joint efforts give rise to sensual experiences that are increasingly evident in the dynamic settings of galleries and museums, illustrating an expanded sensorium of ethnographic knowledge that articulates cultural meanings in vibrant, interactive formats.

Drawing cross-cultural insights on human-water relationships in the Okanagan, the exhibition emerged as a rich tapestry of sensual media, shaping both composition and reception. Howard and Mawyer's [17] classification of digital ethnography helps locate how this approach is used in the collaborative Waterways research and exhibition design, underlining how digital advancements in human-computer interaction and affective computing embody the sensual complexity of cultural experiences. This trend toward sensory ethnography enables researchers to remain acutely attuned to how knowledge is expressed by participants in sensual and nonverbal manners. Moreover, in the realm of media art, the challenge extends into the aesthetic domain in terms of how to aesthetically represent the sensual knowledge encountered and gathered through ethnographic practice. Within the Waterways exhibit, this focus narrows to an aesthetic contemplation of water, as expressed by evaluation participants and revealed by the environmental context of the Okanagan.

The integration of sensory ethnography with Indigenous ways of knowing promises significant advancements in scholarly research. This cross-disciplinary approach not only equips researchers with innovative tools but also deepens the cultural resonance of academic inquiry. It extends ethnographic boundaries and champions a recognition of Indigenous intellectual traditions that align with principles of equity and respect. As we navigate the intricate interplay between the sensory and the cognitive, these methodologies are crucial in finding pathways toward more inclusive, collaborative, and holistic research paradigms.

The visual matrix method applied to the Waterways exhibition created a conducive environment for dialogue and fostered a comprehensive appreciation of water's multifaceted significance. It also served as a powerful catalyst for collective interaction, sparking a rich exchange of knowledge, insights, and emotional connections. By bridging the sensory with the cognitive, the visual matrix method augmented intellectual engagement with academic content and enhanced the emotive resonance within a participatory audience. Importantly, it was effective in transcending beyond an evaluative tool in Waterways to serve as a reflective experience, fluid and transformative, akin to the water it aimed to represent.

Based on findings from the Waterways evaluation, we suggest that future immersive exhibitions consider interdisciplinary collaborations that are place-based and blend art, anthropology, and technology while ensuring cultural and environmental sensitivity. Integrating sensory ethnography and interactive technologies can create rich, multisensory experiences that engage both the senses and the intellect, making complex themes like sustainability palpable and engaging. Balancing immersive sensory engagement with cognitive insights and incorporating participatory methods to foster reflective dialogue and emotional resonance is another important consideration. Our experience also emphasizes inclusivity, including Indigenous ways of knowing as appropriate to the exhibition's context, which enriches the narrative and respects diverse intellectual traditions. Finally,

establishing feedback mechanisms will ensure that exhibitions remain relevant, impactful, and respectful of the themes and communities they represent.

Conclusion

The evaluation of the Waterways exhibition using the visual matrix method provides evidence of the enriching potential of sensory ethnography in articulating the nuanced relationship between humans and water. Through the creation of digital media and art, Waterways enhances our understanding of cultural experiences, connecting affect, cognition, and meaning in a tapestry of human-water interactions. The collaborative synergy between disciplines, which bridged art, anthropology, and technology, transcends traditional communication forms, inviting audiences into a multi-sensory engagement that deepens the resonance of ethnographic narratives within museum spaces.

The Visual Matrix method proved effective in the evaluation of the cultural imaginaries of Waterways, demonstrating its potential to unlock deeper insights into the sensory dimensions of digital artistic installations. This reflective and immersive technique not only supports the academic pursuit of knowledge but also aligns with the commitment to inclusivity and the honouring of diverse ways of knowing. Fostering this methodological exploration enables us to cultivate a richer, more empathetic understanding of our complex relationship with the world, paving the way for future research that is both holistically informed and culturally attuned.

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Aleksandra Dulic is an internationally recognized media artist and scholar working at the intersections of multimedia and live performance with research foci in computational poetics and cross-cultural media performance. Dr. Dulic is a founder and a Director of Centre for Culture and Technology and an Assistant Professor in Computational Art at the Creative Studies at UBC Okanagan. Recent works include *The Music of the Heaven* performance, *the Social Life of*

Water exhibition, and the Waterways Past, Present and Future exhibition. Her current focus is on WaterFutures, which is aimed at developing a place-based, experiential 3D game designed to engage players on water stewardship founded on the Syilx values and practices of water responsibility.