

# A Multisensorial Storytelling Design Strategy to Build Empathy and a Culture of Inclusion

Janice RIEGER<sup>a,1</sup> and Marianella CHAMORRO-KOC<sup>a</sup>

<sup>a</sup>*Queensland University of Technology, Australia*

**Abstract.** The Wondrous Goggles project is a multisensorial storytelling design strategy to explore the experiential world of people who are blind or have low vision, with the aim of raising awareness about inclusive places for work and play. The need for this exploratory storytelling design strategy is predominantly educational, as a tool to inform designers, policy makers, and technology developers of how people with blindness or low vision experience public spaces. The Wondrous Goggles are specifically designed to facilitate an understanding of the navigational and spatial perception of people with low vision. During use, the Wondrous Goggles enable the user to gain a sense of limited vision and provide a vehicle for the wearer to embark upon a process of feeling, sensing, and reflecting while listening to the narration of someone who has navigated the space with low vision. Unlike other technologies that create virtual reality, or an augmented reality based on vision alone, the Wondrous Goggles create a multisensorial storytelling experience through the lived experience of a person with low vision, to gain an understanding of people's lived experiences in navigating public spaces, in order to create cultures of inclusion.

**Keywords.** Design, multisensorial, storytelling, immersive, inclusion, empathy, public space, disability

## 1. Introduction

Our relationships to the world and each other have drastically changed over the last three years and the ever-fast pace of new technologies are shaping our everyday experiences, assisting or transforming our work and play activities to either enable or disable our interactions with the world. The *Wondrous Goggles* project focuses on pushing the boundaries of simulation through the exploratory design of a portable immersive technology to represent the experiential world of people who are blind or have low vision and to provide a multisensorial storytelling experience for users. The need for this exploratory design is predominantly educational, as a tool to inform designers, policy makers, and governments of how public spaces are experienced by someone with low vision, and to enable informed decision-making about modifications to the built environment and other activities to enhance design for all. More importantly, Wondrous

Goggles was developed as a strategic tool to empower people with disabilities to share their lived experience and personal stories about access and inclusion in work, play and their everyday lives. The research project focused on developing Wondrous Goggles as a research tool to engage stakeholders in a design-led process of creating a culture of inclusion. Creating a culture of inclusion is less about designing for empathy, charity, or diversity and more about “designing places that all people can use” [1]. As early as 1994,

---

<sup>1</sup> Corresponding Author, Janice Rieger, School of Architecture and Built Environment, Queensland University of Technology, 2 George Street, Brisbane, Australia, 4000; E-mail: j.rieger@qut.edu.au

Coleman argued that “fresh approaches...are needed to bridge the present gulf between mainstream design and design for the elderly, especially with regard to the scale of demographic change. The concept of Inclusive Design coupled with storytelling and scenario building techniques can turn what is often considered as a branch of design for disability into an exciting gateway to product innovation and a more user-friendly future for all” [2]. Storytelling has the ability to share the lived experiences of people with disabilities beyond codes, guidelines and checklists [3]. Multisensorial storytelling has the ability to take this even further by emphasising how people of all abilities experience environments through all their senses and not just vision alone [4-5]. By utilising people’s narratives of their lived experiences of public spaces, this design strategy offers a medium to explore beyond the often-tokenistic aspects of simulation exercises. As disability scholars and inclusive designers, we need to rethink what immersive simulation through multisensorial storytelling might offer to the field of inclusive design, its practitioners, and in turn people with disabilities.

Aiming to explore immersive storytelling for empathy, we developed Wondrous Goggles. It is a lightweight head-mounted device comprising of headphones, a goggle, and a three-functionality device: (i) audio stream prompting experiences narrated by someone who is blind or has vision loss, (ii) simulation of a visual impairment condition, and (ii) voice memo recording. During use, the Wondrous Goggles provide a tool for the user to gain a sense of limited vision and provides a vehicle for the wearer to embark upon a process of feeling, sensing, and reflecting while listening to the narration of someone who has navigated the space with low vision. The iterative process of feeling, sensing, and reflecting engages the wearer to create a new experience and is conducive to the building of empathy. Empathy in this context is the result of a process that is lived differently every time a person wears the device—a process that augments a person’s perception of diverse views.



**Figure 1.** Prototype of Wondrous Goggles.

Through listening to the pre-recorded narrative and journeying with the person with a disability as navigator, the wearer embarks on the navigation experience of someone

with a visual impairment who has navigated the same space (in this case an art museum). Unlike other technologies that create virtual reality, or an augmented reality based on vision simulation alone, Wondrous Goggles creates a multisensorial experience through and by the lived experience of a person with a visual impairment.

## 2. Literature Review

Research has evidenced how some use of simulation devices may not be effective because people would only be 'experiencing' the disability for a short amount of time—they do not replicate the life-long experience of someone with disabilities and their struggles, memories, and methods of adapting [6]. Therefore, simulation devices risk reinforcing stereotypes already ingrained in the users' minds. However, the studies conducted by Stanford show that the more immersive the experience is, the more likely it is for users to take action to support individuals whose real-life experiences were being simulated [6]. The Stanford research undertook comprehensive studies through two experiments using simulation technologies like Virtual Reality (VR) and its ability to impact upon the levels of people's empathy in contrast to traditional text-based media and 2-dimensional graphic media. The findings from this research found that VR and other IVE's (immersive virtual environments) had a significant improvement on traditional media in generating higher levels of empathy through a more immersive perspective taking experience, while less immersive experiences instead reinforce stereotypes. Many studies view immersive technologies as the "ultimate empathy machine" that can assist people in relating to each other better than novels, TV shows, or films can [7]. Stanford's Jamil Zaki argues that "empathy isn't just a trait. It's something you can work on and turn up or turn down in different situations." [7] Studies and projects on building empathy to increase people's understanding of one another to primarily motivate positive behaviours, such as donating or volunteering, are problematic, as they align with the charity model of disability. Our research intentionally pushes against this staid model of disability, towards an embodied empathy through multisensorial storytelling, and a criticality of that embodiment. "Real human empathy relies on the transmission of perception of a range of subtle visual and audible cues that work with varying degrees of conscious awareness on the part of either transmitter or observer" [8]. Rouse critiques the instrumentalization of empathy and argues that seeking quick, easy, and painless methods using technology to unlearn prejudice fall short of actual change [9]. Our work is also critical of this and highlights that marginalised or misrepresented communities should be included in the design and development of tools or interventions; and that the tools are not the ultimate solution but should be seen as a way for enabling and facilitating conversations and a sharing of stories and experiences.

## 3. Research Design

Drawing upon critical access theories and research through design, this study sought to create a way for people with disabilities to share their first-hand lived experience of a space with multiple stakeholders. This was created through the designing of the Wondrous Goggles as a multisensorial storytelling tool. The Wondrous Goggles are specifically designed to enable an understanding of the navigational and spatial perception of people with low vision. The Wondrous Goggles are a lightweight head-

mounted device comprised of headphones, a visor, and a three-functionality device: audio stream prompting experiences narrated by someone who is blind or has vision loss; simulation of a low vision condition; and voice memo recording. The Wondrous Goggles' visor simulates a low vision condition, while the headphones deliver an audio narrative of navigating a particular place from the perspective of a person with low vision. The memo recording functionality allows the user to record ideas and reflections while navigating the space with the goggles [10]. The goal of this research was to develop Wondrous Goggles as a research tool to engage stakeholders in the creation of a culture of inclusion. The participants for this study were diverse stakeholders (designers, educators and curators) and they were asked to participate in a navigational task (in an indoor environment wearing the simulation goggle), an interview and a focus group. The goggle included a visor that simulated a visual impairment, like diabetic retinopathy and retinitis pigmentosa. The goggle also included an audio recording of the lived experience of someone with low vision navigating the environment, that was played back to the participant as they navigated the same environment. Data collection included:

- Audio recordings from Interviews
- Audio recordings from Focus Groups
- Transcriptions from Interviews
- Audio recorded memos from the Navigational Task
- Observations/Field Notes from the researchers
- Audio recordings from walk-throughs with low vision experts

As part of the design and research, we engaged low vision experts who recorded their firsthand experience of visiting a public space. The audio recording was completely unscripted. This site-specific recording then became the narrative for the Wondrous Goggles and acts as a guidance for participants, as they move through the same space being guided by someone who has low vision. The recordings and navigational exercises are around 8-10 mins in length. Our project partner was QUT Art Museum in Brisbane, Australia, providing the public space for our navigation exploration with the Goggles and lending the expertise of their curators and educators as stakeholders in the research.



**Figure 2.** Participant testing out the narratives developed with people with disabilities at the QUT Art Museum.

Participants were recruited from the QUT Art Museum staff and their participation involved undertaking a navigational task and audio recorded interview; altogether task and interview took approximately 45 – 60 minutes. During the navigational task in an indoor public space (QUT Art Museum) the participants were asked to wear a simulation goggle (see Figure 2). The goggle had a visor which simulates a particular visual impairment like diabetic retinopathy. The goggle also has a headset that included audio. This audio played while the participants were navigating the environment with the researchers. The audio is a narration of the lived experience of a person with that particular visual impairment describing what they see in the same environment that you are navigating. So, for instance, the visor can be switched out to align with the narrator's specific vision impairment like retinitis pigmentosa. The user is also prompted with questions or messages from the narrator with a disability about how a person with visual impairments would sense the environment they are navigating. This experience went beyond vision and was multisensorial, for instance the museum had recently been painted and so our blind expert commented on their audio recording that they could smell fresh paint down one of the corridors and therefore could use smell as a navigational aid. This in turn heightened the users' senses and understanding of other senses like smell as a useful navigational aid. The Wondrous Goggles are also designed to have a memoing recorder in them so that while the users are navigating the space with the narration, they can record their immediate thoughts, design insights, fears, emotions, or other reflections. While wearing the device, users were encouraged to talk about their thoughts and experiences into the microphone. The audio memo was saved in the device so that it would be available for playback and analysis later.

After the navigational task, we conducted short interviews with the participants, where we played back their recorded memos, so that the researchers could ask the reasons behind their responses and gain an understanding of the user's experiences. Finally, there was a follow up audio-recorded Focus Group of about 20 mins, approximately 2 weeks after the interview with the participants who also completed these tasks in the same environment to understand their experience weeks after the original tasks, in order to give time for empathy building and reflection on the experience. This research provided insight on how multisensorial storytelling tools might help stakeholders experience a space from another person's abilities and perspective. The literature review suggests that experiencing a space through someone else's point of view and narratives might aid stakeholders in building empathy, in being reflective of their own embodiment, and in making changes in their environments, programs, and services from reflecting on their use of the Wondrous Goggles.

#### **4. Findings & Discussion**

During use, the Wondrous Goggles provide a tool for the user to gain a sense of limited vision and provides a vehicle for the wearer to embark upon a process of sensing environments differently and reflecting while listening to the narration of someone who has navigated the space with low vision. From this pilot study with the QUT Art Museum, the stakeholders who had worked in this environment for years reported that through the walkthrough with the Goggles many obstacles existed that they had never realised or seen before. These obstacles and other issues were pointed out through the unscripted audio narratives of the people with low vision that co-created the goggles. Additionally, this study led the QUT Art Museum to act upon this new understanding of their

environment and its barriers and obstacles, to add new inclusive design features and services like tactile indicators to denote a downward path of travel, audio descriptions for their visual works, tactile models, sensory maps, and multisensorial touch tours to be inclusive of all visitors.

Our aim with this research was to explore how to create inclusion by providing a multisensorial storytelling tool for stakeholders to assess their public environments from a new and diverse perspective through the lived experience of a person with low vision. This is to encourage design for all, and why we chose to conduct this pilot study in an art museum, because galleries and museums are often exclusionary public spaces, not only in terms of their exhibitions and environments, but also through their public programming and activities. This project highlighted the value of co-created immersive tools designed with people with disabilities to support social participation and equal access. The project's outcomes are applicable to:

1. Development of Post Occupancy Evaluation (POE) strategies to be inclusive of people with disabilities
2. Informing Accessibility Policy, Services, and Regulations
3. Widening participation
4. Creating inclusive employment opportunities for people with disabilities (either as staff or as access consultants)
5. Delivery of education and training for empathy building and design for all for most sectors and practitioners.

The use of storytelling through technology as a tool for stakeholders to understand how provisions and accessibility regulations apply (at minimum or not at all) in public environments (such as workplaces or an art museum in this case), is an area that has not been addressed for the purpose of stakeholders conducting accessibility evaluations of public spaces. Auditors of access still primarily rely on tick and flick checklists, and these are most often devoid of input from and of the lived experience of people with disabilities [3].

This study will serve to advance knowledge in the field of co-creating multisensorial storytelling tools for creating inclusive cultures, an area which currently has minimal academic research undertaken. Extant literature in the topic of creating inclusion comes from management theory and business practice [11] discussing definitions and processes in the workplace, or it comes from human resources and policy [12, 13] that touches on redefinition of accessible work environments and organizational culture around equity, diversity and bias. These approaches to creating cultures of inclusion do not include the lived experience of people with disabilities, nor have they employed multisensorial storytelling as a method for empathy building. In Braunsteiner and Mariano-Lapidus [14] perspectives of inclusion and challenges for the future, they call for a cultural shift in how we conceptualise inclusion, shifting from a deficit view to a success view based on diversity. Our research project on Wondrous Goggles is very much aligned with this perspective, utilizing technology and a multisensorial approach to emphasise abilities and not limitations, and in this way to create new experiences that would further stakeholders' capability to understand the spaces they design, curate and manage from a different perspective.

This research also served to expand upon our research conducted in 2018 with the Queensland State Government (Australia) with a large workforce of 250,000 employees [15]. From data collected through document and policy analysis, surveys, and workshops with Queensland Government stakeholders, one of the key outcomes from this research was to use storytelling rather than disability disclosure on employee surveys. This

understanding of first-person storytelling by people with disabilities, and its ability to empower people with disabilities but also create empathy, reinforced our need to incorporate first-person narratives and storytelling in our immersive technology. This research also reinforces the need to move beyond tick-and-flick processes, codes, and other checklists. People with disabilities felt more comfortable sharing their story rather than choosing to identify their disability from a list on surveys. Participants responded that they would not feel comfortable choosing from a list to identify if they have an impairment or disability, but would rather share and create their own narrative as self-identification [15].

Aligning with the socio-cultural model of disability, and using person-centered narrative techniques, our research highlights how multisensorial storytelling could be integrated into research design with people with disability. By asking thoughtful questions about people with disabilities' daily lived experience, these questions could also be used as prompts for the audio narratives in the Wondrous Goggles. Questions like: *Did you experience any barriers getting here today? Please share what these were.* This allows for the person with a disability to choose what they want to share about the personal issues and barriers that they experience, rather than ticking a box labelled *I have a physical disability*. This storytelling process also pushes against someone (often an architect, interior designer, facility manager or access consultant) using an access checklist and ticking a box that there is an 'accessible' toilet. Ticking boxes and filling out checklists do not empower people with disabilities, create empathy, include multisensorial and embodied knowledge or highlight the nuances of people's lived experiences. Storytelling techniques like these we have presented through our research projects will allow for disabilities and barriers to be revealed and for empathy-building through multisensorial and embodied experiences. By developing tools, strategies, and technologies to create a culture of inclusion across all sectors, it is expected that stakeholders, managers, and all users will embrace best practice models of storytelling, minimise stigma associated with self-disclosure of a disability, be able to reduce the increasing percentage drop of people with disabilities from workforces globally, and address the lack of access to cultural activities and full participation of people with disabilities.

## 5. Conclusion

Most of the public spaces and public indoor environments that we encounter on a daily basis have barriers for inclusion, whether they are physical barriers or socio-cultural barriers [1,3,4]. Through designing a tool to enable multisensorial storytelling experiences to help build empathy about the navigation challenges of people with disabilities, we can begin to understand the perceptions and experiences of diverse users and try to eliminate these barriers in order to create inclusive environments. Unlike other technologies that create virtual reality, or an augmented reality simulation based on vision alone, the Wondrous Goggles offer a multisensorial experience through the lived experience of a person with low vision and their first-person narrative. By also including the user's ability to record their own reflections at the point of experience, this approach pushes against taken-for-granted simulation exercises with imagined users and opens up opportunities for new co-designed empathic experiences to create cultures of inclusion for all. Future research will focus on expanding tools and strategies to help stakeholders

support the building of cultures of inclusion, in the workplace and in public spaces, to enable everyone's full access and participation in society.

## Acknowledgments

Funded by QUT Design Lab, this research/design was conducted in a collaboration involving QUT Art Museum, participants who are blind, QUT Faculty of Health, and the QUT Faculty of Creative Industries. We would like to acknowledge the design students who worked on this project, Corey Tinney, Nicholas Sabulis, and Katyusha Methanisa, and the support of the QUT *Vacation Research Experience Scheme* (VRES). We would also like to acknowledge the contributions of Salvatore Fazio and Alexander Black.

## References

- [1] CABE. The principles of inclusive design: they include you. Commission for Architecture and the Built Environment 2006: 20.
- [2] Coleman R. The Case for Inclusive Design, Toronto, Canada: DesignAge, Royal College of Art, London, UK; 1994.
- [3] Rieger J, Strickfaden M. Taken for granted: Material relations between disability and codes/guidelines. *Societies*, 6 (1), 2016.
- [4] Rieger J. Doing dis/ordered mapping/s: Embodying disability in the museum environment, University of Alberta. 2016. <https://era.library.ualberta.ca/items/72964556-d167-4126-8373-fla97931185b>
- [5] Rieger J, Herssens J, Strickfaden M. Spatialising differently through ability and techné. *CoDesign*, 2018;1-17. Link: <https://eprints.qut.edu.au/122315/>
- [6] Herrera F, Bailenson J, Weisz E, Ogle E, Zaki J. Building long-term empathy: A large-scale comparison of traditional and virtual reality perspective-taking. *PLoS ONE*, 2018; 13(10): e0204494. <https://doi.org/10.1371/journal.pone.0204494>
- [7] Shashkevich A. 2018; <https://news.stanford.edu/2018/10/17/virtual-reality-can-help-make-people->
- [8] Nishida T. Toward mutual dependency between empathy and technology. *AI & society*, 2013; 28(3), 277-287.
- [9] Rouse R. Against the Instrumentalization of Empathy: Immersive Technologies and Social Change. *Augmented & Mixed Reality for Communities*, 2021;3-19. <https://doi.org/10.1201/9781003052838-2>
- [10] Chamorro-Koc M, Rieger J, Black A. *Wondrous Goggles: An empathy experience device*. p.24-43 from Rieger J, Van Ooyen V, Dionysius K, Rafferty L. (2019) Vis-ability: Artwork from the QUT Art Collection. Link: <https://eprints.qut.edu.au/132875/>
- [11] Pless N, Maak T. Building an inclusive diversity culture: Principles, processes and practice. *Journal of business ethics*, 2004; 54(2), 129-147.
- [12] Byrd MY. Creating a culture of inclusion and belongingness in remote work environments that sustains meaningful work. *Human Resource Development International*, 2022; 25(2), 145-162.
- [13] Booyesen LA, Gill P. Creating a Culture of Inclusion Through Diversity and Equity. In *Management & Leadership Skills for Medical Faculty and Healthcare Executives*; 2020 (pp. 135-144). Springer, Cham.
- [14] Braunsteiner ML, Mariano-Lapidus S. A perspective of inclusion: Challenges for the future. *Global Education Review*, 2014;1(1).
- [15] Rieger J, Chamorro-Koc M, Beatson AT, Sartori Do Amaral C. Creating a Culture of Inclusion in the Public Service Sector: Research Report. 2018; QUT Design Lab, Australia.